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Authorised and notified according to Article 29 of the Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011

European Technical Assessment ETA-15/0761 of 2026/01/07

General Part

Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011: ETA-Danmark A/S

Trade name of the construction product:	E.u.r.o.Tec Magnus connectors, Timberframe PRV connectors, and Connecto connectors
Product family to which the above construction product belongs:	Three-dimensional nailing plate (face-fixed beam hangers to be used in timber to timber connections)
Manufacturer:	E.u.r.o.Tec GmbH Unter dem Hofe 5 D-58099 Hagen Tel. +49 2331 / 6245 - 0 Fax +49 2331 / 6245 - 200 Internet www.eurotec.team
Manufacturing plant:	HSW 19, HSW 20, HSW 21
This European Technical Assessment contains:	53 pages including 2 annexes which form an integral part of the document
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of:	EAD 130186-00-0603 for Three dimensional nailing plates
This version replaces:	The ETA with the same number issued on 2020-03-05

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II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product

E.u.r.o.Tec connectors are two-piece, face-fixed beam hangers to be used in timber-to-timber connections. They are connected to construction members made of timber or wood-based products with screws according to EN 14592 or ETA-11/0024.

The Magnus connectors are made of aluminium grade EN-AW 5083 H111 or EN-AW 5083 cast plate according to EN 573-3 and EN 755-2. The Connecto connectors are made of aluminium grade EN-AW 6063 according to EN 573-3 and EN 755-2. Dimensions, hole positions and typical installations are shown in Annex A.

2 Specification of the intended use(s) in accordance with the applicable European Assessment Document (hereinafter EAD)

The E.u.r.o.Tec Magnus connectors are intended for use in load-bearing timber structures as connectors between wood-based joists and solid timber or wood-based headers. The connectors enable the transfer of forces between the connected members. The performance of the connectors meets the requirements for mechanical resistance, stability, and safety in use in accordance with Basic Work Requirement 1 of Regulation (EU) No. 305/2011.

The E.u.r.o.Tec Magnus connectors can be installed as connections between wood-based members such as:

- Structural solid timber according to EN 14081,
- Glue-laminated and glued solid timber according to EN 14080,
- LVL according to EN 14374,
- Cross-laminated timber to manufacturer ETA.

However, the calculation methods are only allowed for a characteristic wood density of up to 460 kg/m^3. Even though a wood-based material may have a larger density, this must not be used in the formulas for the load-carrying capacities of the fasteners.

The E.u.r.o.Tec Timberframe PRV connectors are intended for use in making end-grain to side-grain connections in load bearing timber structures, as a connection between a wood based joist and a wood based header, where requirements for mechanical resistance and stability and safety in use in the sense of the Basic Works Requirements 1 and 4 of Regulation (EU) 305/2011 shall be fulfilled.

The E.u.r.o.Tec Timberframe PRV connector can be installed between wood-based members such as:

- Structural solid timber according to EN 14081,
- Glulam or glued solid timber according to EN 14080,
- LVL according to EN 14374 or European Technical Assessment.

However, the calculation methods are only allowed for a characteristic wood density of up to 550 kg/m^3. Even though the wood-based material may have a larger density, this must not be used in the formulas for the load-carrying capacities of the fasteners.

The E.u.r.o.Tec Connecto connectors are designed for structural applications in load-bearing timber assemblies, providing connections between wood-based joists and solid timber or wood-based headers. They facilitate the transfer of forces between the connected members, and their performance satisfies the criteria for mechanical resistance, structural stability, and safety in use as defined in Basic Work Requirements 1 and 4 of Regulation (EU) No. 305/2011.

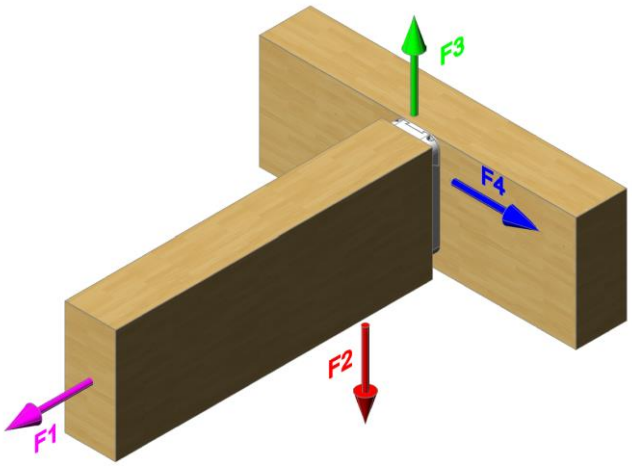
The E.u.r.o.Tec Connecto connectors can be installed as connections between wood-based members such as:

- Structural solid timber according to EN 14081,
- Glue-laminated and glued solid timber according to EN 14080,
- LVL according to EN 14374,
- Cross-laminated timber to manufacturer ETA.

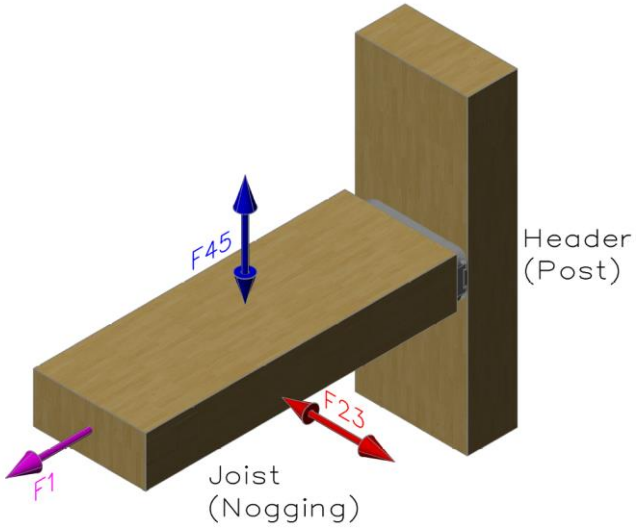
However, the calculation methods are only allowed for a characteristic wood density of up to 460 kg/m^3. Even though a wood-based material may have a larger density, this must not be used in the formulas for the load-carrying capacities of the fasteners.

Annex B states the formulas for the characteristic load-carrying capacities of the connections with E.u.r.o.Tec s connectors. The design of the connections shall be in accordance with Eurocode 5 or an associated national Timber Code.

It is assumed that the forces acting on the connection are the following F_1, F_2, F_3 and F_{45}. The force F_1 acts perpendicular to the connector plate with an eccentricity e_1 with regard to the centre of gravity of the screws in the joist connector part, F_2 and F_3 shall act in the middle of the connector in or against the direction of insertion. The force F_{45} acts with an eccentricity e_{45} with regard to the centre of gravity of the screws in the joist connector part. It is assumed that the forces are acting right at the end of the joist.



Force directions for Magnus and Connecto connectors



Force directions for Timberframe PRV connector

It is assumed that the header beam is laterally restrained. If the header beam only has a E.u.r.o.Tec connector on one side the eccentricity moment $M_v = F_d \cdot (B_H / 2)$ shall be considered. The same applies when the header has E.u.r.o.Tec connectors on both sides, but with vertical forces which differ more than 20%.

The E.u.r.o.Tec connectors are intended to be used for connections subject to static or quasi static loading.

The E.u.r.o.Tec connectors are for use in timber structures subject to the dry, internal conditions defined by the service classes 1, 2 and 3 based on material and coating defined in EN 1995-1-1 (Eurocode 5).

The scope of the connectors regarding resistance to corrosion shall be defined according to national provisions that apply at the installation site considering environmental conditions and in conjunction with the admissible service conditions according to EN 1995-1-1 and the admissible corrosivity category as described and defined in EN ISO 12944-2

Assumed working life

The assumed intended working life of the connectors for the intended use is 50 years, provided that they are subject to appropriate use and maintenance as described by the manufacturer.

The information on the working life does not constitute a guarantee by the manufacturer or by ETA Danmark A/S. The expression “assumed intended working life” signifies that the product is expected to meet the essential requirements for at least the stated period. Under normal conditions of use, the actual service life may extend considerably beyond this duration without significant loss of performance.

3 Performance of the product and references to the methods used for its assessment

Characteristic		Assessment of characteristic
3.1	**Mechanical resistance and stability*) (BWR1)**	
	Joint Strength - Characteristic load-carrying capacity	See Annex B
	Joint Stiffness	See Annex B
	Joint ductility	No performance assessed
	Resistance to seismic actions	No performance assessed
	Resistance to corrosion and deterioration	See section 3.6
3.2	**Safety in case of fire (BWR2)**	
	Reaction to fire	The connectors are made from aluminum classified as Euroclass A1 in accordance with Commission Delegated Regulation 2016/364 and EN 13501-1 and EC decision 96/603/EC, amended by EC Decision 2000/605/EC
	Resistance to fire	No performance assessed
3.3	**General aspects related to the performance of the product**	The connectors have been assessed as having satisfactory durability and serviceability when used in timber structures using the timber species described in Eurocode 5 and subject to the conditions defined by service class 1, 2 and 3

*) See additional information in section 3.4 – 3.7.

3.4 Methods of verification

Safety principles and partial factors

The characteristic load-carrying capacities are based on the characteristic values of the connections with metal fasteners, the steel plates and the timber members.

In the case of timber failure or failure of the metal fasteners, the design values shall be calculated according to EN 1995-1-1 by dividing the characteristic values of the load-carrying capacities by different partial factors for the strength properties, and in addition multiplied with the coefficient k_{mod}.

Thus, the characteristic values of the load–carrying capacity are determined also for timber failure $F_{Rk,H}$ (obtaining the embedment strength of screws subjected to shear or the withdrawal capacity of the screws, respectively) as well as for screw tensile failure $F_{Rk,S}$. The design value of the load–carrying capacity is the smaller value of the two load–carrying capacities.

In the case of aluminium failure, the design value shall be calculated according to EN 1993-1-1 by reducing the characteristic values of the load-carrying capacity with different partial factors.

The design value of the load-carrying capacity is the smaller value of all load-carrying capacities:

$$F_{Rd} = \min\left\{\frac{k_{mod} \cdot F_{Rk,T}}{\gamma_{M,T}}; \frac{F_{Rk,S}}{\gamma_{Mi,S}}\right\}$$

Therefore, for timber failure or failure of the metal fasteners the load duration period and the service class are included. The different partial factors γ_M for steel or timber failure, respectively, are also correctly taken into account.

3.5 Mechanical resistance and stability

See Annex B for characteristic load-carrying capacities of the E.u.r.o.Tec Magnus connectors and see Annex D for characteristic load-carrying capacities of the E.u.r.o.Tec Connecto connectors.

The characteristic capacities of the E.u.r.o.Tec connectors are determined by calculation assisted by tests as described in EAD 130186-00-0603. They should be used for designs in accordance with Eurocode 5 or a similar national Timber Code.

The design models allow the use of fasteners described in the table on page 41 in Annex A:

Screws in accordance with ETA-11/0024 based on the relevant approval conditions

In the formulas in Annex B and Annex D the capacities for screws are calculated from the formulas of Eurocode 5 are used assuming a thick steel plate without the rope effect when calculating the lateral fastener load-carrying-capacity, F_{Rk}.

No performance has been assessed in relation to ductility of a joint under cyclic testing. The contribution to the performance of structures in seismic zones, therefore, has not been assessed.

See Annex B and Annex D and for the joint's stiffness properties - to be used for the analysis of the ultimate or serviceability limit state.

3.6 Aspects related to the performance of the product

In accordance with EAD 130186-00-0603the aluminium E.u.r.o.Tec connectors are produced from aluminium alloy EN AW-5083 H111 or EN-AW 5083 cast plate and according to EN 573-3 and EN 755-2. Similarly, the E.u.r.o.Tec Connecto connectors are made of aluminum grade EN-AW 6063 according to EN 573-3 and EN 755-2.

3.7 General aspects related to the use of the product

E.u.r.o.Tec connectors are manufactured in accordance with the provisions of this European Technical Assessment using the manufacturing processes as identified in the inspection of the plant by the notified inspection body and laid down in the technical documentation.

The following provisions concerning product performance apply:

E.u.r.o.Tec Magnus and Connecto connectors

A E.u.r.o.Tec connector joint is assessed for its intended use provided:

Header – support conditions

- The header beam shall be restrained against rotation and be free from wane under the E.u.r.o.Tec connector.

  If the header carries joists only on one side the eccentricity moment from the joists $M_{ec} = R_{joist}$ (b_{header}/2) shall be considered for E.u.r.o.Tec Magnus and Connecto connectors at the strength verification of the header.

  R_{joist} Reaction force from the joists
  b_{header} Width of header

- For a header with joists from both sides but with different reaction forces a similar consideration applies.

- E.u.r.o.Tec Magnus and Connecto connectors are fastened to wood-based joists or headers by screws.
- There shall be screws in all holes.
- The characteristic capacity of the E.u.r.o.Tec connector joint is calculated according to the manufacturer's technical documentation dated 2015-06-29.
- The E.u.r.o.Tec connector joint is designed in accordance with Eurocode 5 or an appropriate national code.
- The gap between the end of the joist and the surface, where contact stresses can occur during loading shall be limited. This means that for E.u.r.o.Tec Magnus and Connecto connectors the gap between the surface of the connector plates and the timber surface shall be maximum 1 mm.
- The end grain of the joist and the surface of the header shall have a plane surface against the whole E.u.r.o.Tec connector.
- The depth of the joist shall be so large that the bottom of the joist is at least 10 mm below the lower screw tip in the joist.
- Only relevant E.u.r.o.Tec screws in accordance with ETA-11/0024 shall be used and shall have a diameter and head shape which fits the holes of the E.u.r.o.Tec Magnus and Connecto connectors.

E.u.r.o.Tec Timberframe PRV connector joints

A E.u.r.o.Tec connector joint is assessed for its intended use provided:

Header – support conditions

- Connectors are fastened to wood-based members by screws.
- There shall be screws in all marked holes as prescribed in Annex A.
- The characteristic capacity of the connector joint is calculated according to the manufacturer's technical documentation, dated 2019-01-09.
- The connector joint is designed in accordance with Eurocode 5 or an appropriate national code.
- There is no gap between the end of the joist and the connector part or between the header surface and the connector part.
- For E.u.r.o.Tec connectors the width of the joist and header shall be at least 60 mm.
- The cross section of the joist at the connector joint shall have sharp edges e, i.e. it shall be without wane.
- The cross section of the header shall have a plane surface against the whole connector part.
- The depth of the joist or header shall be sufficient that the minimum fastener end and edge distances are observed.
- Screws shall have a diameter of Ø4 mm or Ø5 mm and a head shape, which fits the holes of the connector plates.

4 Assessment and verification of constancy of performance (hereinafter AVCP) system applied, with reference to its legal base.

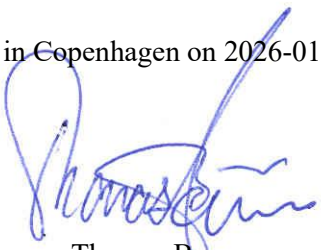
4.1 AVCP system

According to the decision 97/638/EC of the European Commission1, as amended, the system(s) of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) is 2+.

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

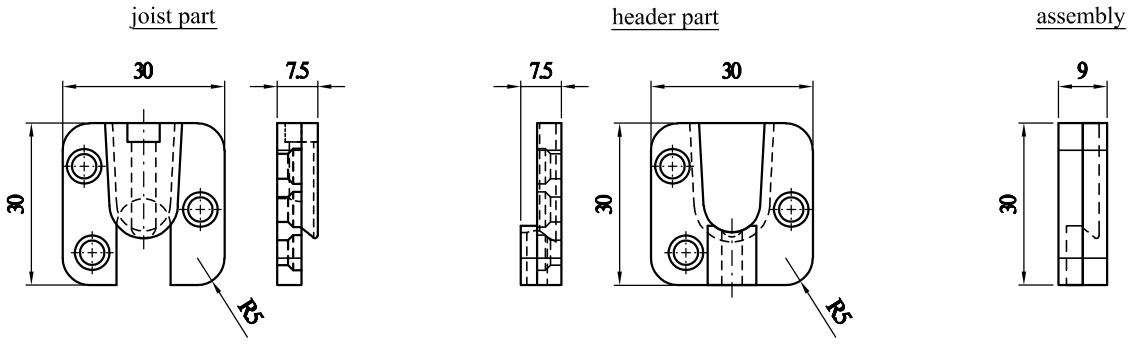
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at ETA-Danmark prior to CE marking.

Issued in Copenhagen on 2026-01-07 by

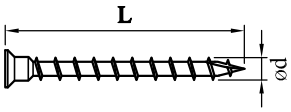


Thomas Bruun
Managing Director, ETA-Danmark

Annex A
Product details and definitions
Magnus XS 30x30
All specifications in mm

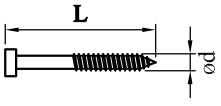


Fastener types and sizes



Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

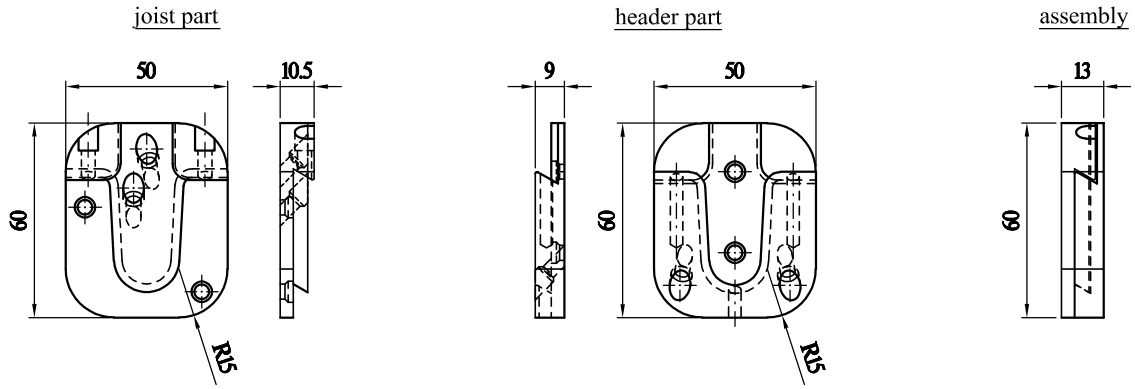
d	L	total number per connector
4,0	30	6



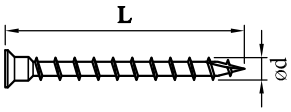
Self-tapping screw according to this ETA
for connecting the two connector parts

d	L	total number per connector
4,2	26	1

Magnus S 50x60
All specifications in mm

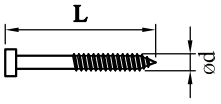


Fastener types and sizes



Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

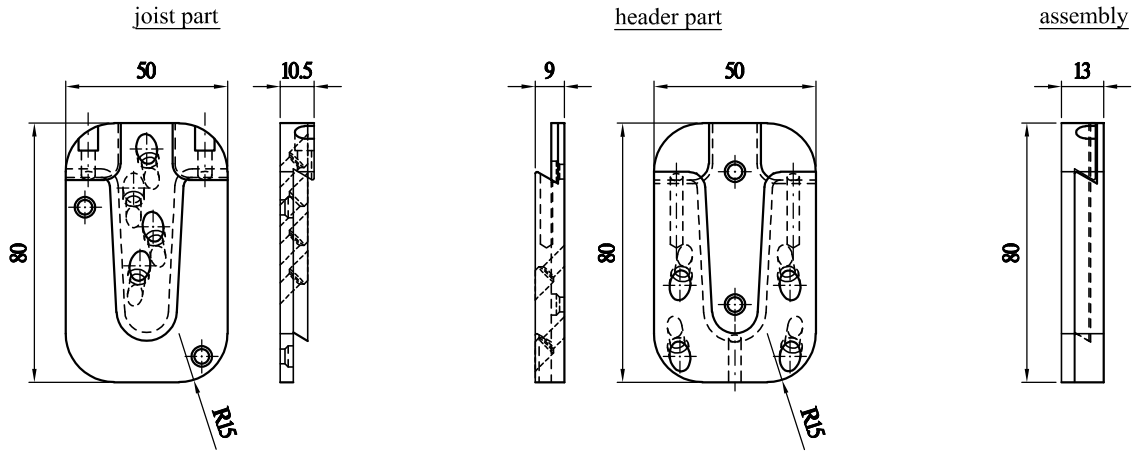
d	L	total number per connector
4,0	60	8



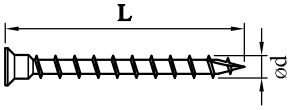
Self-tapping screw according to this ETA
for connecting the two connector parts

d	L	total number per connector
4,2	26	2

Magnus S 50x80
All specifications in mm

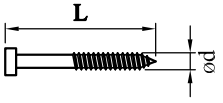


Fastener types and sizes



Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

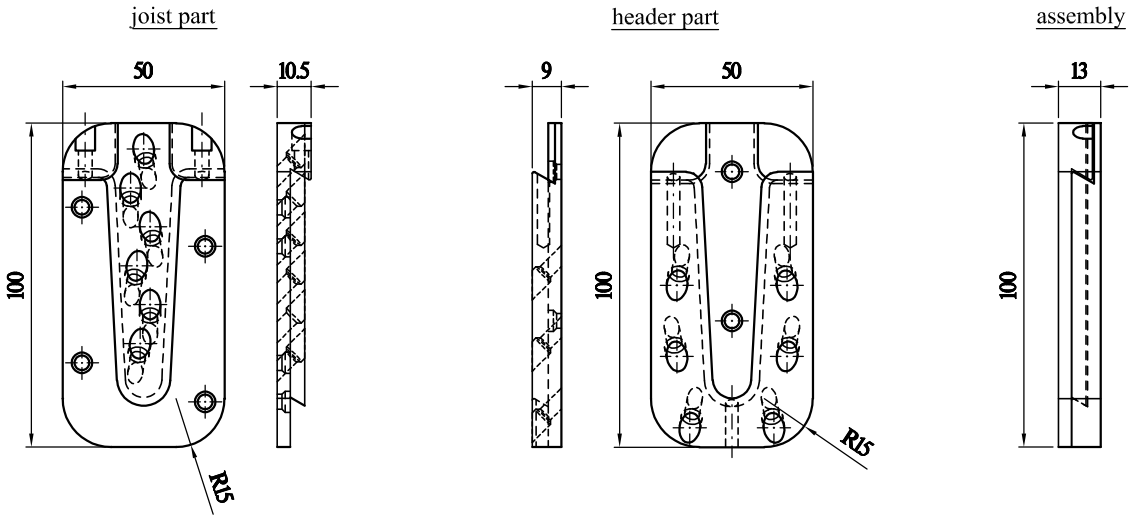
d	L	total number per connector
4,0	60	12



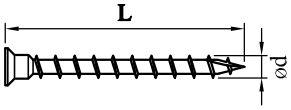
Self-tapping screw according to this ETA
for connecting the two connector parts

d	L	total number per connector
4,2	26	2

Magnus S 50x100
All specifications in mm

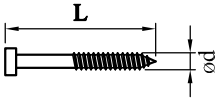


Fastener types and sizes



Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

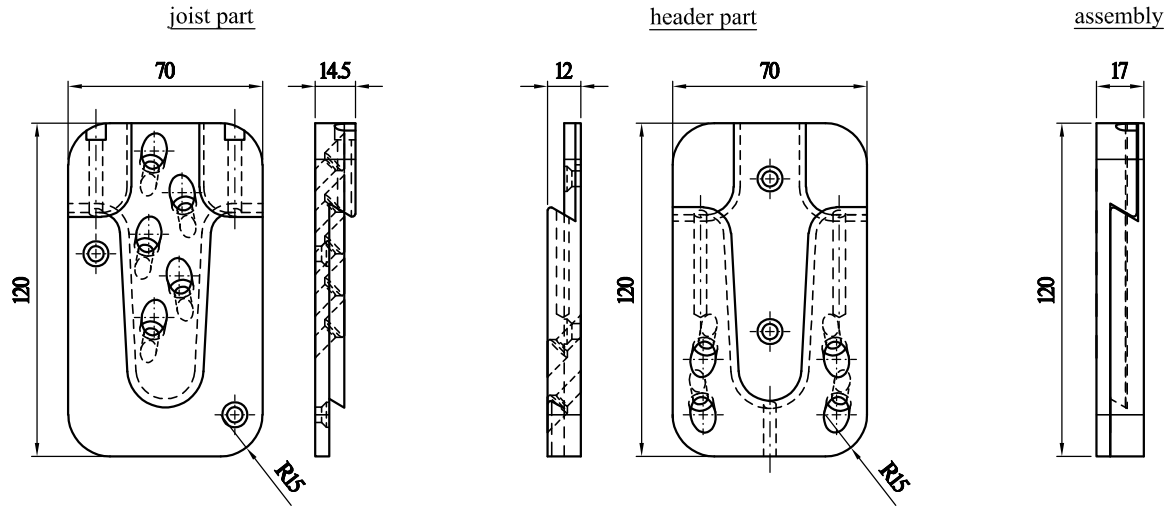
d	L	total number per connector
4,0	60	18



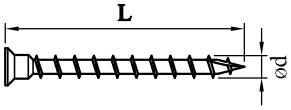
Self-tapping screw according to this ETA
for connecting the two connector parts

d	L	total number per connector
4,2	26	2

Magnus M 70x120
All specifications in mm

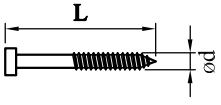


Fastener types and sizes



Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

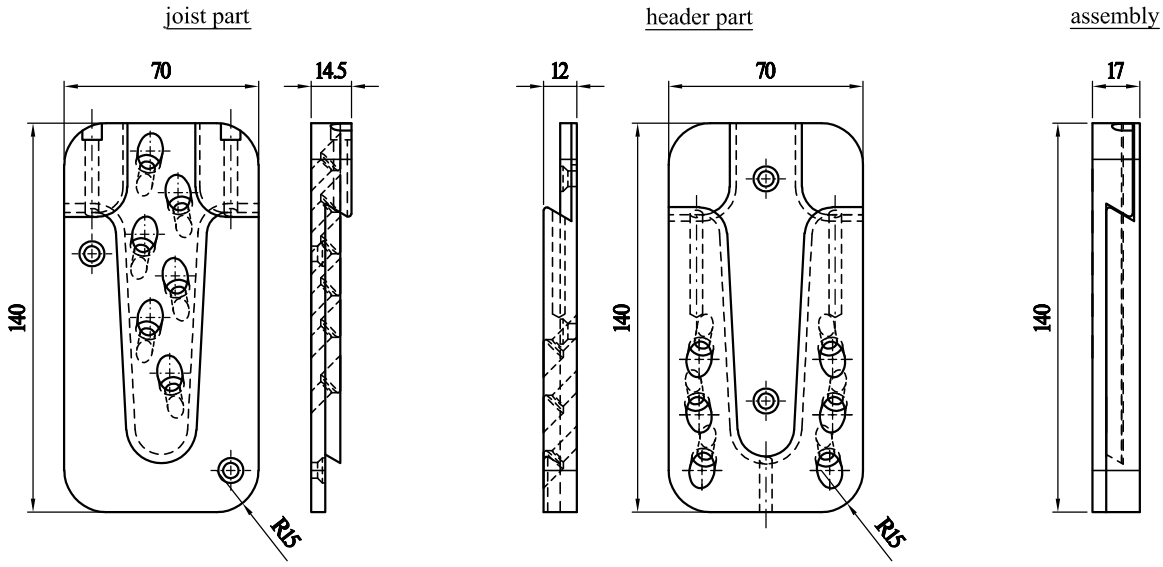
d	L	total number per connector
5,0	80	13



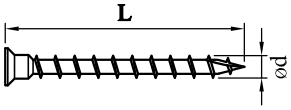
Self-tapping screw according to this ETA
for connecting the two connector parts

d	L	total number per connector
4,8	60	2

Magnus M 70x140
All specifications in mm

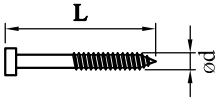


Fastener types and sizes



Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

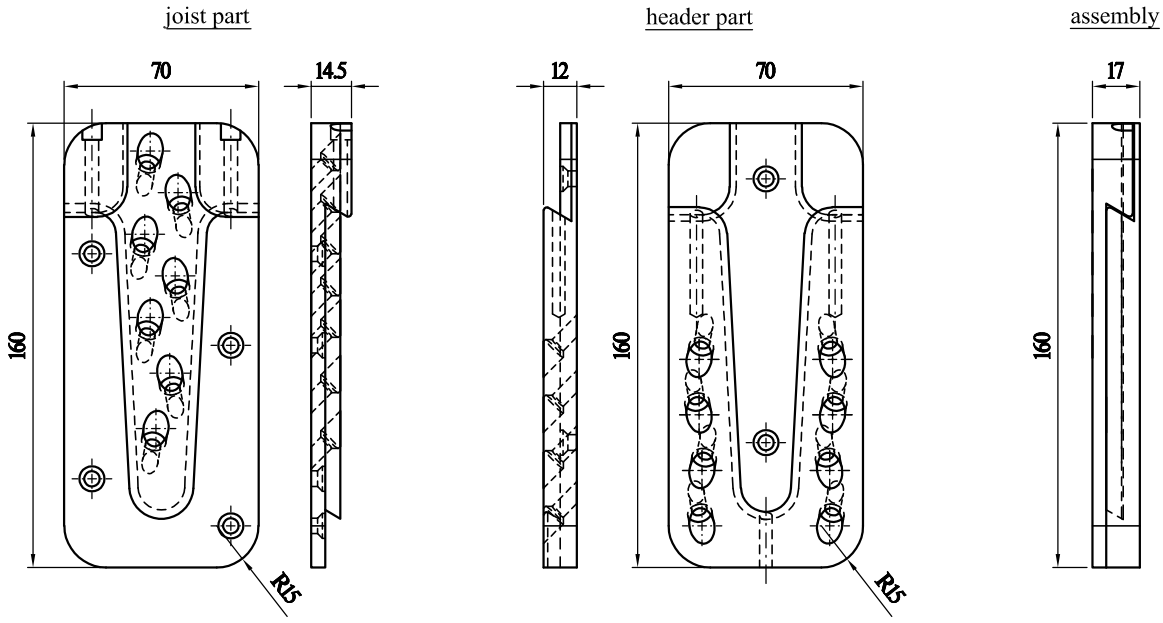
d	L	total number per connector
5,0	80	16



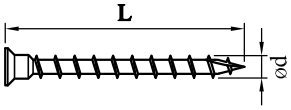
Self-tapping screw according to this ETA
for connecting the two connector parts

d	L	total number per connector
4,8	60	2

Magnus M 70x160
All specifications in mm

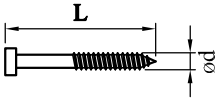


Fastener types and sizes



Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

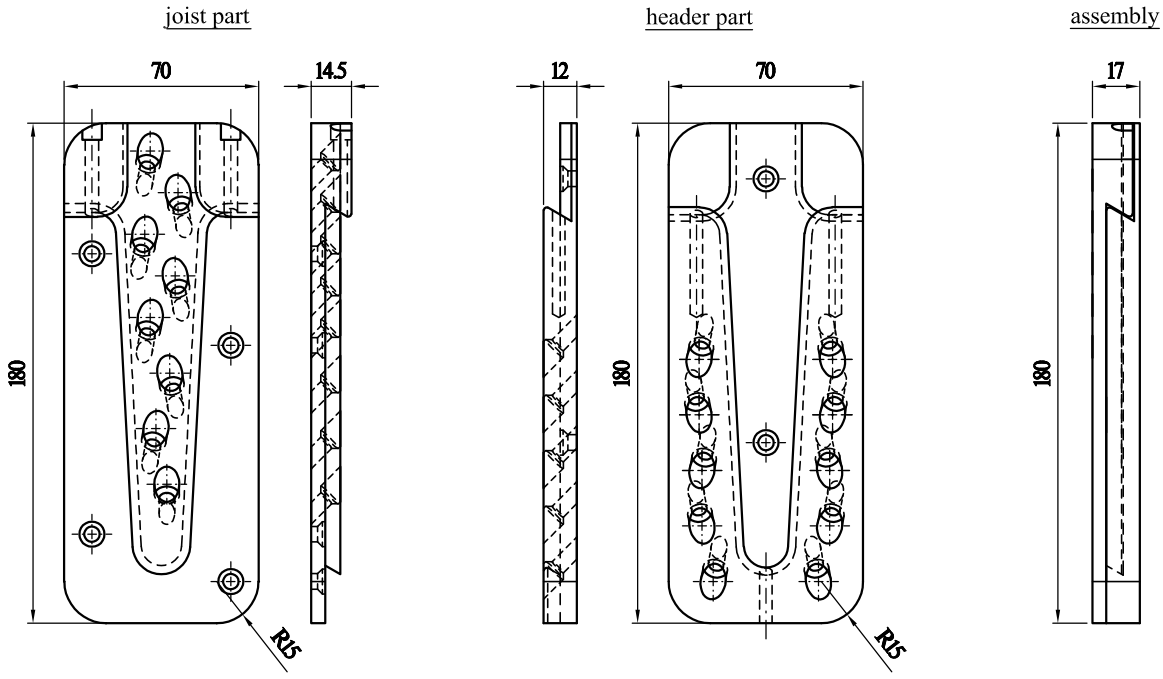
d	L	total number per connector
5,0	80	21



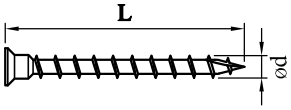
Self-tapping screw according to this ETA
for connecting the two connector parts

d	L	total number per connector
4,8	60	2

Magnus M 70x180
All specifications in mm

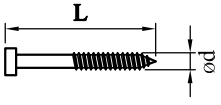


Fastener types and sizes



Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

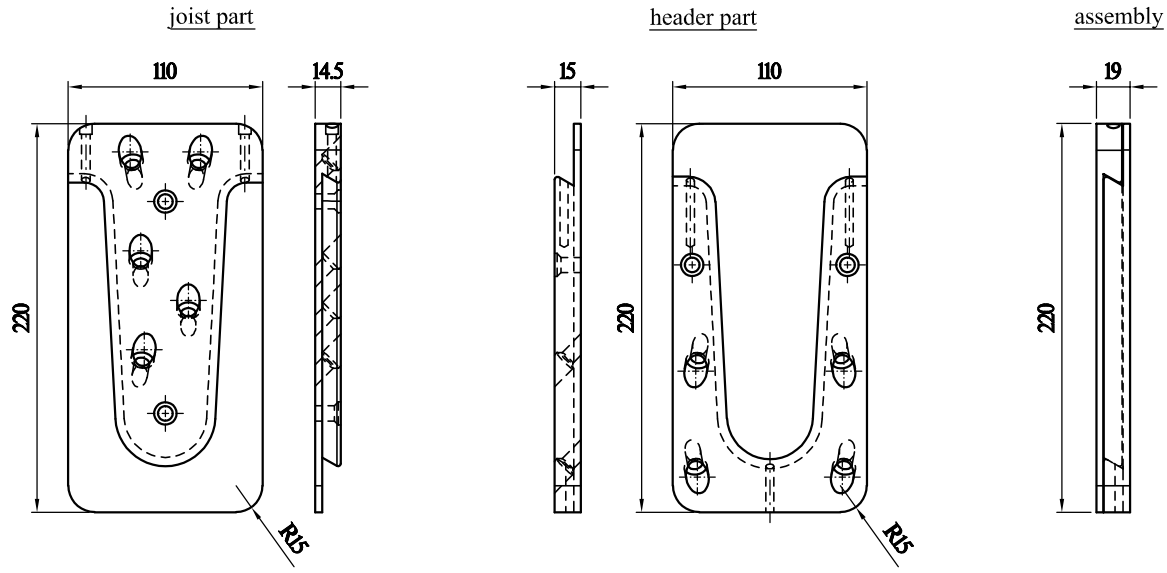
d	L	total number per connector
5,0	80	24



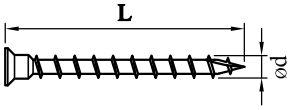
Self-tapping screw according to this ETA
for connecting the two connector parts

d	L	total number per connector
4,8	60	2

Magnus L 110x220
All specifications in mm



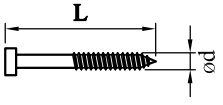
Fastener types and sizes



Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

d	L	total number per connector
8,0	120	13

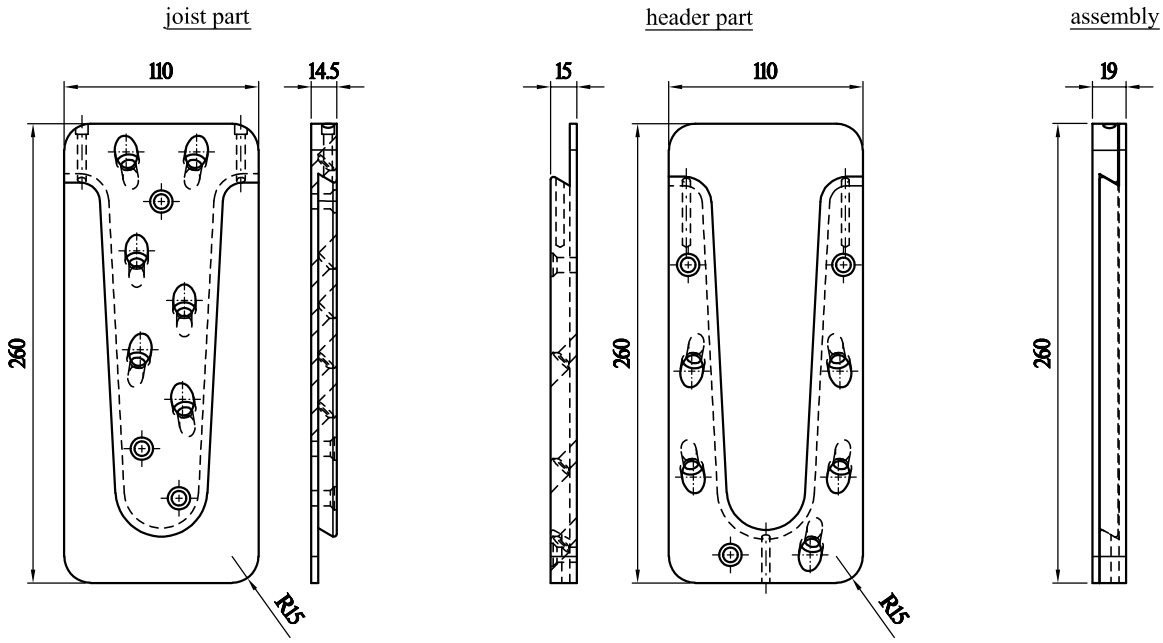
optionally 8,0x160 with the same number



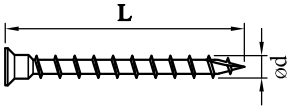
Self-tapping screw according to this ETA
for connecting the two connector parts

d	L	total number per connector
4,8	60	2

Magnus L 110x260
All specifications in mm



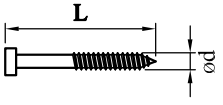
Fastener types and sizes



Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

d	L	total number per connector
8,0	120	17

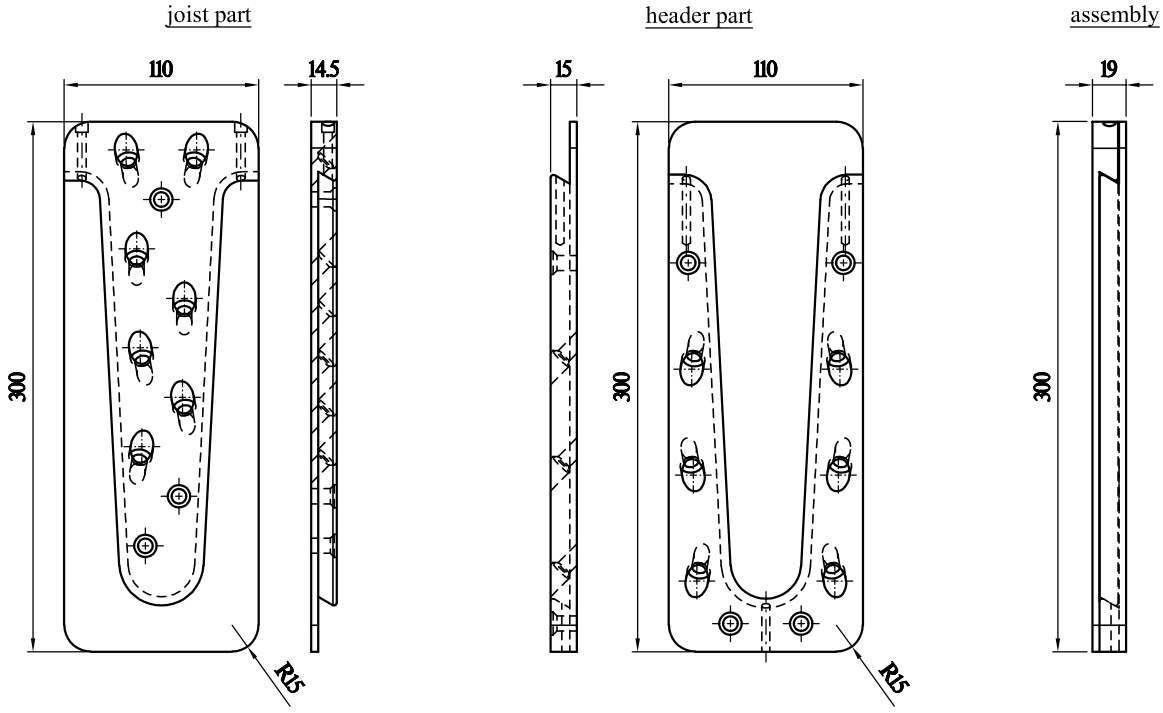
optionally 8,0x160 with the same number



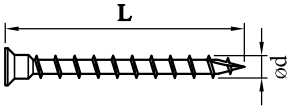
Self-tapping screw according to this ETA
for connecting the two connector parts

d	L	total number per connector
4,8	60	2

Magnus L 110x300
All specifications in mm



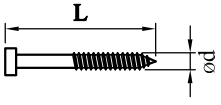
Fastener types and sizes



Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

d	L	total number per connector
8,0	120	20

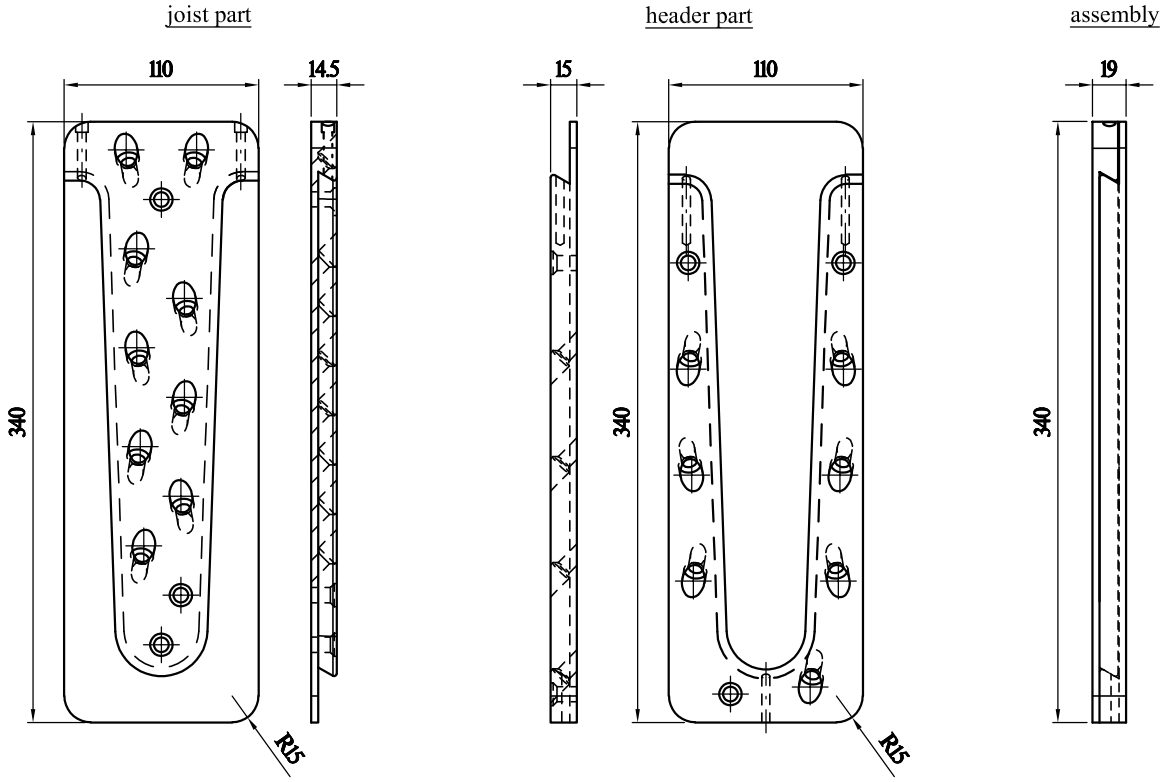
optionally 8,0x160 with the same number



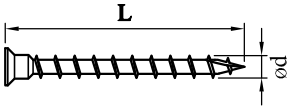
Self-tapping screw according to this ETA
for connecting the two connector parts

d	L	total number per connector
4,8	60	2

Magnus L 110x340
All specifications in mm



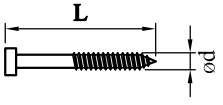
Fastener types and sizes



Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

d	L	total number per connector
8,0	120	22

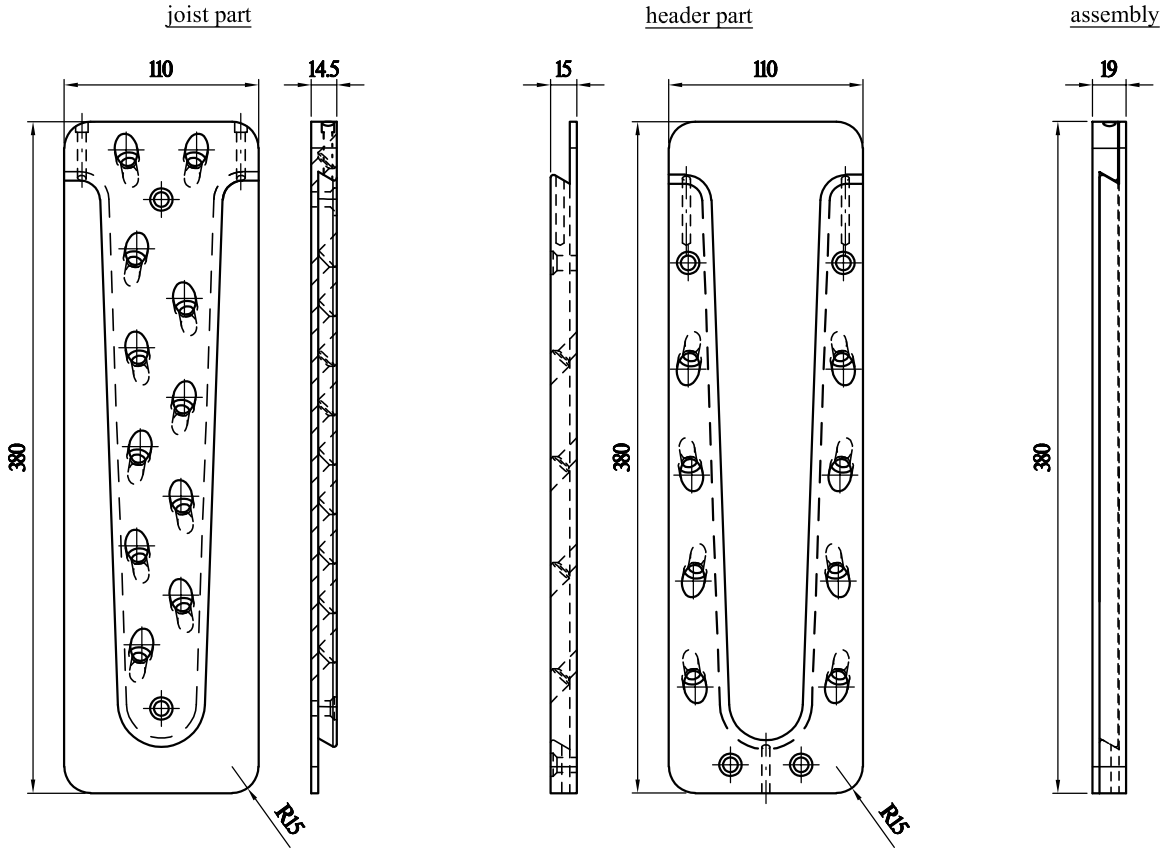
optionally 8,0x160 with the same number



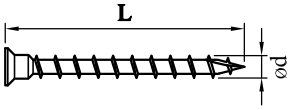
Self-tapping screw according to this ETA
for connecting the two connector parts

d	L	total number per connector
4,8	60	2

Magnus L 110x380
All specifications in mm



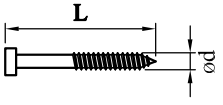
Fastener types and sizes



Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

d	L	total number per connector
8,0	120	25

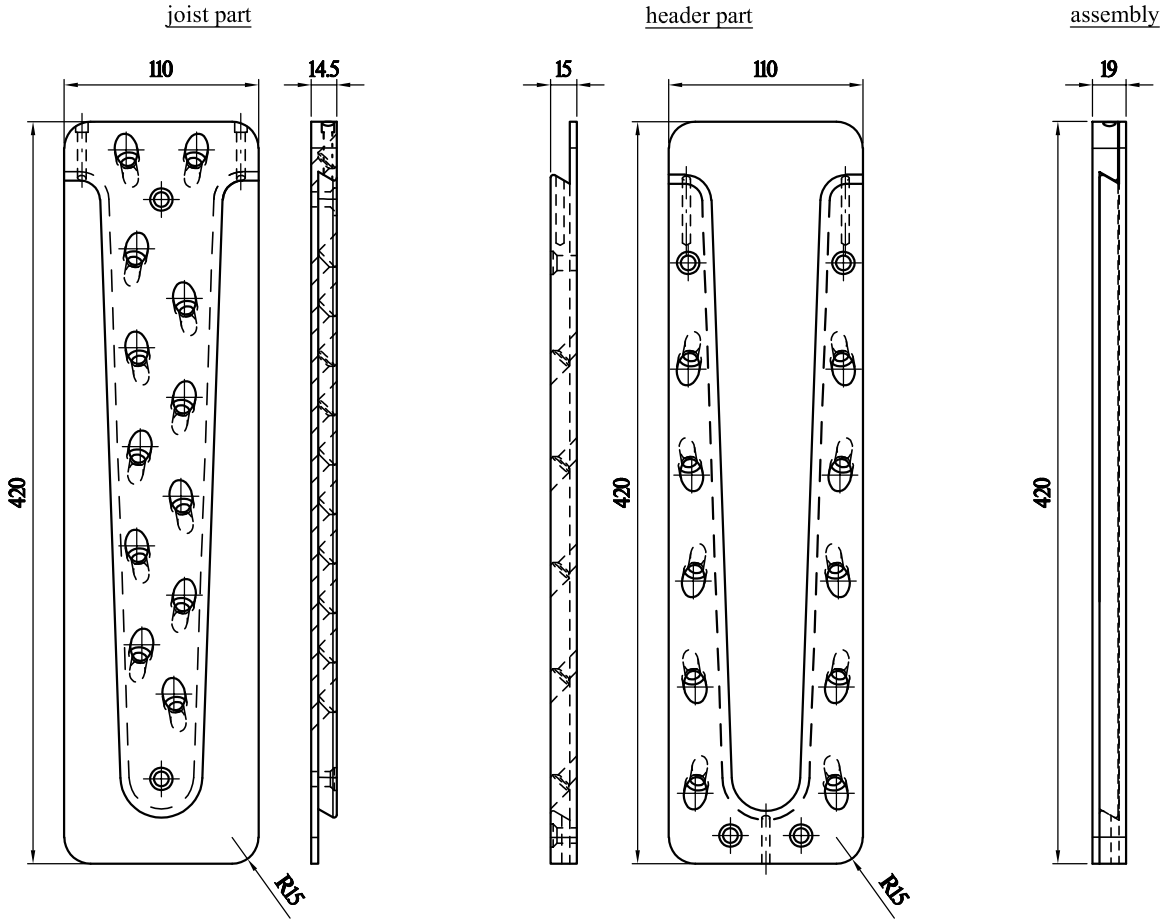
optionally 8,0x160 with the same number



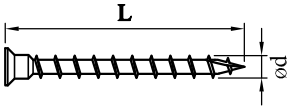
Self-tapping screw according to this ETA
for connecting the two connector parts

d	L	total number per connector
4,8	60	2

Magnus L 110x420
All specifications in mm



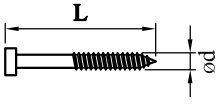
Fastener types and sizes



Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

d	L	total number per connector
8,0	120	28

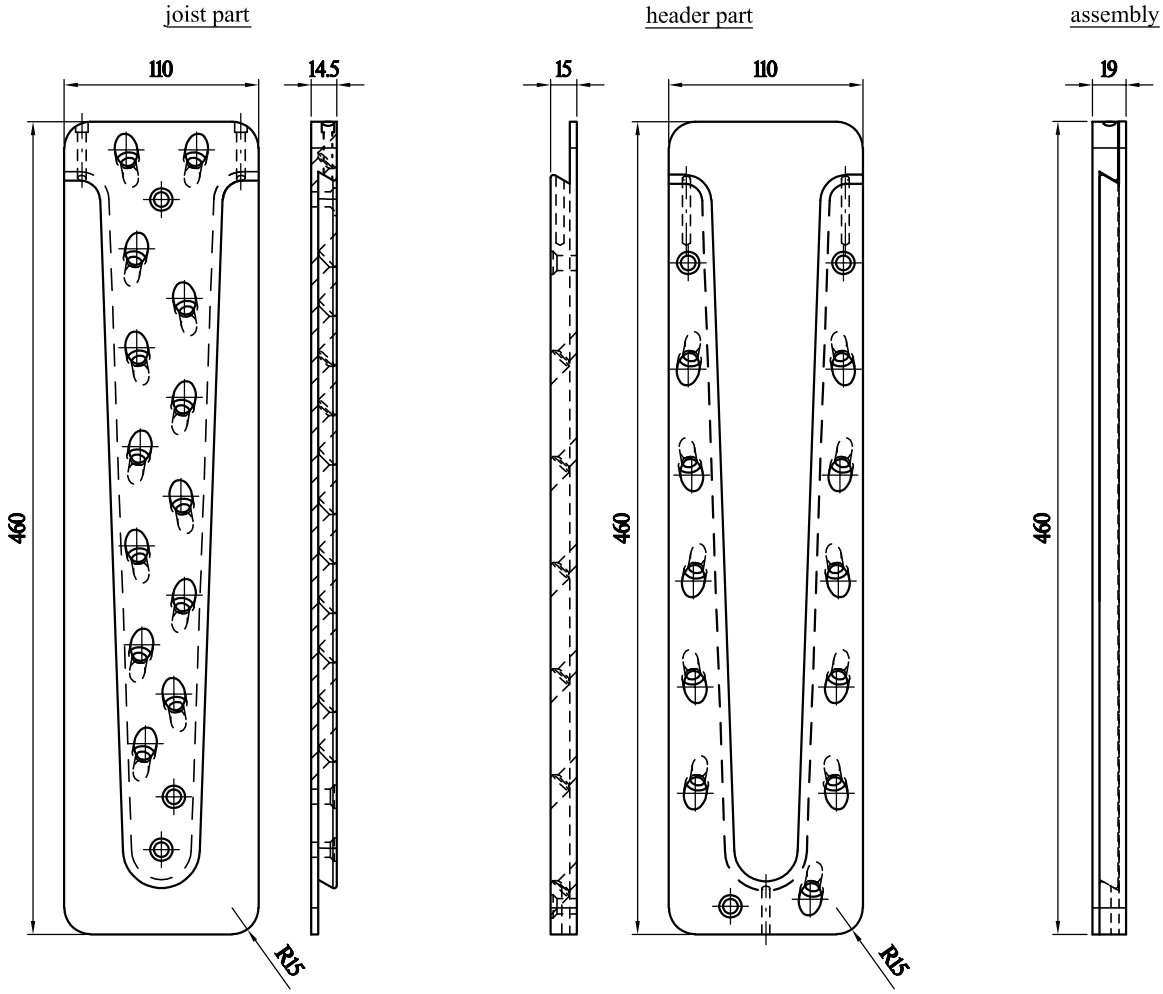
optionally 8,0x160 with the same number



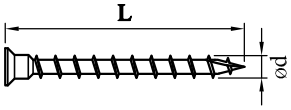
Self-tapping screw according to this ETA
for connecting the two connector parts

d	L	total number per connector
4,8	60	2

Magnus L 110x460
All specifications in mm



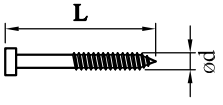
Fastener types and sizes



Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

d	L	total number per connector
8,0	120	30

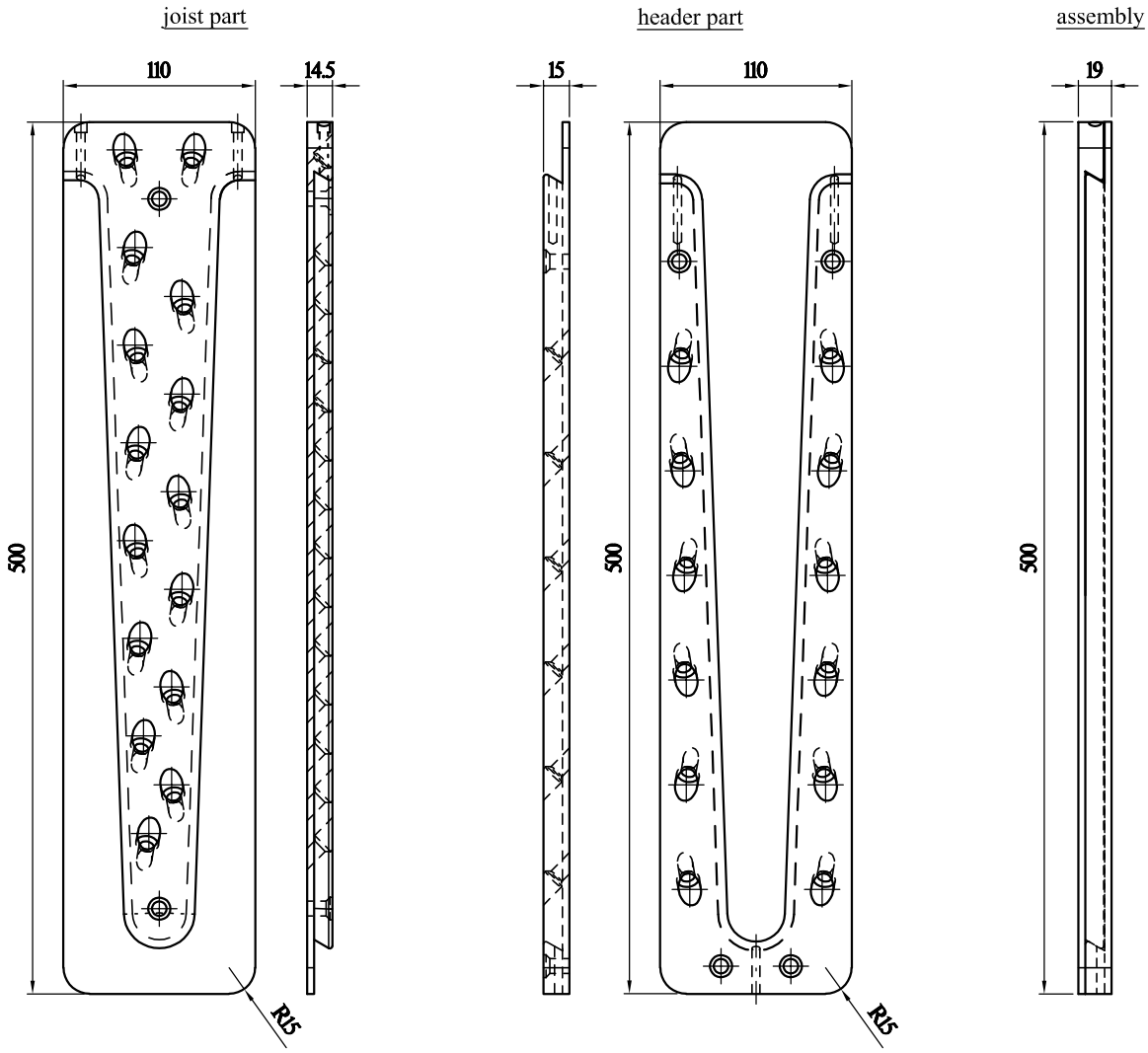
optionally 8,0x160 with the same number

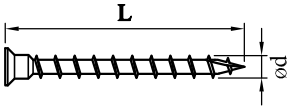


Self-tapping screw according to this ETA
for connecting the two connector parts

d	L	total number per connector
4,8	60	2

Magnus L 110x500
All specifications in mm

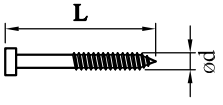




Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

d	L	total number per connector
8,0	120	33

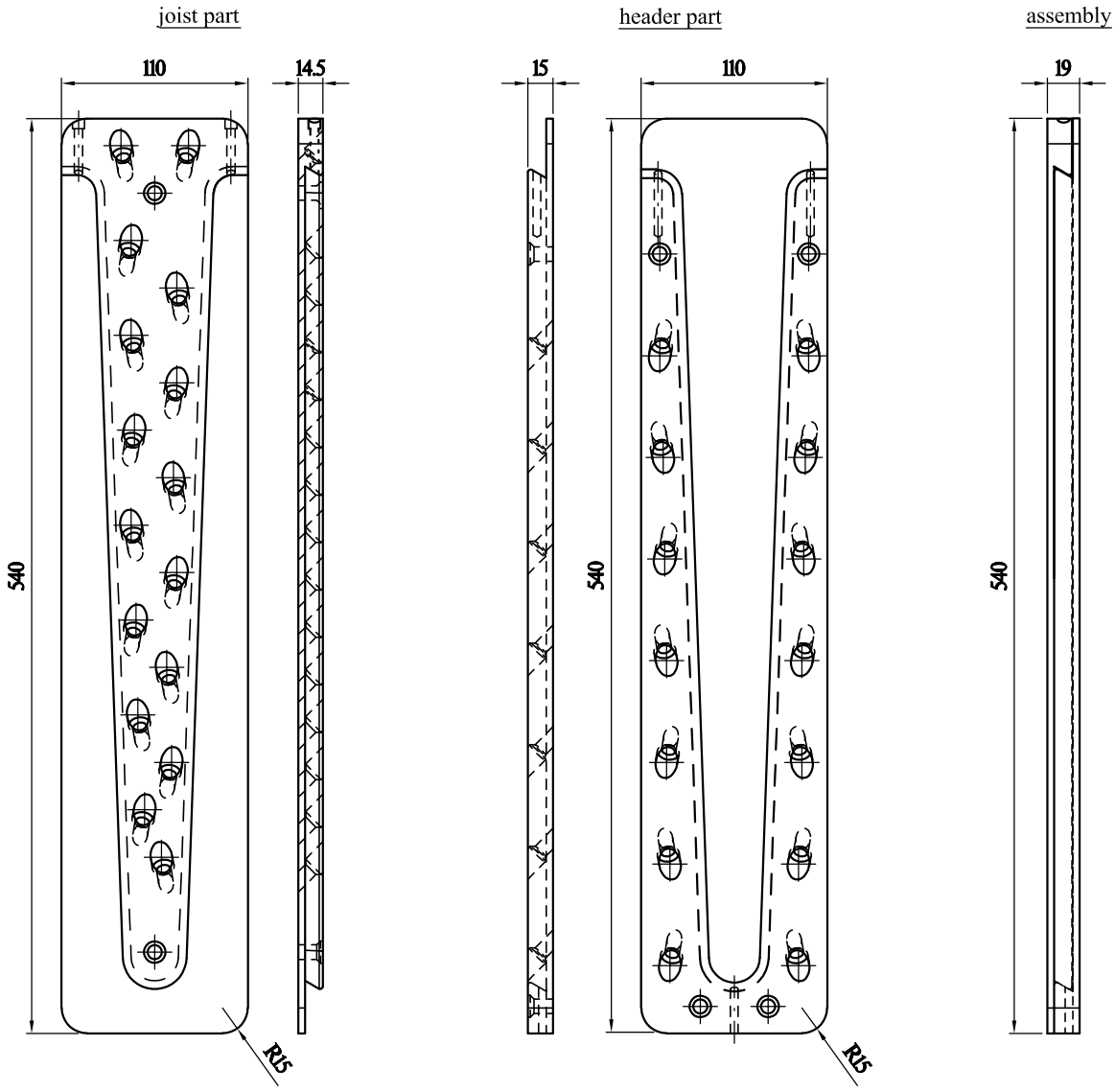
optionally 8,0x160 with the same number

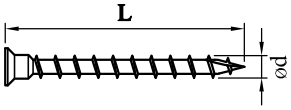


Self-tapping screw according to this ETA
for connecting the two connector parts

d	L	total number per connector
4,8	60	2

Magnus L 110x540
All specifications in mm

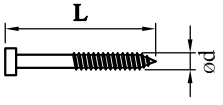




Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

d	L	total number per connector
8,0	120	36

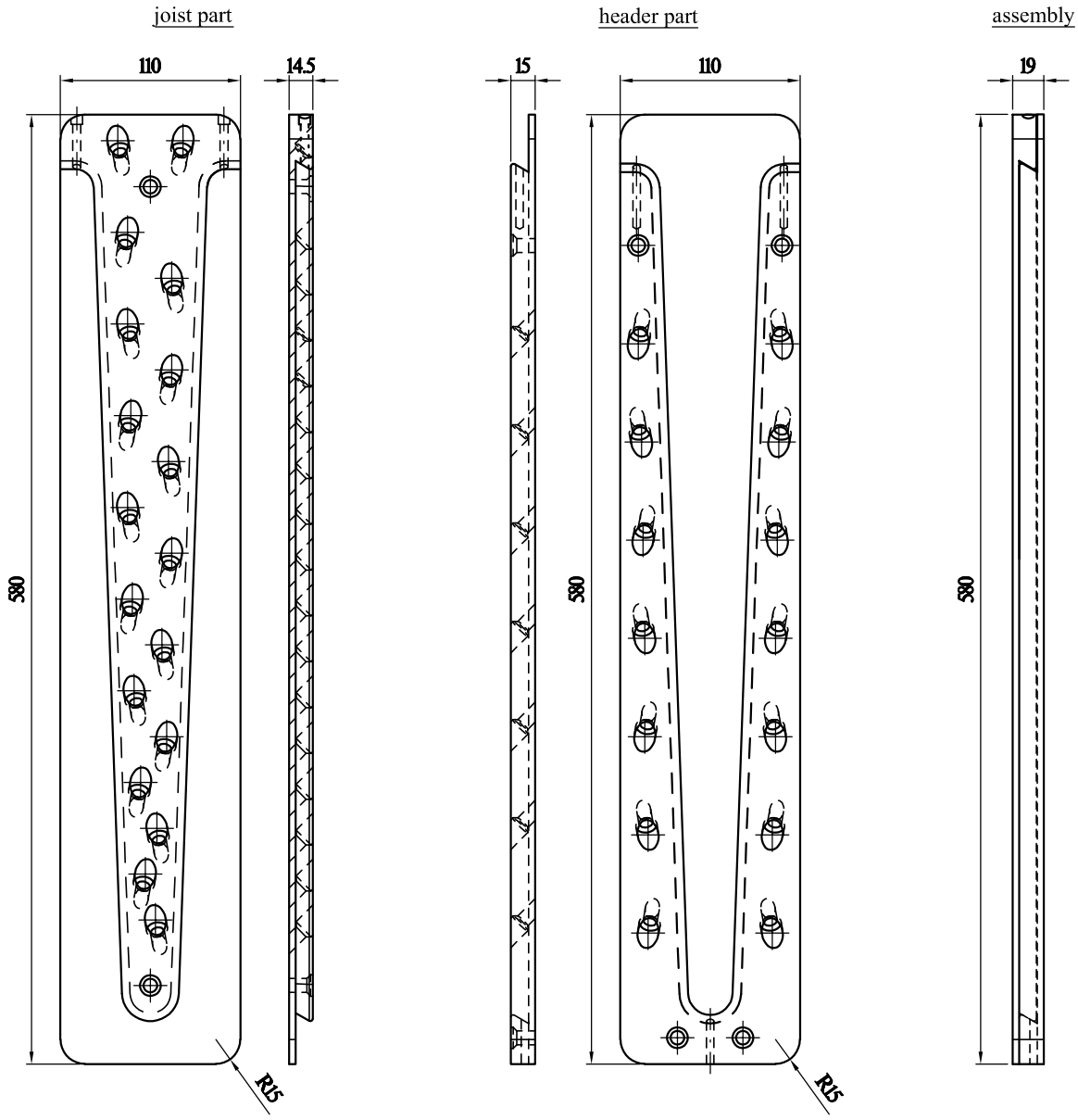
optionally 8,0x160 with the same number



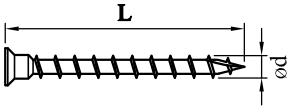
Self-tapping screw according to this ETA
for connecting the two connector parts

d	L	total number per connector
4,8	60	2

Magnus L 110x580
All specifications in mm



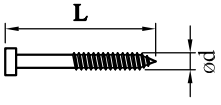
Fastener types and sizes



Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

d	L	total number per connector
8,0	120	38

optionally 8,0x160 with the same number



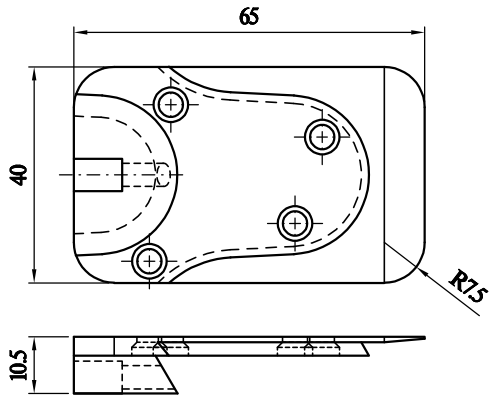
Self-tapping screw according to this ETA
for connecting the two connector parts

d	L	total number per connector
4,8	60	2

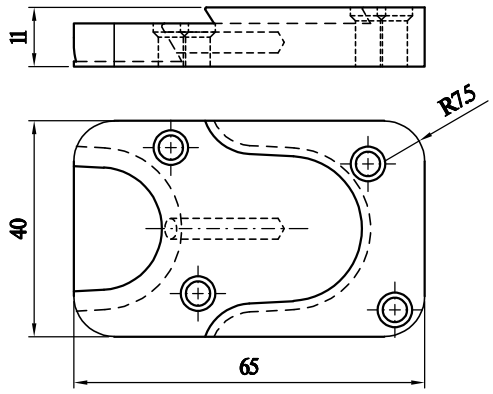
Timberframe Connector PRV 40x65

All specifications in mm

joist part

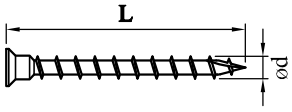


header part



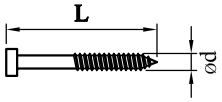
assembly

Fastener types and sizes



Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

d	L	total number per connector
4,0	60	8



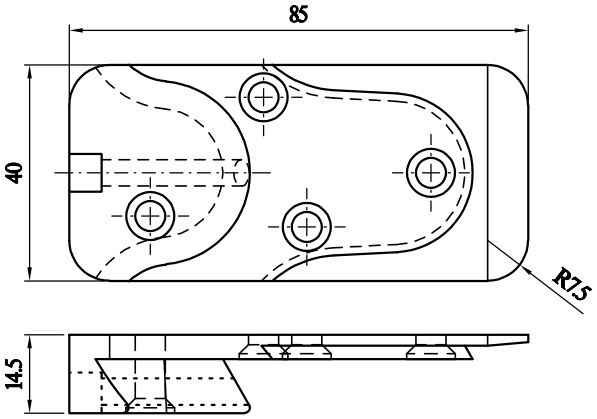
Self-tapping screw according to this ETA
for connecting the two connector parts

d	L	total number per connector
4,2	26	1

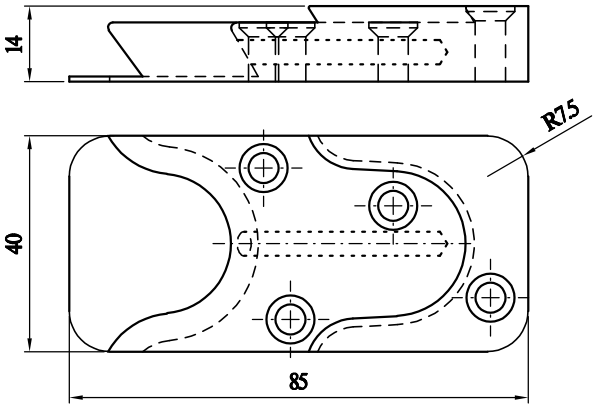
Timberframe Connector PRV 40x85

All specifications in mm

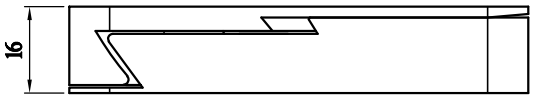
joist part



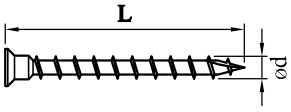
header part



assembly

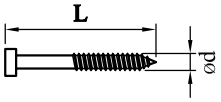


Fastener types and sizes



Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

d	L	total number per connector
5,0	60	8



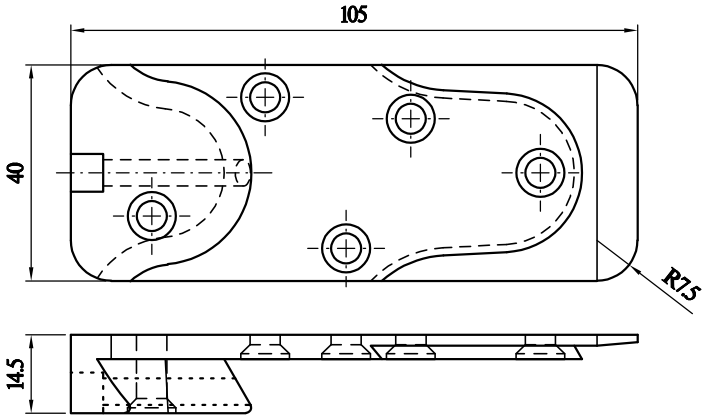
Self-tapping screw according to this ETA
for connecting the two connector parts

d	L	total number per connector
4,8	60	1

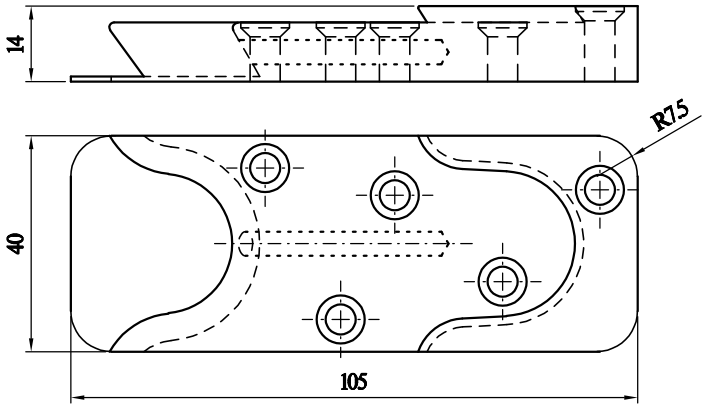
Timberframe Connector PRV 40x105

All specifications in mm

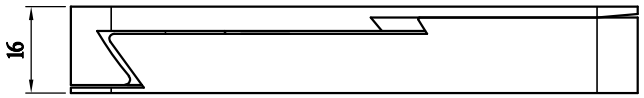
joist part



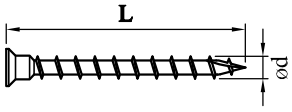
header part



assembly

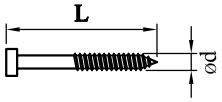


Fastener types and sizes



Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

d	L	total number per connector
5,0	60	10



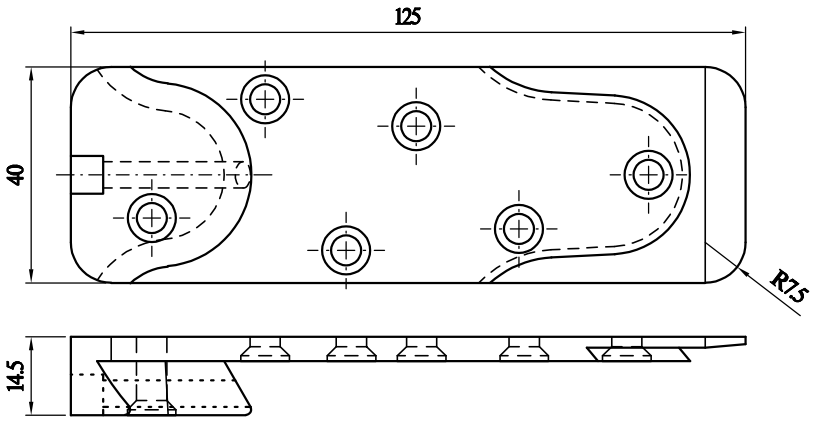
Self-tapping screw according to this ETA
for connecting the two connector parts

d	L	total number per connector
4,8	60	1

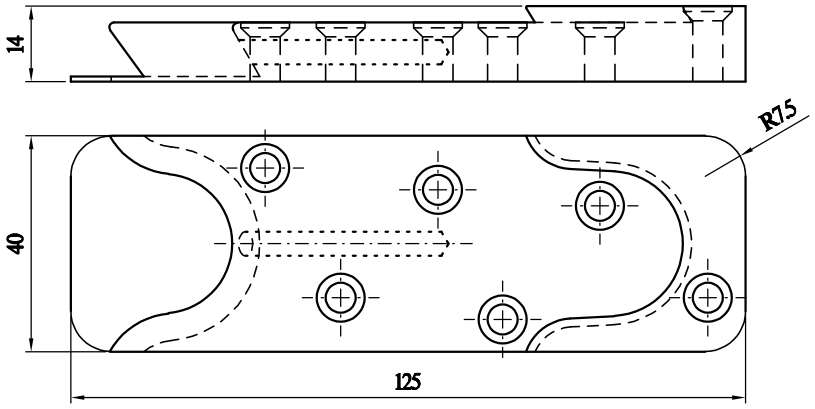
Timberframe Connector PRV 40x125

All specifications in mm

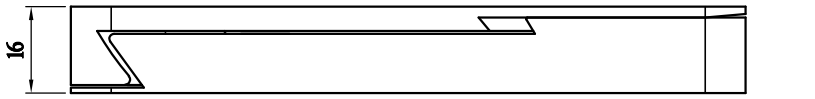
joist part



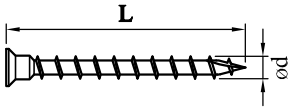
header part



assembly

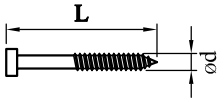


Fastener types and sizes



Self-tapping screw according to ETA-11/0024 for fixing the connector to wood

d	L	total number per connector
5,0	60	12



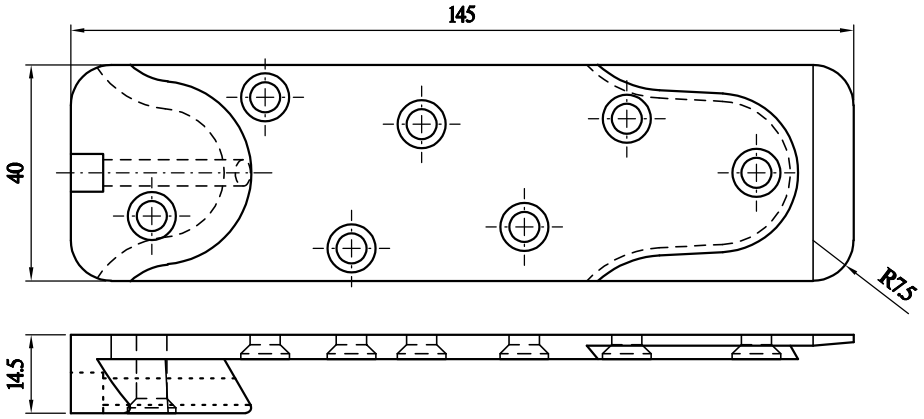
Self-tapping screw according to this ETA for connecting the two connector parts

d	L	total number per connector
4,8	60	1

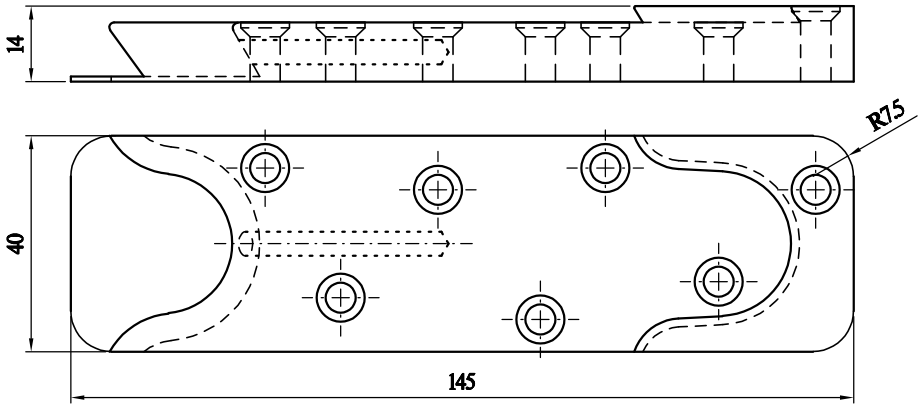
Timberframe Connector PRV 40x145

All specifications in mm

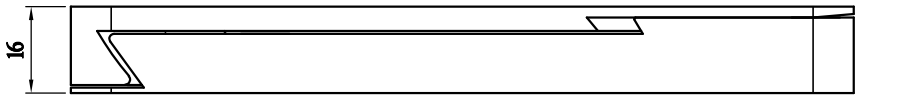
joist part



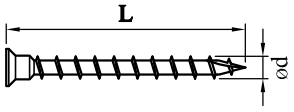
header part



assembly

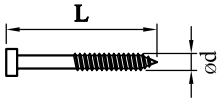


Fastener types and sizes



Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

d	L	total number per connector
5,0	60	14



Self-tapping screw according to this ETA
for connecting the two connector parts

d	L	total number per connector
4,8	60	1

Annex A - Continued
Product details and definitions – Connecto
All specifications are in mm

Table A.1. Dimensions and number of screws for E.u.r.o.Tec Connecto connectors

Connecto	Width b [mm]	Depth h [mm]	Screw diameter [mm]	Header	Joist
				n_{90}	n_{45}
EHV H135B50	50	135	5,2	3	2
EHV H175B50	50	175	5,2	3	4
EHV H175B75	75	175	5,2	6	6
EHV H215B75	75	215	5,2	6	9
EHV H240B75	77	240	5,2	8	9
EHV H265B75	75	265	5,2	8	12
EHV H290B75	75	290	5,2	10	12
EHV H215B100	100	215	5,2	9	12
EHV H240B100	100	240	5,2	12	12
EHV H265B100	100	265	5,2	12	16
EHV H290B100	100	290	5,2	15	16
EHV H240B125	125	240	5,2	16	15
EHV H265B125	125	265	5,2	16	20
EHV H290B125	125	290	5,2	20	20

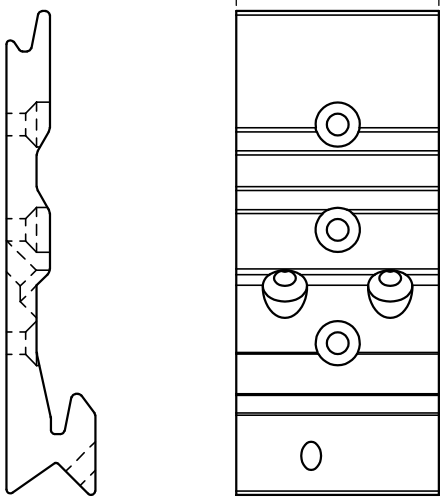
Table A.2. Required minimum timber sections for E.u.r.o.Tec Connecto connectors

Connecto	Height of connector (h) [mm]	Width of connector (b) [mm]	Timber header cross-section* [mm]	Timber joist cross-section* [mm]
EHV H135B50	135	50	80x160	100x200
EHV H175B50	175	50	80x200	100x240
EHV H175B75	175	75	100x200	120x240
EHV H215B75	215	75	100x240	120x280
EHV H240B75	240	75	100x240	120x280
EHV H265B75	265	75	100x280	120x320
EHV H290B75	290	75	100x320	120x360
EHV H215B100	215	100	140x240	160x280
EHV H240B100	240	100	140x240	160x280
EHV H265B100	265	100	140x280	160x320
EHV H290B100	290	100	140x320	160x360
EHV H240B125	240	125	160x240	180x280
EHV H265B125	265	125	160x280	180x320
EHV H290B125	290	125	160x320	180x360

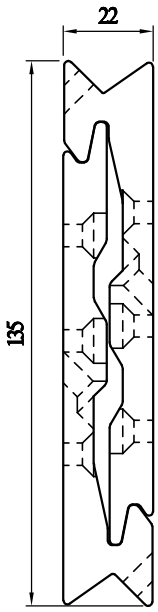
* The timber section dimensions presented are predicated on adherence to minimum screw edge distance regulations. It is imperative that, where fire resistance is a design consideration for the timber members, the sections are increased in size to satisfy the applicable fire resistance rating requirements.

Connecto H135 B50
All specifications in mm

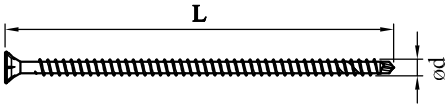
Two identical components
form one connector



assembly

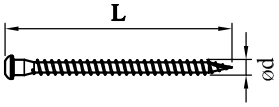


Fastener types and sizes



Self-tapping screw according to
ETA-11/0024
for fixing the connector to wood

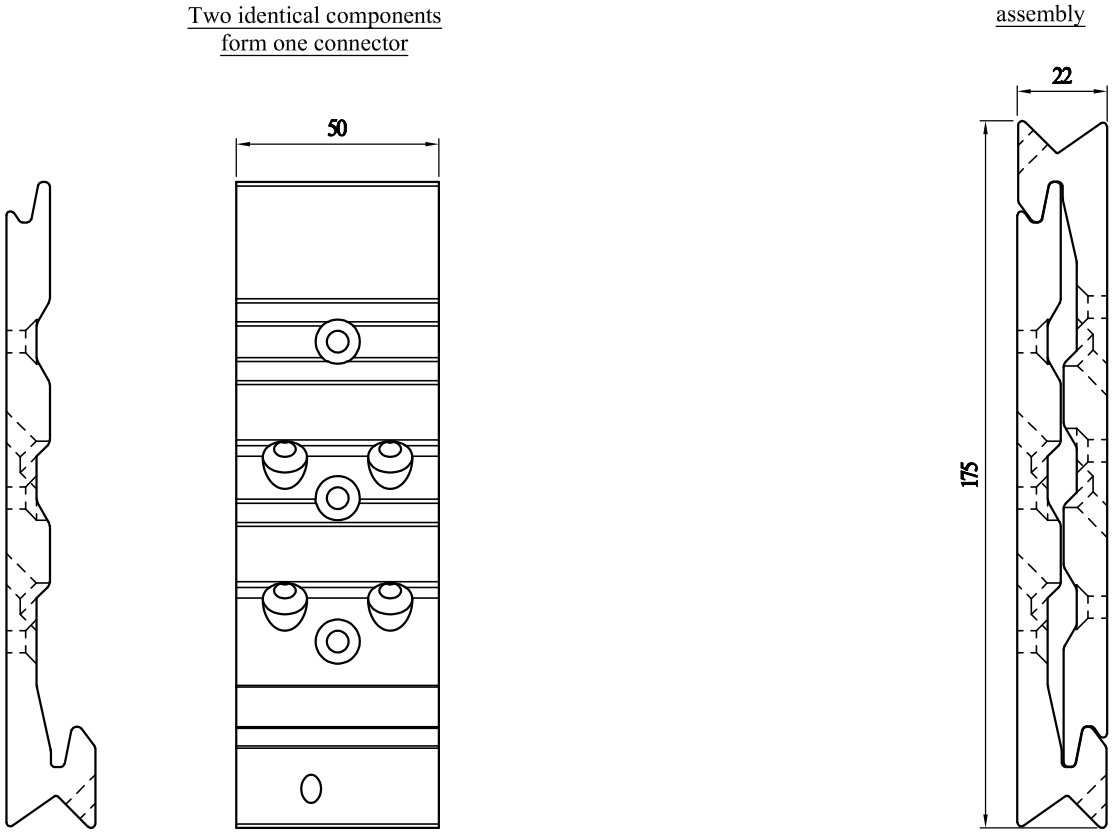
d	L	total number per connector
5,2	120	10



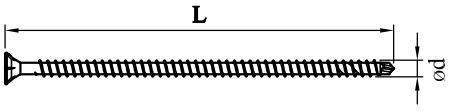
Self-tapping screw according to
ETA-11/0024
for connecting the two connector parts

d	L	total number per connector
5,0	70	1

Connecto H175 B50
All specifications in mm

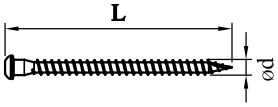


Fastener types and sizes



Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

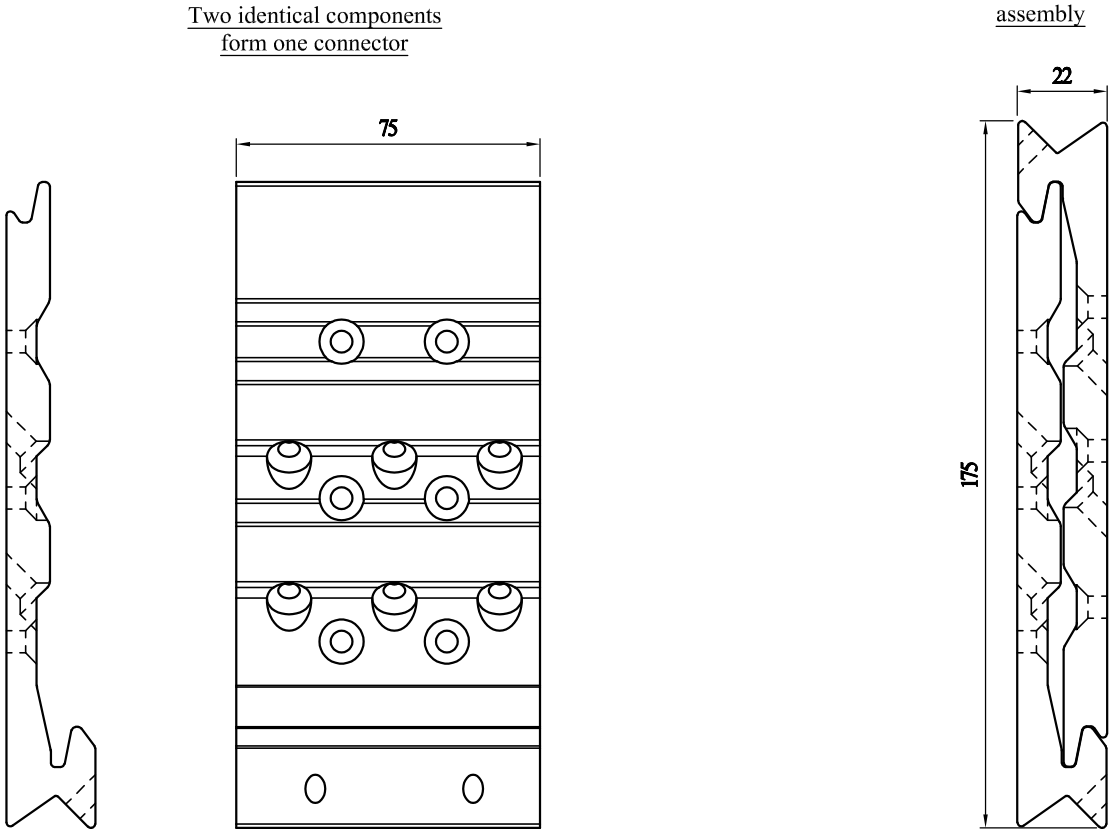
d	L	total number per connector
5,2	120	14



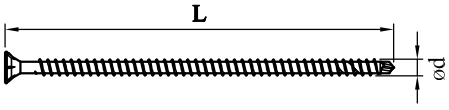
Self-tapping screw according to ETA-11/0024
for connecting the two connector parts

d	L	total number per connector
5,0	70	1

Connecto H175 B75
All specifications in mm

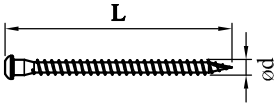


Fastener types and sizes



Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

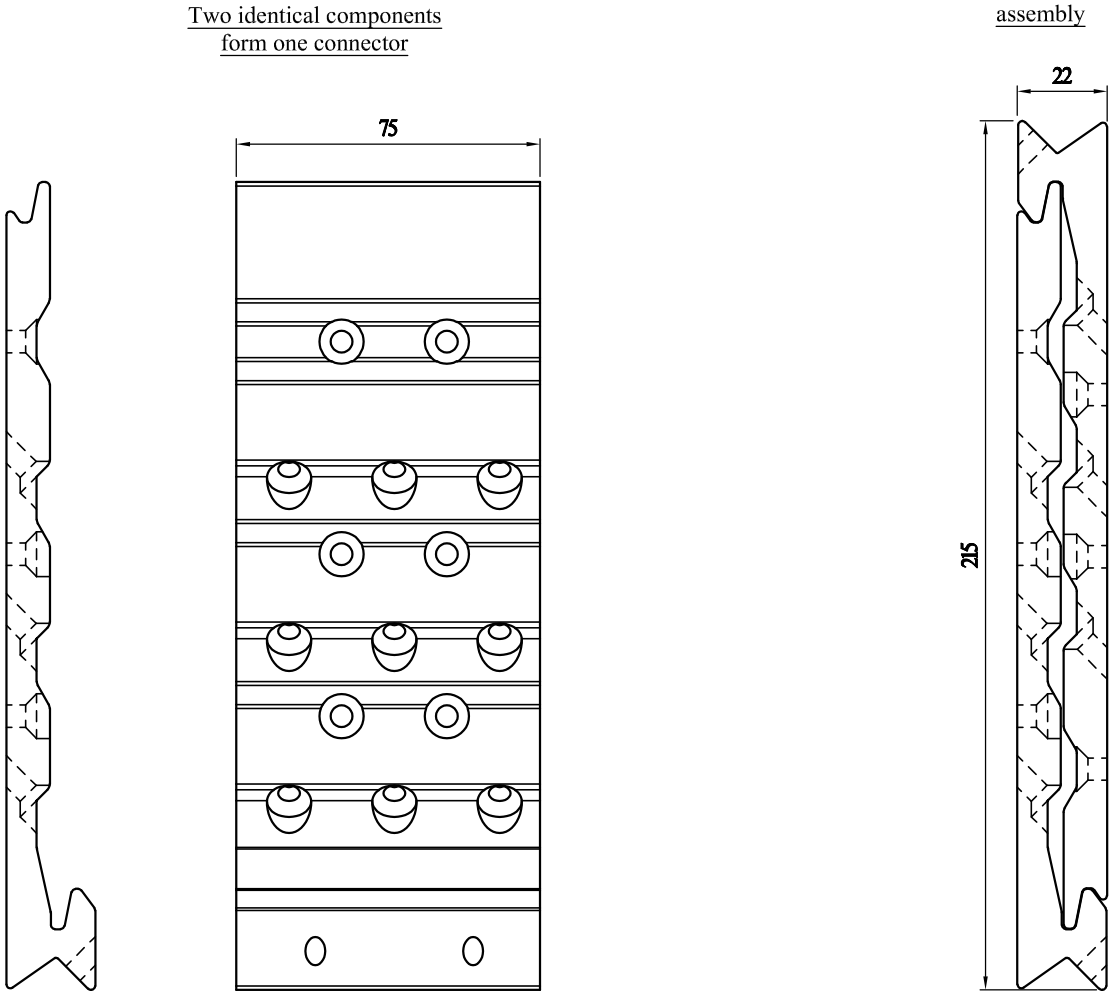
d	L	total number per connector
5,2	120	24



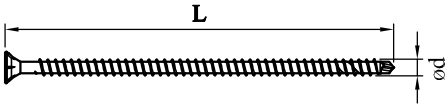
Self-tapping screw according to ETA-11/0024
for connecting the two connector parts

d	L	total number per connector
5,0	70	2

Connecto H215 B75
All specifications in mm

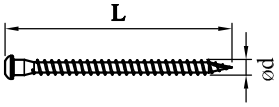


Fastener types and sizes



Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

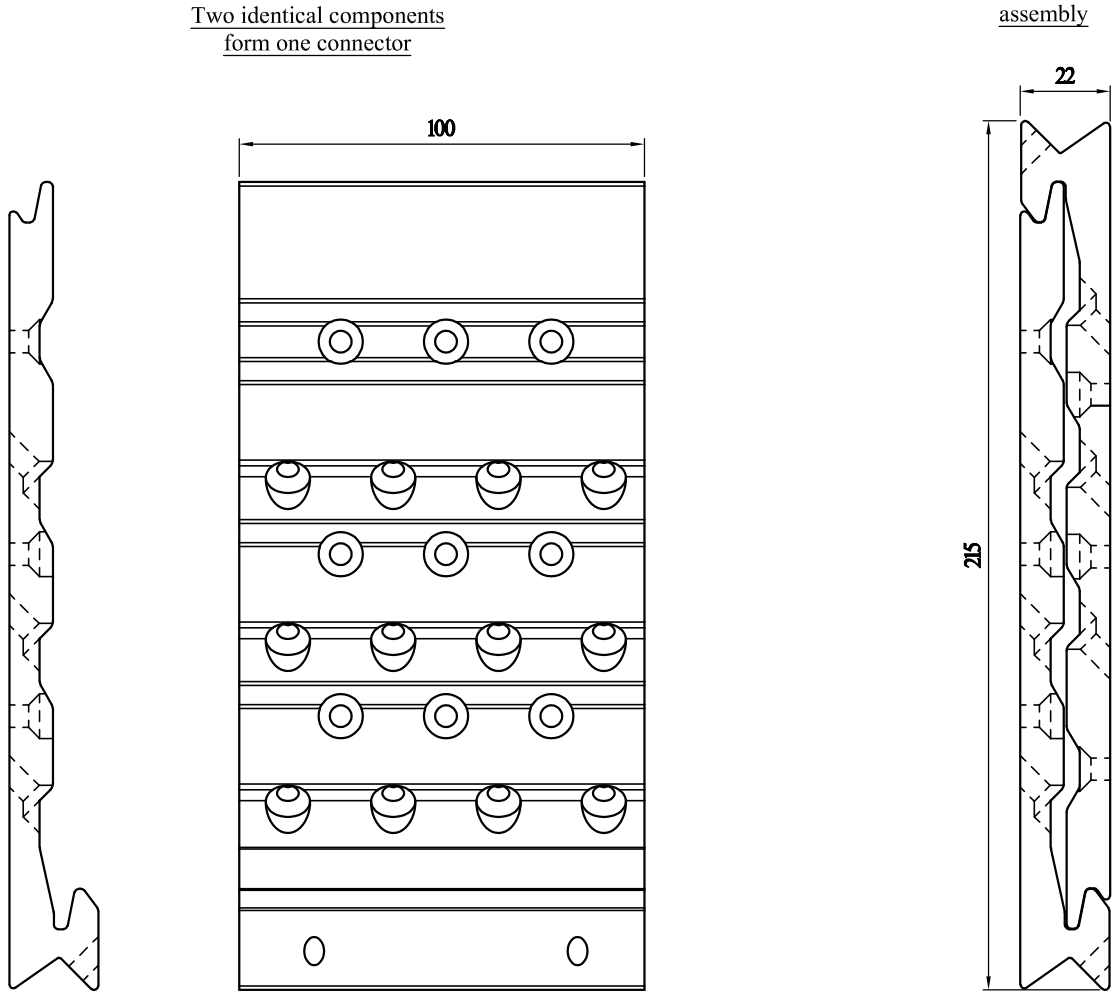
d	L	total number per connector
5,2	120	30



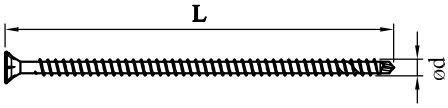
Self-tapping screw according to ETA-11/0024
for connecting the two connector parts

d	L	total number per connector
5,0	70	2

Connecto H215 B100
All specifications in mm

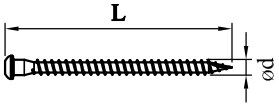


Fastener types and sizes



Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

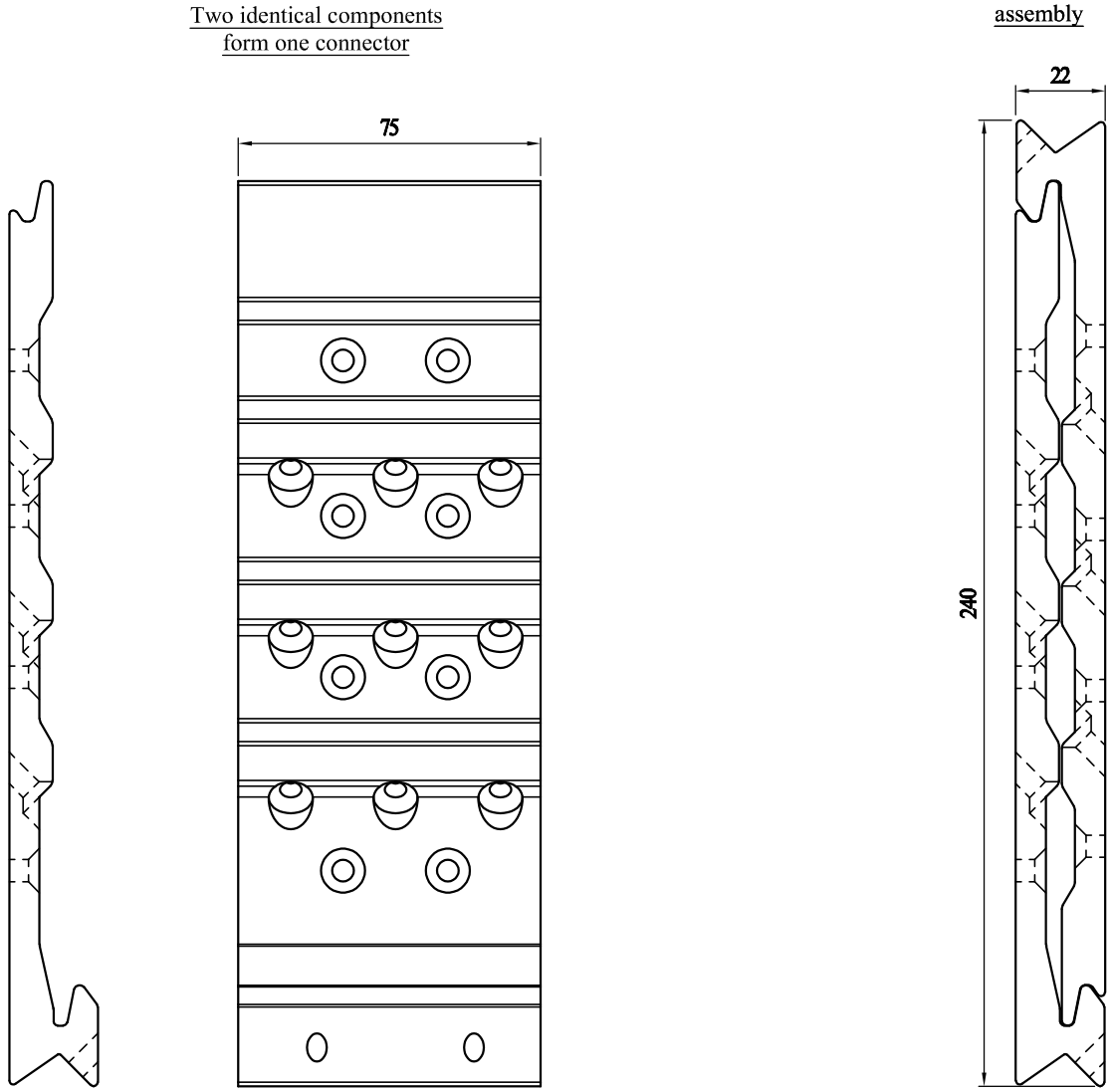
d	L	total number per connector
5,2	120	42



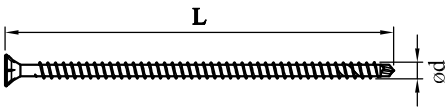
Self-tapping screw according to ETA-11/0024
for connecting the two connector parts

d	L	total number per connector
5,0	70	2

Connecto H240 B75
All specifications in mm

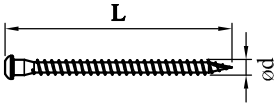


Fastener types and sizes



Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

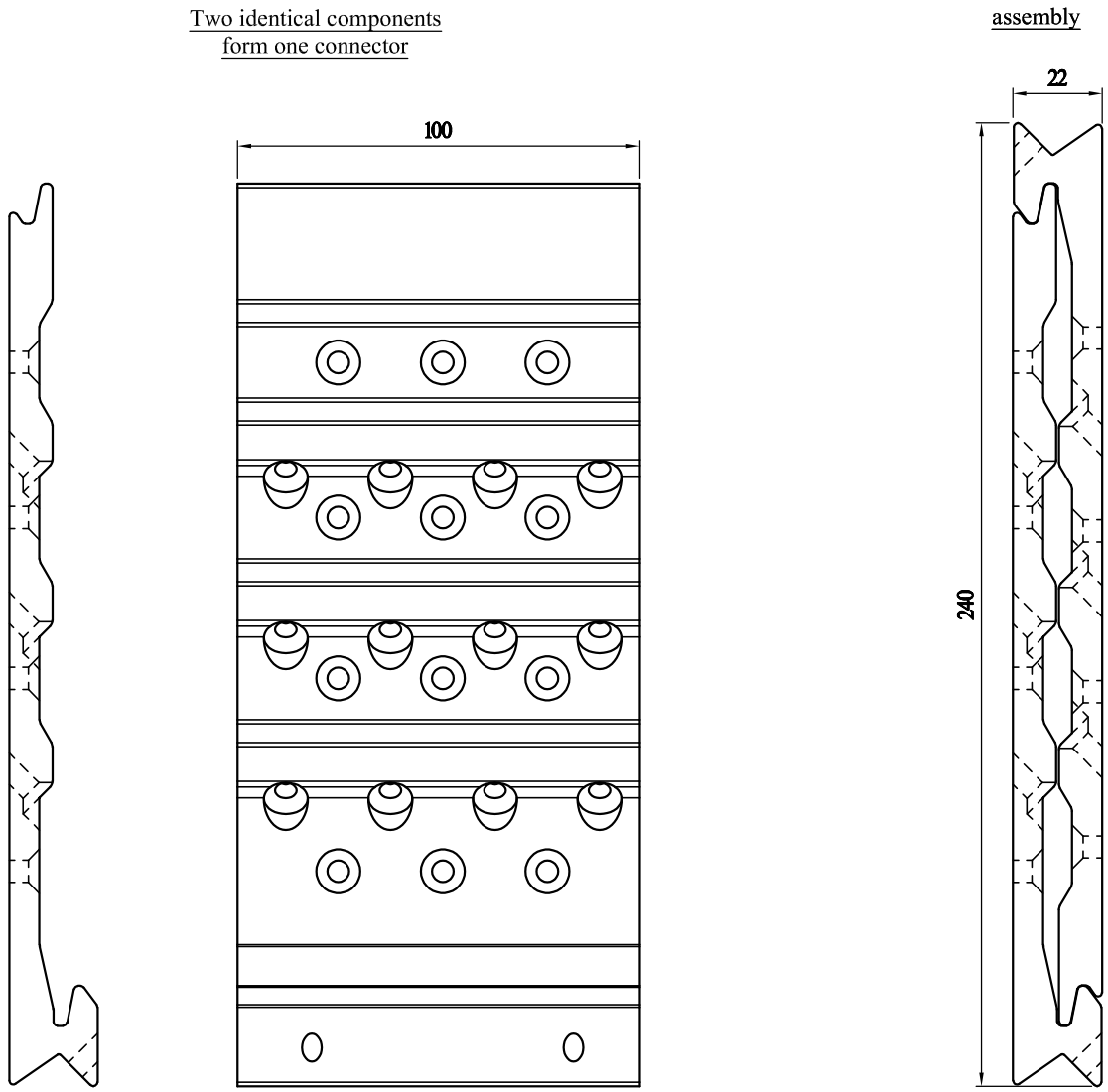
d	L	total number per connector
5,2	120	34



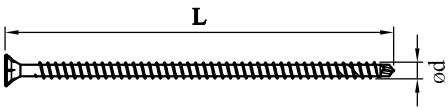
Self-tapping screw according to ETA-11/0024
for connecting the two connector parts

d	L	total number per connector
5,0	70	2

Connecto H240 B100
All specifications in mm

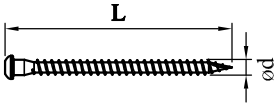


Fastener types and sizes



Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

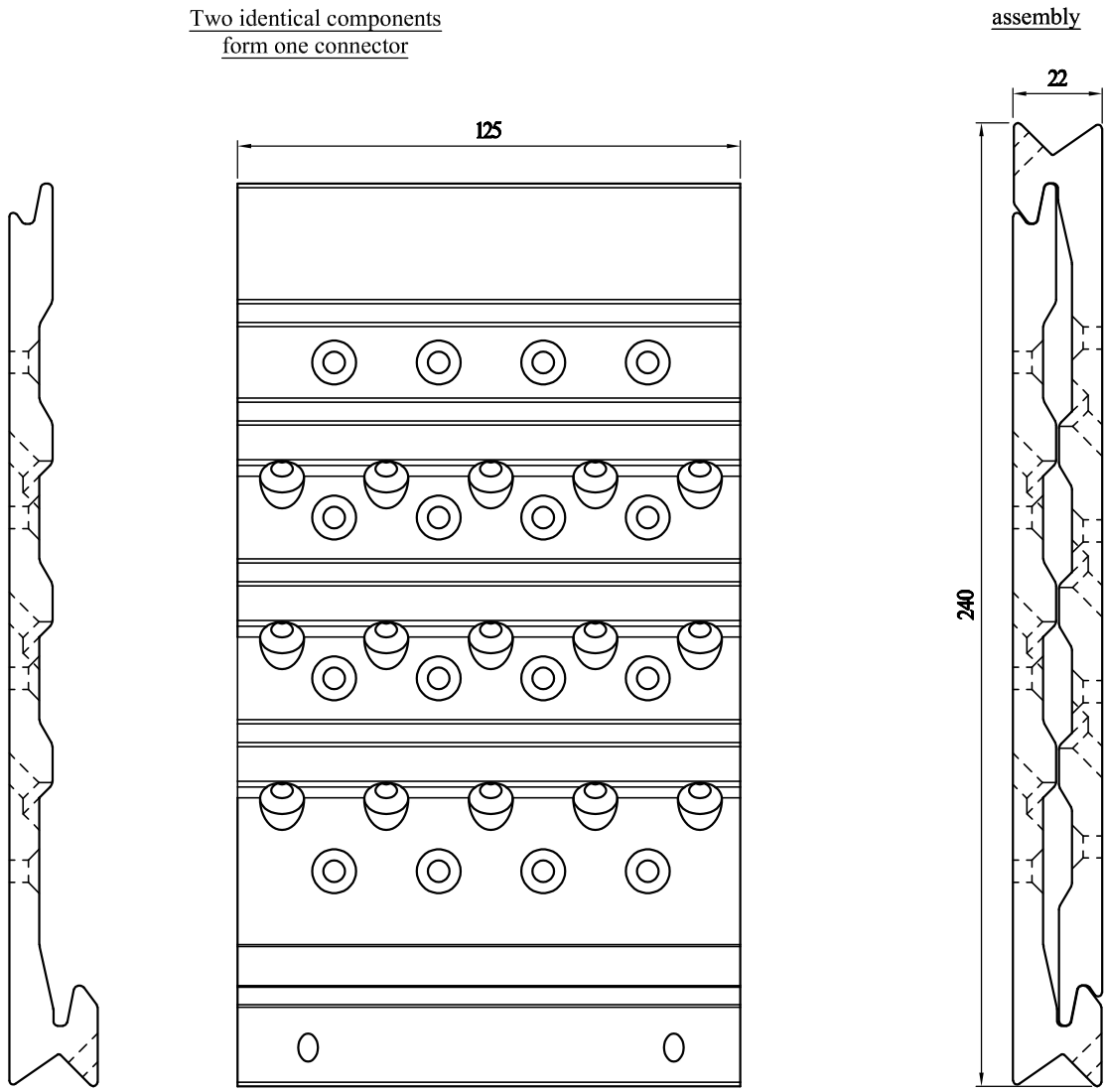
d	L	total number per connector
5,2	120	48



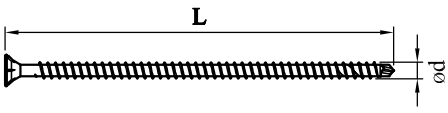
Self-tapping screw according to ETA-11/0024
for connecting the two connector parts

d	L	total number per connector
5,0	70	2

Connecto H240 B125
All specifications in mm

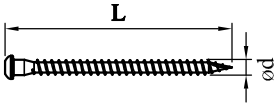


Fastener types and sizes



Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

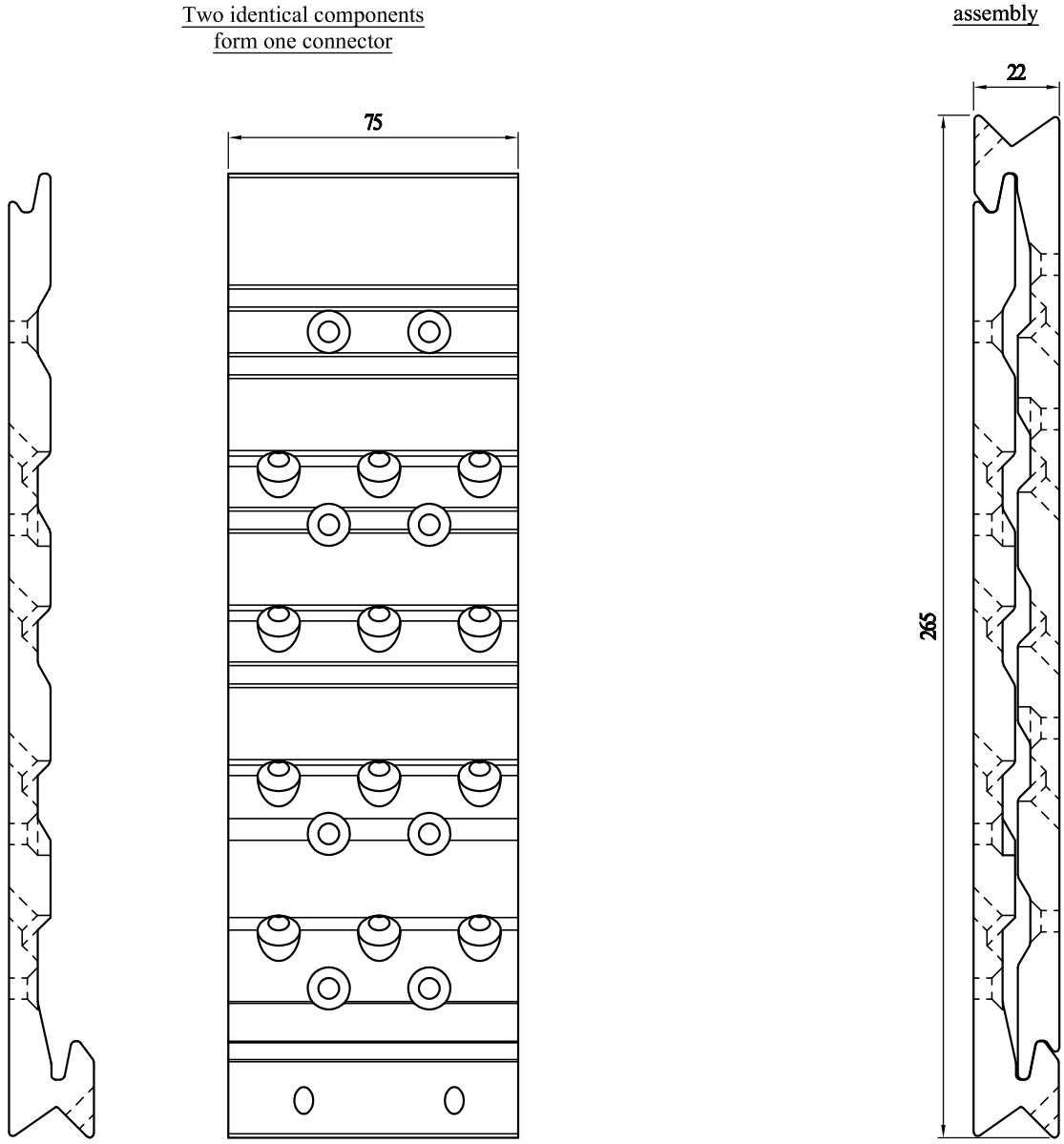
d	L	total number per connector
5,2	120	62



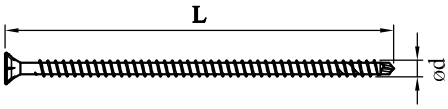
Self-tapping screw according to ETA-11/0024
for connecting the two connector parts

d	L	total number per connector
5,0	70	2

Connecto H265 B75
All specifications in mm

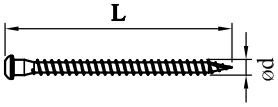


Fastener types and sizes



Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

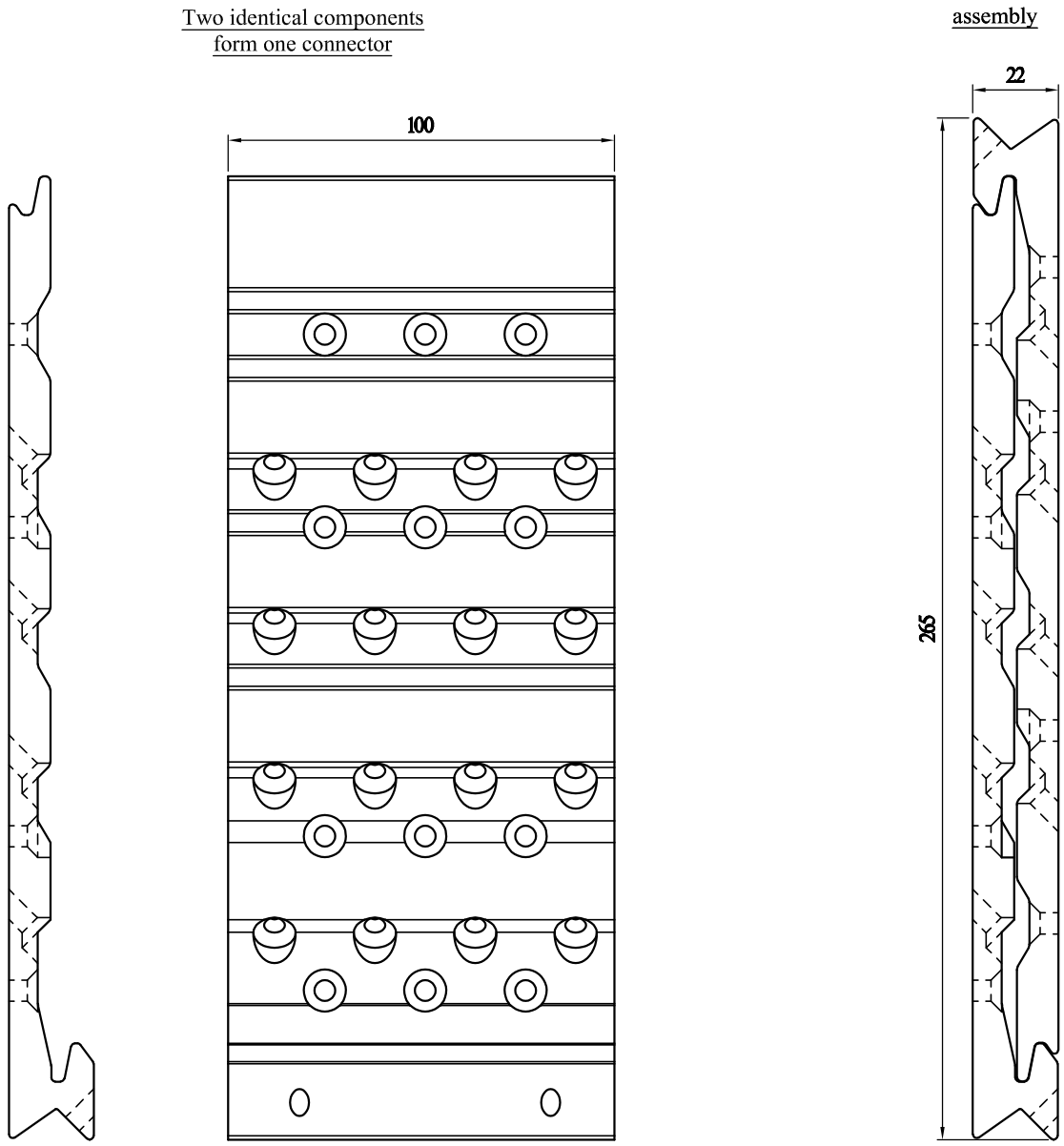
d	L	total number per connector
5,2	120	40



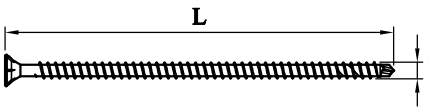
Self-tapping screw according to ETA-11/0024
for connecting the two connector parts

d	L	total number per connector
5,0	70	2

Connecto H265 B100
All specifications in mm

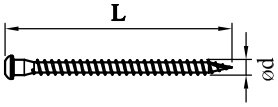


Fastener types and sizes



Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

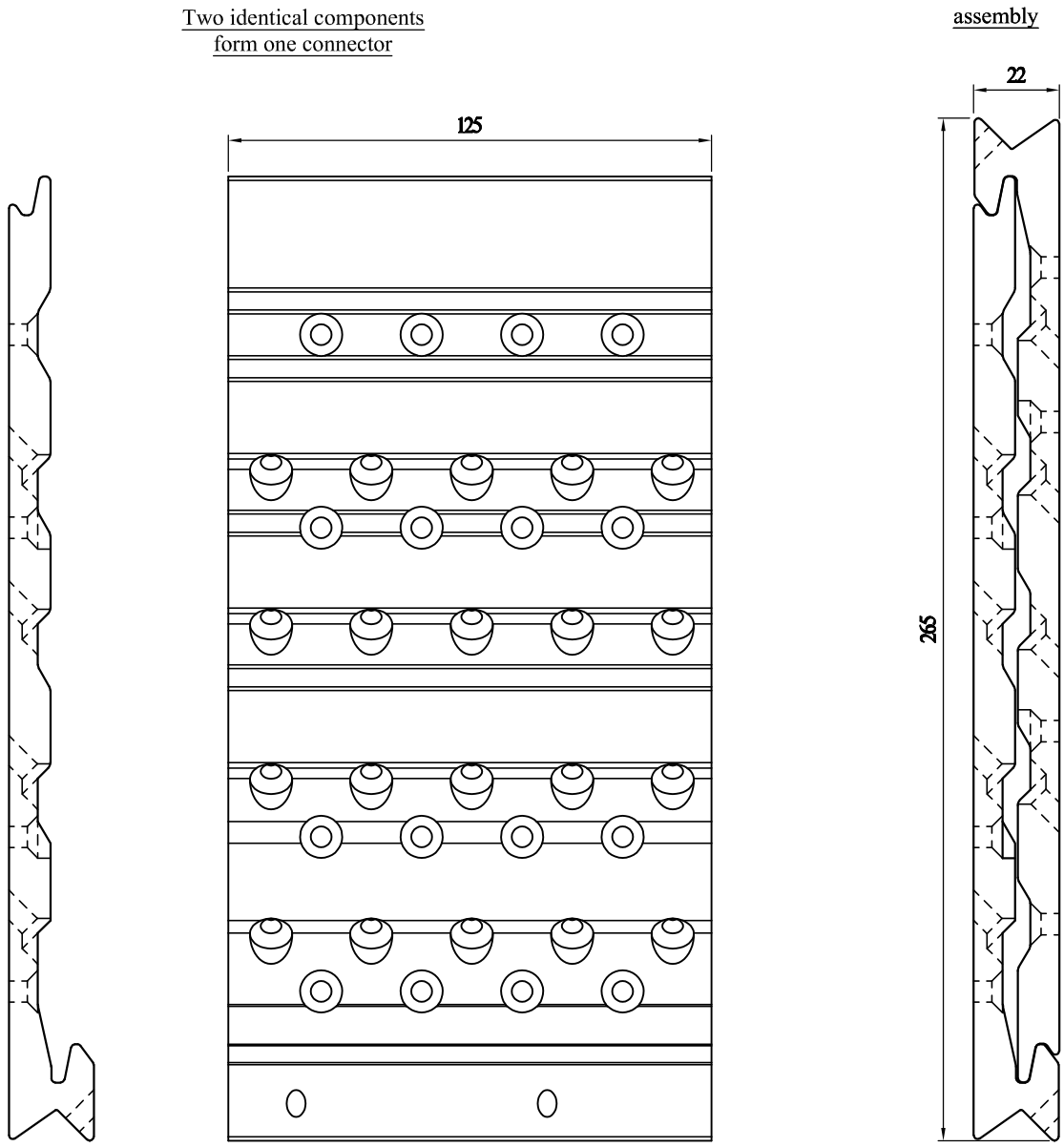
d	L	total number per connector
5,2	120	56



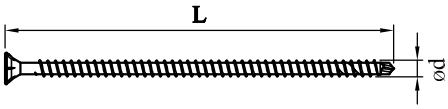
Self-tapping screw according to ETA-11/0024
for connecting the two connector parts

d	L	total number per connector
5,0	70	2

Connecto H265 B125
All specifications in mm

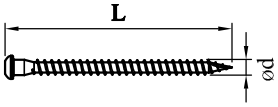


Fastener types and sizes



Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

d	L	total number per connector
5,2	120	72

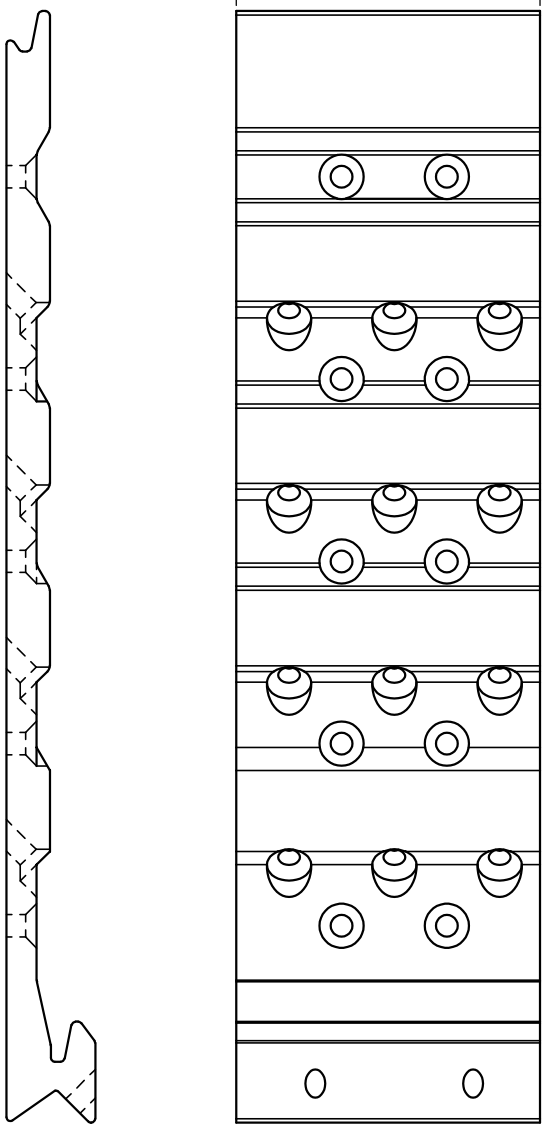


Self-tapping screw according to ETA-11/0024
for connecting the two connector parts

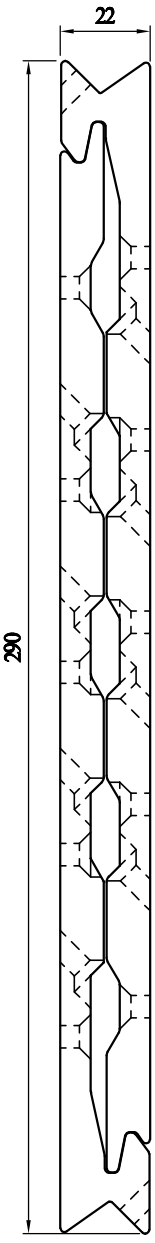
d	L	total number per connector
5,0	70	2

Connecto H290 B75
All specifications in mm

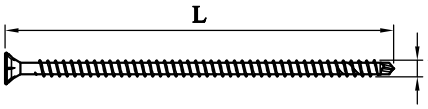
Two identical components
form one connector



assembly

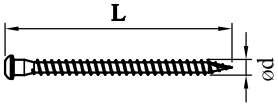


Fastener types and sizes



Self-tapping screw according to
ETA-11/0024
for fixing the connector to wood

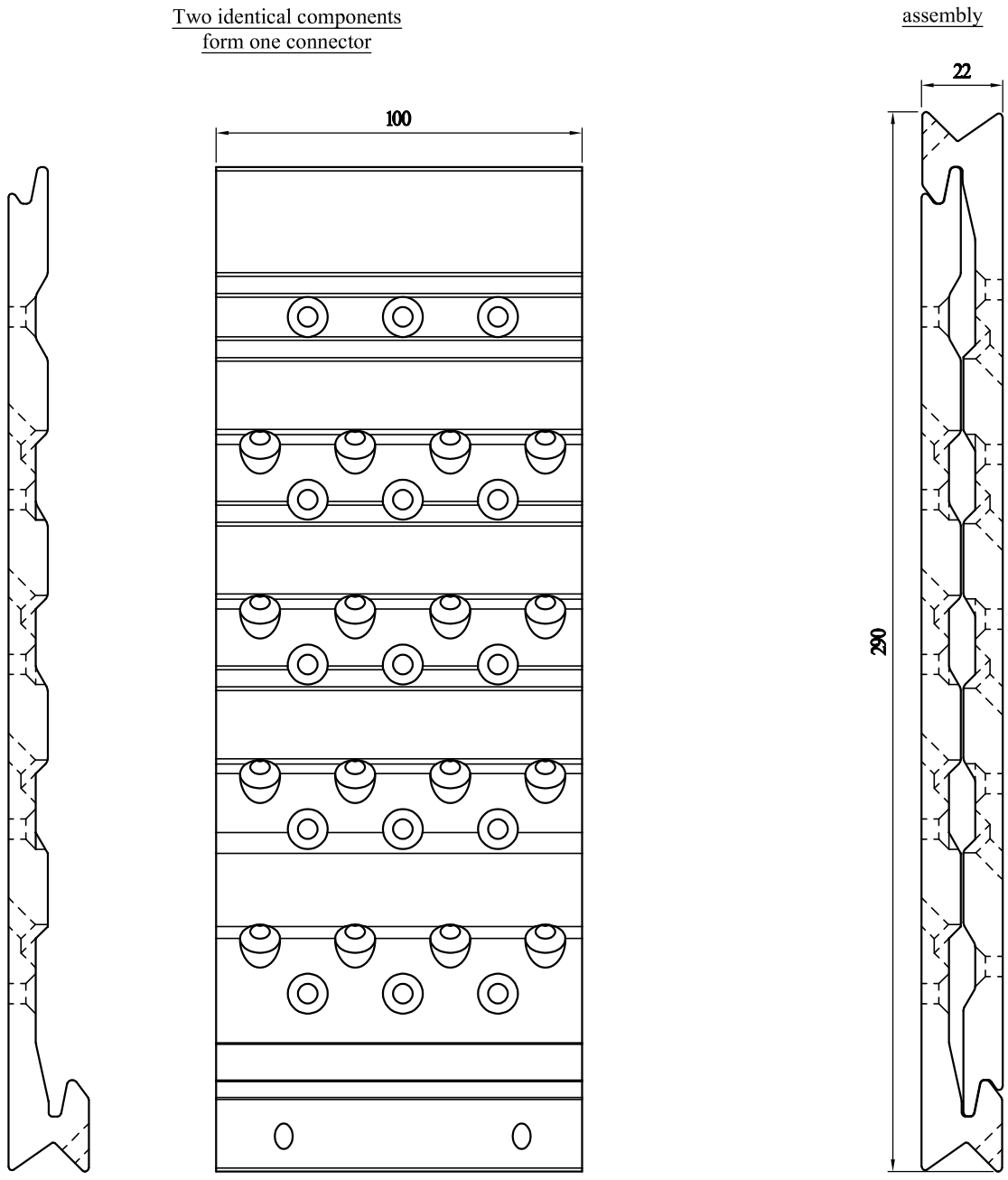
d	L	total number per connector
5,2	120	44



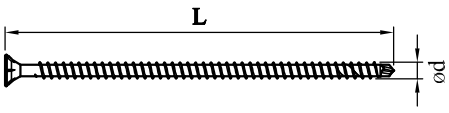
Self-tapping screw according to
ETA-11/0024
for connecting the two connector parts

d	L	total number per connector
5,0	70	2

Connecto H290 B100
All specifications in mm

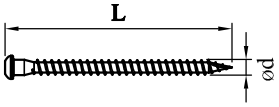


Fastener types and sizes



Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

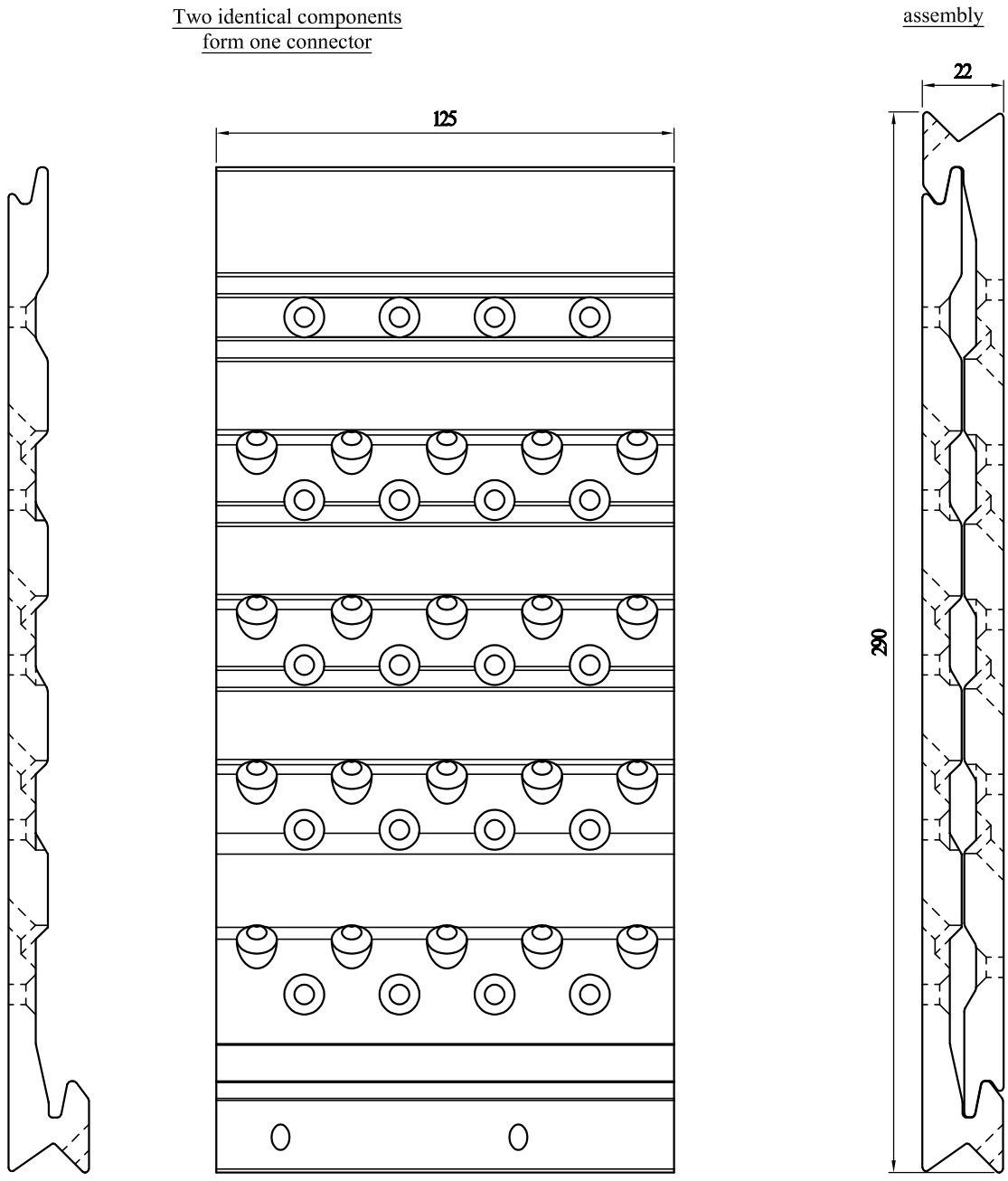
d	L	total number per connector
5,2	120	62



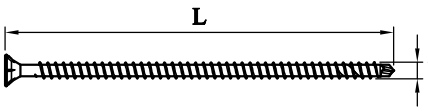
Self-tapping screw according to ETA-11/0024
for connecting the two connector parts

d	L	total number per connector
5,0	70	2

Connecto H290 B125
All specifications in mm

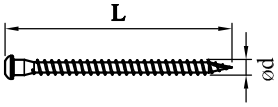


Fastener types and sizes



Self-tapping screw according to ETA-11/0024
for fixing the connector to wood

d	L	total number per connector
5,2	120	80



Self-tapping screw according to ETA-11/0024
for connecting the two connector parts

d	L	total number per connector
5,0	70	2

Annex B
Characteristic values of load-carrying capacities and stiffness – MAGNUS Connector

The forces perpendicular to the connector plate are assumed to act in the middle of the joist.

Only a full fastener pattern is specified, where there are screws in all the holes of the joist and header connection.

B.1 Timber-to-timber connections with screws - torsionally restrained header beam

Loading perpendicular to the connector plane

$$F_{1,Rk} = n_{ef} \cdot 0{,}43 \cdot \sqrt{d} \cdot \ell_{ef}^{0,9} \cdot \rho_k^{0,8} \text{ in N} \quad \text{(B.1.1)}$$

Loading in the direction of insertion for $e_2 \leq e_{lim}$

E.u.r.o.Tec connectors XS:

$$F_{2,Rk} = n_{90,J} \cdot F_{la,J,Rk} \quad \text{(B.1.2)}$$

$$K_{ser} = \frac{n_{90} \cdot \rho_m^{1,5} \cdot d^{0,8}}{30} \quad \text{(B.1.3)}$$

E.u.r.o.Tec connectors S, M and L:

$$F_{2,Rk} = \frac{1{,}25 \cdot n_{45} \cdot F_{ax,\alpha,Rk}}{\sqrt{2}} \quad \text{(B.1.4)}$$

$$K_{2,ser} = \frac{F_{2,Rk}}{2 \text{ mm}} \quad \text{(B.1.5)}$$

Loading in the direction of insertion for $e_2 > e_{lim}$

E.u.r.o.Tec connectors S, M and L:

$$F'_{2,Rk} = \frac{F_{2,Rk}}{\left(1+\left(\frac{e_2 - e_{lim}}{e_M}\right)^3\right)^{1/3}} \quad \text{(B.1.6)}$$

Loading against the direction of insertion

E.u.r.o.Tec connectors XS: $F_{3,Rk} = 1{,}7$ kN (B.1.7)
E.u.r.o.Tec connectors S: $F_{3,Rk} = 5{,}0$ kN (B.1.8)
E.u.r.o.Tec connectors M: $F_{3,Rk} = 13$ kN (B.1.9)
E.u.r.o.Tec connectors L: $F_{3,Rk} = 23$ kN (B.1.10)

Loading perpendicular to the direction of insertion

$$F_{4,Rk} = \min \begin{cases} \dfrac{F_{la,J,Rk}}{\sqrt{\left(\dfrac{1}{(n_{90}+n_{45})} + \dfrac{e_{45}}{e_{1,J}}\right)^2 + \left(\dfrac{e_{45}}{e_{2,J}}\right)^2}} \\ \dfrac{F_{la,H,Rk}}{\sqrt{\left(\dfrac{1}{(n_{90}+n_{45})} + \dfrac{e_{45}}{e_{1,H}}\right)^2 + \left(\dfrac{e_{45}}{e_{2,H}}\right)^2}} \end{cases} \quad \text{(B.1.11)}$$

Where:

α Angle between screw axis and grain direction

n_{ef} = 0,6 for E.u.r.o.Tec connector XS

n_{ef} = 0,5 · $n_{90,J}$ for E.u.r.o.Tec connectors S, M and L

$\ell_{ef,J}$ Penetration depth of the threaded part of a joist screw

$\ell_{ef,H}$ Penetration depth of the threaded part of a header screw

$\rho_{k,J}$ Characteristic density of the joist

$\rho_{k,H}$ Characteristic density of the header

n_{45} Number of inclined screws in the joist or header plate of the E.u.r.o.Tec connector

n_{90} Number of screws perpendicular to the joist or header plate of the E.u.r.o.Tec connector

$F_{la,J,Rk}$ Lateral capacity of a joist screw,

$$F_{la,J,Rk} = \min\left(2{,}3 \cdot \sqrt{0{,}4 \cdot M_{y,k} \cdot f_{h,k} \cdot d};\ 0{,}4 \cdot f_{h,k} \cdot d \cdot \ell_{ef}\left[\sqrt{2 + \frac{4 \cdot M_{y,k}}{0{,}4 \cdot f_{h,k} \cdot d \cdot \ell_{ef}^2}} - 1\right]\right)$$

$F_{la,H,Rk}$ Lateral capacity of a header screw, $F_{la,H,Rk} = \min\left(2{,}3 \cdot \sqrt{M_{y,k} \cdot f_{h,k} \cdot d};\ f_{h,k} \cdot d \cdot \ell_{ef}\left[\sqrt{2 + \frac{4 \cdot M_{y,k}}{f_{h,k} \cdot d \cdot \ell_{ef}^2}} - 1\right]\right)$

$M_{y,k}$ Characteristic yield moment of a screw

$f_{h,k}$ Characteristic embedding strength according to equation (8.15) of Eurocode 5

d Outer thread diameter of a screw

$F_{ax,\alpha,J,Rk}$ Withdrawal capacity of an inclined joist screw, $F_{ax,\alpha,J,Rk} = \frac{0{,}52 \cdot \sqrt{d} \cdot \ell_{ef,J}^{0,9} \cdot \rho_{k,J}^{0,8}}{1{,}2 \cdot \cos^2\alpha + \sin^2\alpha}$,

$F_{ax,\alpha,H,Rk}$ Withdrawal capacity of an inclined header screw, $F_{ax,\alpha,H,Rk} = \frac{0{,}52 \cdot \sqrt{d} \cdot \ell_{ef,H}^{0,9} \cdot \rho_{k,H}^{0,8}}{1{,}2 \cdot \cos^2\alpha + \sin^2\alpha}$

e_2 Eccentricity of the force $F_{2,Ed}$ with regard to the joist end grain surface

e_{45} Eccentricity of the force $F_{4,Ed}$ with regard to the centre of the E.u.r.o.Tec connector

e_{lim} E.u.r.o.Tec connector dimension (see Table B.1)

e_M $M_{2,Rk}/F_{2,Rk}$

$M_{2,Rk}$ The lower characteristic moment capacity of the joist or header connection

$$M_{2,Rk} = F_{ax,Rk} \cdot e_Z + F_{2,Ed} \cdot e_{lim}$$

$F_{ax,Rk}$ Withdrawal capacity of a moment screw arranged perpendicular to the connector plate

e_Z E.u.r.o.Tec connector dimension (see Table B.1)

$e_{1,J}$, $e_{2,J}$, $e_{1,H}$, $e_{2,H}$ E.u.r.o.Tec connector dimensions (see Table B.1);

Table B.1. E.u.r.o.Tec connectors; dimensions and numbers of screws

E.u.r.o.Tec connector No.	Width b [mm]	Depth h [mm]	Screw diameter [mm]	Number of screws				e_{lim} [mm]	e_Z [mm]	$e_{1,J}$ [mm]	$e_{2,J}$ [mm]	$e_{1,H}$ [mm]	$e_{2,H}$ [mm]
				Header		Joist							
				n_{90}	n_{45}	n_{90}	n_{45}						
30x30	30	30	4,0	3	-	3	-	-	16	52	39	52	38
50x60	50	60	4,0	2	2	2	2	0,0	25	80	93	80	82
50x80	50	80	4,0	2	4	2	4	9,1	41	101	170	117	197
50x100	50	100	4,0	2	6	4	6	14	46	185	380	158	366
70x120	70	120	5,0	2	4	2	5	10	55	151	286	170	301
70x140	70	140	5,0	2	6	2	6	17	78	189	436	213	467
70x160	70	160	5,0	2	8	4	7	23	95	310	837	265	689
70x180	70	180	5,0	2	10	4	8	30	95	378	1173	320	965
110x220	110	220	8,0	2	4	2	5	33	0	278	1027	419	572
110x260	110	260	8,0	3	5	3	6	50	129	440	2157	517	964
110x300	110	300	8,0	4	6	3	7	66	146	7536	3004	700	1623
110x340	110	340	8,0	3	7	3	9	84	240	759	5311	726	2014
110x380	110	380	8,0	4	8	2	11	101	288	879	6946	954	3079
110x420	110	420	8,0	4	10	2	12	107	338	999	9140	1237	4555
110x460	110	460	8,0	3	11	3	13	123	364	1315	13020	1237	5116
110x500	110	500	8,0	4	12	2	15	141	407	1459	15870	1555	7139
110x540	110	540	8,0	4	14	2	16	147	448	1612	19190	1925	9713
110x580	110	580	8,0	4	14	2	18	175	488	2001	25810	1915	10530

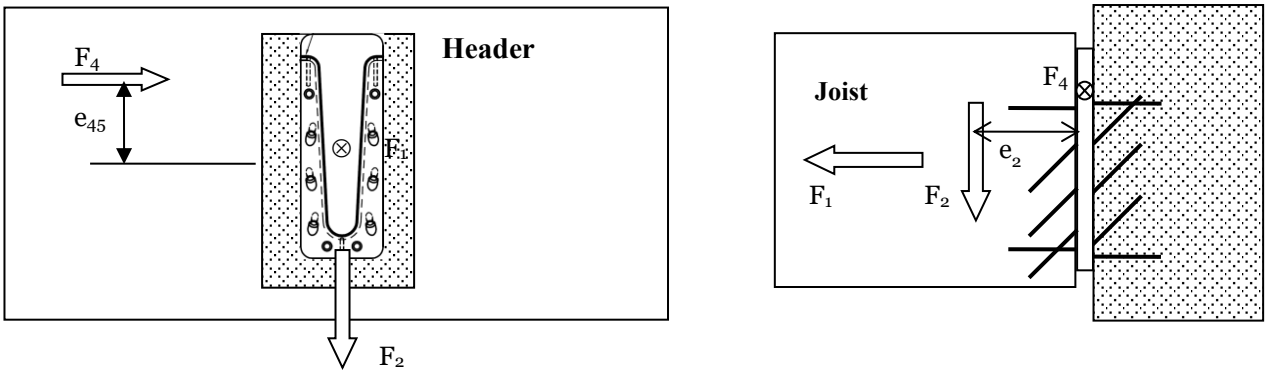


Figure B.1 Definition of e_2 and e_{45}

Combined forces

In case of combined forces, the following inequality shall be fulfilled:

$$\left(\frac{F_{1,Ed}}{F_{1,Rd}}\right)^2+\left(\frac{F_{2,Ed}}{F_{2,Rd}}\right)^2+\left(\frac{F_{3,Ed}}{F_{3,Rd}}\right)^2+\left(\frac{F_{4,Ed}}{F_{4,Rd}}\right)^2\le 1 \qquad \text{(B.1.12)}$$

Here, $F_{1,Ed}$, $F_{2,Ed}$, $F_{3,Ed}$ and $F_{4,Ed}$ are the design loads perpendicular to the connector plate and parallel and perpendicular to the direction of insertion, respectively.

Annex B - continued
Design values of load-carrying capacities and stiffness - Timberframe PRV

B.2 Design load-carrying capacities of E.u.r.o.Tec connector joints

The force F_{23} is assumed to act in the middle of the joist. The forces F_1 and F_{45} are assumed to act at a distance e_1 or e_{45} from the centre of gravity of the joist connection.

Force F_1 for E.u.r.o.Tec Timberframe PRV connectors:

$$F_{1,Rd} = \frac{F_{ax,Rd}}{\frac{1}{n_J} + \frac{e_1 \cdot x_{max}}{I_{p,ax}}} \quad (B.2.1)$$

Force F_2 or F_3 for E.u.r.o.Tec Timberframe PRV connectors:

$$F_{23,Rd} = \rightleftarrows \min \begin{cases} n_J \cdot F_{v,Rd} \\ \frac{f_{tens,FS,k}}{\gamma_{M2}} \end{cases} \quad [N] \quad (B.2.2)$$

Force F_{45} for E.u.r.o.Tec Timberframe PRV connectors:

$$F_{45,Rd} = \frac{F_{v,Rd}}{\sqrt{\left(\frac{1}{n_J} + \frac{e_{45} \cdot x_{max}}{I_p}\right)^2 + \left(\frac{e_{45} \cdot y_{max}}{I_p}\right)^2}} \quad (B.2.3)$$

Where:

$F_{ax,Rd}$ Axial design load-carrying capacity per joist screw in N;

$$F_{ax,Rk} = 0{,}3 \cdot f_{ax,k} \cdot d \cdot \ell_{ef} \cdot \left(\frac{\rho_k}{350}\right)^{0,8}$$

$f_{ax,k}$ Joist screw withdrawal parameter for an angle of 90° between screw axis and grain direction;

d Joist screw diameter, d = 4 mm or d = 5 mm;

ℓ_{ef} Thread penetration length of the joist screws in mm;

ρ_k Characteristic joist density in kg/m³;

$F_{v,Rd}$ Lateral design load-carrying-capacity of a joist screw oriented parallel to grain in N;

$$F_{v,Rk} = 2{,}3 \cdot \sqrt{M_{y,k} \cdot f_{h,k} \cdot d} + 0{,}25 \cdot F_{ax,Rk}$$

$M_{y,k}$ Characteristic yield moment of a joist screw in Nmm;

$f_{h,k}$ Characteristic joist embedding strength in N/mm²;

$$f_{h,k} = 0{,}033 \cdot \rho_k \cdot d^{-0,3}$$

n_J Number of screws per joist connection, see table B.2;

e_1 Distance between the force $F_{1,Ed}$ and the centre of gravity of the joist connection in mm;

e_{45} Distance between the force $F_{45,Ed}$ and the centre of gravity of the joist connection in mm;

$f_{tens,FS,k}$ Characteristic tensile capacity of a fixing screw in N, see Table B.2;

γ_{M2} Partial material safety factor for steel tensile members;

$I_{p,ax}/x_{max}$ Connector dimension, see table B.2;

I_p/x_{max} Connector dimension, see table B.2;

I_p/y_{max} Connector dimension, see table B.2;

Combined forces

In case of combined forces, the following inequality shall be fulfilled:

$$\left(\frac{F_{1,Ed}}{F_{1,Rd}}\right)^2 + \left(\frac{F_{23,Ed}}{F_{23,Rd}}\right)^2 + \left(\frac{F_{45,Ed}}{F_{45,Rd}}\right)^2 \leq 1 \quad (B.2.4)$$

Table B.2. Numbers n_J and connector dimensions

Connector		40x65	40x85	40x125	40x145
d	[mm]	4	5	5	5
n_J		4	4	6	7
$f_{tens,FS,k}$	[N]	7000	8000	8000	8000
$I_{p,ax}/x_{max}$	[mm]	49	54	123	168
I_p/x_{max}	[mm]	84	66	137	182
I_p/y_{max}	[mm]	90	125	391	692

B.2.1 Slip moduli of E.u.r.o.Tec Timberframe PRV joints

The following slip moduli K_{ser} related to joist edge are to be used for E.u.r.o.Tec connector joints:

E.u.r.o.Tec connector joint for load direction F_1: $$K_{ser,1} = \frac{F_{1,Rk}}{0{,}6\ \text{mm}}$$

E.u.r.o.Tec connector joint for load direction F_{23}: $$K_{ser,23} = \frac{F_{23,Rk}}{1{,}5\ \text{mm}}$$

E.u.r.o.Tec connector joint for load direction F_{45}: $$K_{ser,45} = \frac{F_{45,Rk}}{2\ \text{mm}}$$

Annex B - Continued
Design values of load-carrying capacities and stiffness – Connecto

B.3 Design load-carrying capacities of E.u.r.o.Tec connectors

The forces $F_{1,}$ F_{23} and F_{45} is assumed to act at the centre of the joist.

Force F_1 for E.u.r.o.Tec Connecto connectors:

$$F_{1,R_k} = n_{90} \cdot 0{,}43 \cdot \sqrt{d} \cdot l_{ef}^{0,9} \cdot \rho_k^{0,8} \text{ [N]} \quad \text{(B.3.1)}$$

Where:
$F_{1,Rk}$ is the characteristics withdrawal capacity of a screw in kN
n_{90} is the number of screws at 90°
d is the diameter of a screw in mm
l_{ef} is the penetration depth of the threaded part of a screw arranged parallel to the load direction in mm
ρ_k is the characteristic density of timber in kg/m3

Force F_2 for E.u.r.o.Tec Connecto connectors:

$$F_{2,R_k} = \frac{1{,}25 \cdot n_{45} \cdot F_{ax,\alpha,R_k}}{\sqrt{2}} \text{ [N]} \quad \text{(B.3.2)}$$

Where:
$F_{2,Rk}$ is the characteristics load-carrying capacity of a screw
n_{45} is the number of inclined screws installed at 45◦
$F_{ax,\alpha,Rk}$ is the withdrawal capacity of an inclined screw according to ETA-11/0024

$$K_{2,ser} = \frac{F_{2,Rk}}{2\text{ mm}} \quad \text{(B.3.3)}$$

Force F_3 for E.u.r.o.Tec Connecto connectors:

$$F_{3,Rk} = \frac{n_{lock} \cdot 1{,}25 \cdot F_{ax,lock,Rk}}{\sqrt{2}} \text{ [N]} \quad \text{(B. 3.4)}$$

n_{lock} is the number of locking screws
$F_{ax,lock,Rk}$ is the characteristic capacity of a locking screw according to ETA-11/0024 for E.u.r.o.Tec Connecto connectors arranged at an angle α = 45° to the grain

Force F_{45} for E.u.r.o.Tec Connecto connectors recessed in main beam:

$$F_{45,Rk} = f_{c,0,k} \cdot A \text{ [N]} \quad \text{(B. 3.5)}$$

Where:
$F_{45,Rk}$ is the characteristic load-carrying capacity of the connector perpendicular to connector plate in kN
$f_{c,0,k}$ is the characteristic compressive strength of timber parallel to the grain of the main beam in N/mm^2
A is the contact area between Connecto and recessed main beam member in mm^2

Table B.3. E.u.r.o.Tec Connecto contact area A for load direction F_{45} in timber-to-timber connections

Connecto	b [mm]	h [mm]	(A) [mm^2]
H135B50	50	135	1013
H175B50	50	175	1313
H175B75	75	175	1313
H215B75	75	215	1613
H240B75	77	240	1800
H265B75	75	265	1988
H290B75	75	290	2175
H215B100	100	215	1613
H240B100	100	240	1800
H265B100	100	265	1988
H290B100	100	290	2175
H240B125	125	240	1800
H265B125	125	265	1988

Combined forces

In case of combined forces, the following inequality shall be fulfilled:

$$\left(\frac{F_{1,Ed}}{F_{1,Rd}}\right)^2 + \left(\frac{F_{2,Ed}}{F_{2,Rd}}\right)^2 + \left(\frac{F_{3,Ed}}{F_{3,Rd}}\right)^2 + \left(\frac{F_{45,Ed}}{F_{45,Rd}}\right)^2 \leq 1 \qquad \text{(B.3.6)}$$