2

02 CONCEALED CONNECTORS

TOPLINE KONSTRULINE DCSTATIK

CONCEALED CONNECTORS

(Invisible connectors)

TOP UV CONCEALED CONNECTORS

- Invisible dovetail connection
- Safety catch
- Optimised hole pattern
- For loading in 4 load directions
- Quick assembly of secondary beams
- Conical dovetail guide pulls together
- Milling radii

up to 72 kN

Basics of statics **from page 68** / Products & statics **from page 66**

CONCEALED CONNECTORS TOP OV

„Simple and ingenious“
More flexibility in connection technology

- **In the factory:** Simply mill out the connection form or attach and mount on the secondary beam with a maximum of 4 tensile and 2 pressure screws.
- **On the building site:** Insert the secondary beam in the recess of the main beam or only place it down. Turn 2 pressure screws into the main beam/support.

up to 27 kN

Basics of statics **from page 84** / Products & statics **from page 82**

BEAM HANGER

- Connection to timber, concrete and masonry
- Type alu combi without holes for rod dowels. By drilling through the secondary beam and connector, you receive a connection with a perfect fit.
- Type alu SD 12 and SD 16 with assembly fix tab.

up to 258 kN

Basics of statics **from page 90** / Products & statics **from page 88**

INTEGRAL CONNECTORS

- GH integral connectors type M, 2- and 4-row with assembly fix tab for concealed connections with connections between the main/secondary beam and connections to the columns.
  For both versions, the secondary beam with pre-fitted rod dowel is suspended in the assembly fix tab.
- 2-row integral connectors with embossed reinforcement studs. This gives you the necessary accuracy of fit and the same slot width as with a 4-row integral connector.
- 4-row integral connections with even higher load-bearing capacities!

up to 58 kN

Basics of statics **from page 90** / Products & statics **from page 88**

CONCEALED CONNECTORS

2 ASSORTMENT

							Basics Statics & Diagrams from page	Products & Statics from page
TOP UV CONNECTORS TIMBER/TIMBER		CE	Al Aluminium	NKL 2			65	66
TOP UVB CONNECTORS TIMBER/CONCRETE		CE	Al Aluminium	NKL 2			65 / 68	78
TOP OV CONNECTORS		CE	Al Aluminium	NKL 2			65 / 84	82
BEAM HANGER TYPE ALU COMBI		CE	Al Aluminium	NKL 2			65 / 90	88
BEAM HANGER TYPE ALU COMBI SD 12		CE	Al Aluminium	NKL 2			65 / 90	88
BEAM HANGER TYPE ALU COMBI SD 16		CE	Al Aluminium	NKL 2			65 / 90	88
INTEGRAL CONNECTOR 2-ROW TYPE M		CE	250 GD Z275	NKL 2			65 / 90	88
INTEGRAL CONNECTOR 4-ROW TYPE M		CE	250 GD Z275	NKL 2			65 / 90	88
INTEGRAL CONNECTOR ANGLED CONNECTION			250 GD Z275	NKL 2				102

CE symbol

Steel with indication of the steel quality and galvanisation

Aluminium

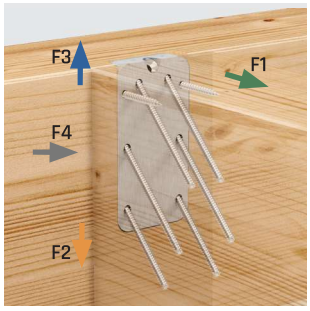
Timber/timber connection

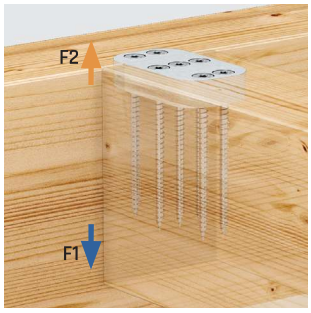
Timber/concrete-connection

Usage class 1
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated. Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

Usage class 2
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof. Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

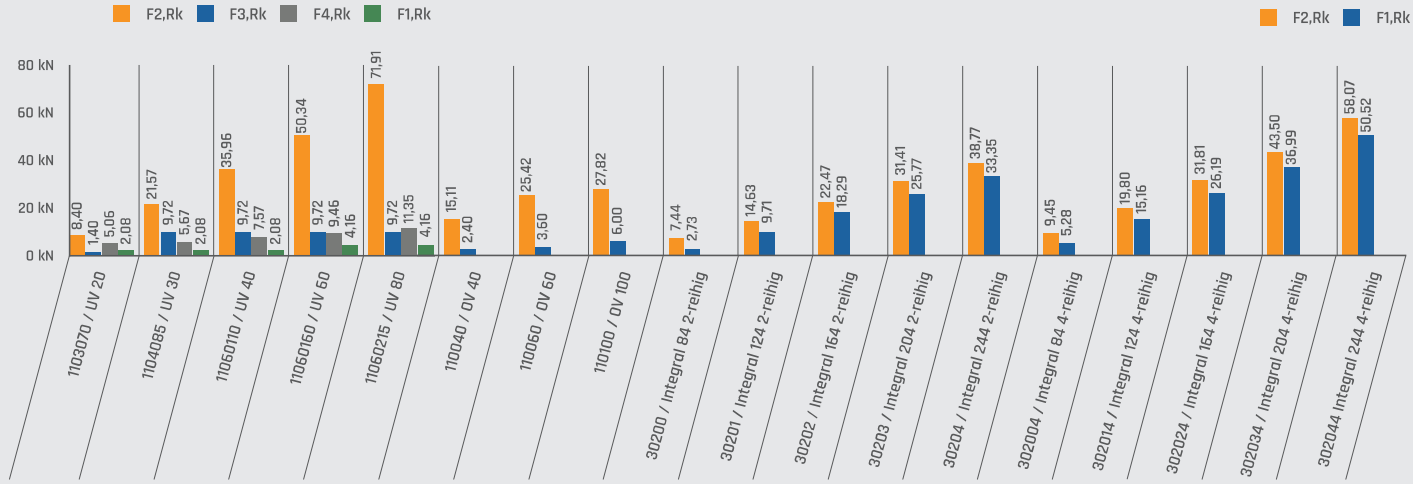
Usage class 3
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection. Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

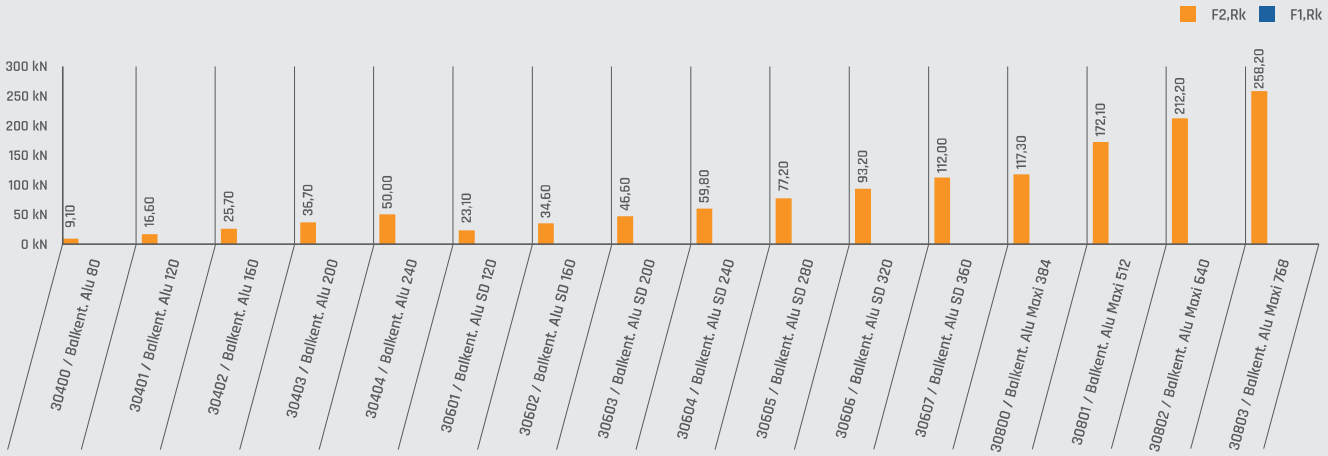




CONCEALED CONNECTORS

STATICS DIAGRAM 2





TOP UV CONNECTORS

2 TECHNICAL FEATURES

Geometry

W	Width (mm)
H	Height (mm)
T	Material thickness (mm)

Tables

n_{HT}	Number of holes in main beam
n_{NT}	Number of holes in secondary beam
n_{v}	Number of connecting elements for full screw fitting
n_{T}	Number of connecting elements for partial screw fitting
HT	Main beam
NT	Secondary beam
H_{HT}	Minimum height of main beam
B_{HT}	Minimum width of main beam
H_{NT}	Minimum height of secondary beam
B_{NT}	Minimum width of secondary beam

Verbindungsmittel Beton/Stahl

Bo	Dowels/bolts

Timber connecting element

Ø [mm]	Diameter of connecting element
L [mm]	Length of connecting element
	Grain direction of component

Force directions

F_1 →	Force at a right angle to the connector level
F_2 ↓	Force in insertion direction (main load)
F_3 ↑	Force against insertion direction (lifting load)
F_4 ↙	Force at right-angle to insertion direction in Connector level (horizontal load)

Design

$F_{i,Ed}$	Design value of impact
$F_{i,Rd}$	Design value of load capacity
$F_{i,Rk}$	Characteristic value of load capacity
i	Index of force direction
k_{mod}	Modification factor
γ_M	Partial safety factor

Dowel measurement

$F_{Bo,lat}$	Force at right angles to the bolt axis (shearing)
$F_{Bo,ax}$	Force in bolt axis
H	Spacing of the two outer bolts/dowels
$f_{2/3}$	Spacing of the two outer bolts/dowels
f_4	Spacing of the two outer bolts/dowels
n_{Bo}	Spacing of the two outer bolts/dowels

User video
for our TOP UV connectors

Aluminium

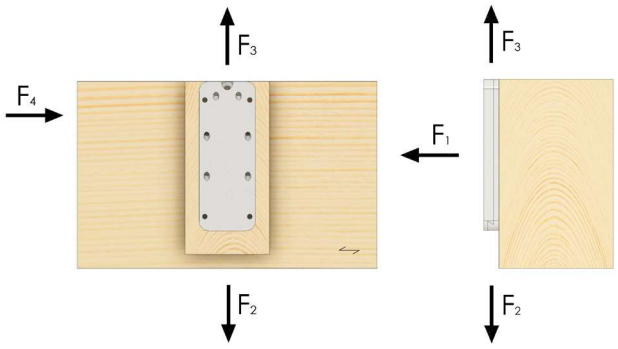
Usage class 1
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated. Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

Usage class 2
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof. Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

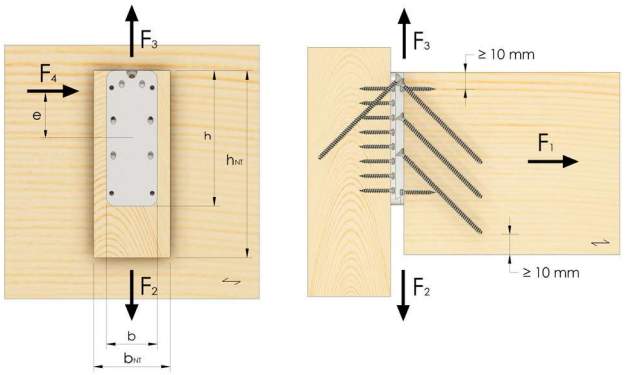
Usage class 3
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection. Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

2

Load directions



Load attack points



F_1 takes effect in the centre of the TOP UV connector.
F_2 and F_3 take effect in the centre of the TOP UV connector.
F_4 takes effect at spacing e from the centre of the TOP UV connector. In the design tables, the values for e = 0 mm and e = h/2 are indicated. Load capacities for other spacing e can be calculated according to ETA-11/0036.

Timber/timber connection

Load case F_3
When connecting timber to timber, an additional UV fully threaded screw is always required after hanging the connector.
When connecting wood - concrete/steel, always use 2 M6 x 20 locking screws with washers.

One-sided connection
With one-sided connection to a main beam, the moment $M_{ec} = F_{2/3,E} \times (B_{HT} / 2 + e)$ must be considered for the load capacity proof of the main beam. With $F_{2/3}$ support force of the secondary beam, B_{HT} - width of the main beam and e – spacing of support force from the component edge, e = 9 mm for connection timber/timber with screws, e = 17 mm for connection timber/concrete or timber/steel with dowels/bolts

Two-sided connection
In the case of connections on both sides with different loads on the secondary beam connections (difference in forces > 20 %), the moment from the differential forces of the secondary beam connections should be applied when designing the main beam.

Connection over intermediate layers
If there is an intermediate layer between the joist hangers and the main beam, the length of the connecting centre must be selected so that the fastener is anchored to the main beam at the lengths given above.

Proof of load capacity

$$\left(\frac{F_{1,Ed}}{F_{1,Rd}}+\frac{F_{2/3,Ed}}{F_{2/3,Rd}}\right)^2+\left(\frac{F_{4,Ed}}{F_{4,Rd}}\right)^2 \le 1$$

Connection timber/concrete, steel

Dowel design

Stress on the dowel/bolt for connection timber - concrete/ steel
Forces in most stressed dowel/bolt

Load case	F_1	F_2 and F_3	F_4
$F_{B,lat}$	0	$F_{2/3} / n_B$	$F_4 \times (1/n_B + e/H) = f_4 \times F_4$
$F_{B,ax}$	F_1 / n_B	$f_{2/3} \times F_{2/3}$	$1{,}2 \times F_4 / n_B$

Design value of load capacity

Full and partial screw fitting

$F_{i,Rd} = F_{i,Rk} \times k_{mod} / \gamma_{M,Holz}$ mit $\gamma_{M,Holz} = 1{,}3$

Load case F_3 timber-concrete/steel: $F_{3,Rd} = 6 / 1.25 = 4.8$ kN

Factors for connection timber-concrete/steel

Type		UV-B 40	UV-B 60	UV-B 80	
n_B		2	2	3	2
$f_{2/3}$		0.299	0.192	0.106	0.133
f_4	e = 0 mm	0.500	0.500	0.333	0.500
	e = h/2	1.267	1.167	0.948	1.114

Proof of load capacity

$$\left(\frac{F_{1,Ed}}{F_{1,Rd}}+\frac{F_{2/3,Ed}}{F_{2/3,Rd}}\right)^2+\left(\frac{F_{4,Ed}}{F_{4,Rd}}\right)^2 \le 1$$

General information

The load capacities in the table apply to timbers with a characteristic raw density of ρ_k 350 kg/m³.
For timber with a high raw density, the values in the table can be used to be on the safe side.

The height of the secondary beam must be selected so that the top screw Ø 5 mm in the secondary beam is at least 10 mm below the top of the secondary beam and the lowest screw tip in the secondary beam is at least 10 mm above the underside of the secondary beam.
The spacing between a TOP UV connector and a component surface may be max. 1 mm.

Design example timber/timber connection UV 80

Main beam: BSH GL24h 14/40; secondary beam: NH C24 10/28
Connection forces:
$F_{2,Ed}$ = 32.0 kN; $F_{4,Ed}$ = 1.20 kN; NKL 1, KLED mittel bzw. k_{mod} = 0.8; Last $F_{4,Ed}$
Attacks the secondary beam top edge.

Determination of spacing "e" between the connector's centre of gravity and the attack point of load F_4
e = h /2 = 215 / 2 = 108 mm, with connector top edge flush with the top edge of the secondary beam

Necessary characteristic load capacities of a connector

$F_{2,Rk,erf} = F_{2,Ed} / k_{mod} \times \gamma_M$ = 32.0 / 0.8 x 1.3 = 52.0 kN

$F_{4,Rk,erf} = F_{4,Ed} / k_{mod} \times \gamma_M$ = 1.20 / 0.8 x 1.3 = 1.95 kN

A higher load-bearing capacity is selected due to the biaxial load.
TOP UV 80 fully screw fitted with screws 5.0 x 60 mm and 6.0 x 160 mm

Design value of load capacities from the table values

$F_{2,Rd} = F_{2,Rk} \times k_{mod} / \gamma_M$ = 68.0 x 0.8 / 1.3 = 41.8 kN

$F_{4,Rd} = F_{2,Rk} \times k_{mod} / \gamma_M$ = 3.53 x 0.8 / 1.3 = 2.17 kN

Proof of load capacity

$$\left(\frac{F_{1,Ed}}{F_{1,Rd}} + \frac{F_{2/3,Ed}}{F_{2/3,Rd}}\right)^2 + \left(\frac{F_{4,Ed}}{F_{4,Rd}}\right)^2 \leq 1 \qquad \left(\frac{32{,}0}{41{,}8}\right)^2 + \left(\frac{1{,}20}{2{,}17}\right)^2 = 0.89$$

Connecting element:

Main beam:	GH screws 5.0 x 60	30	units
	VG screws 6.0 x 160	1	units
Secondary beam:	GH screws 5.0 x 60	4	units
	VG screws 6.0 x 160	8	units

Design example timber/concrete connection UV-B 80

Main beam: Reinforced concrete wall; secondary beam: NH C24 10/28
Proof of load capacity same as timber-timber connection

Determination of forces for the concrete with the maximum stress

Anchor forces from load $F_{2,Ed}$:

$F_{B,2,lat,Ed} = F_{2/3,Ed} / n_B$ = 32.0 / 3 = 10.7 kN

$F_{B,2,ax,Ed} = f_{2/3} \times F_{2/3,Ed}$ = 0.106 x 32.0 = 3.39 kN

Anchor forces from load $F_{4,Ed}$:

$F_{B,4,lat,Ed} = f_4 \times F_{4,Ed}$ = 0.948 x 1.20 = 1.14 kN

$F_{B,4,ax,Ed}$ = 1,2 x $F_{4,Ed} / n_B$ = 1.2 x 1.20 / 3 = 0.48 kN

Addition of anchor forces:

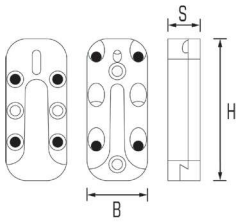
$F_{B,lat,Ed}$ = 10.7 + 1.14 = 11.8 kN

$F_{B,ax,Ed}$ = 3.39 + 0.48 = 3.87 kN

The load capacity of the concrete anchor must be verified for the impacts $F_{B,lat,Ed}$ = 11.8 kN and $F_{B,ax}$ = 3.87 kN.

Connecting element:

Concrete:	Concrete anchor M10	3	units
Secondary beam:	GH screws 5.0 x 60	4	units
	VG screws 6.0 x 160	8	units



TOPLINE DCSTATIK ETA-11 0036

NKL 2 Aluminium

TOP UV CONNECORS

2 UV 20 TIMBER/TIMBER

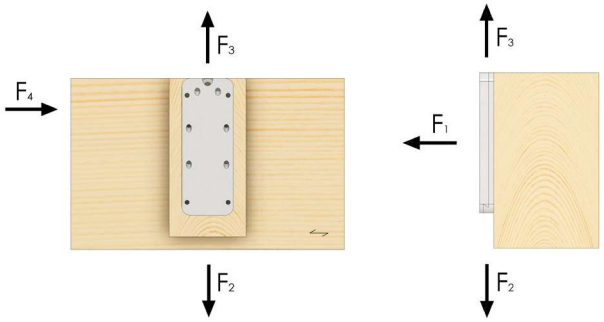
Timber / Timber

Art. No.	Type	Dimensions [mm] W(B) x H x T(S)	Milled groove [mm] Width	Depth	EAN 4019346	Weight kg	Pallet	PU
1103070	UV 20	30 x 70 x 16,0	30	16	018910	0.071	2400	25

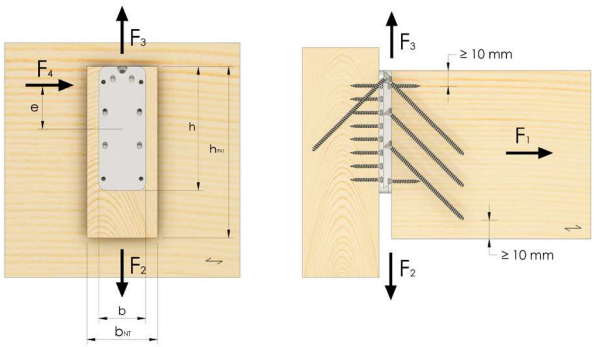
GH screw S Drive Ø x L	Full NT $n_{45°}$	Partial NT $n_{45°}$	Minimum timber cross-diameter $W(B)_{NT}$	H_{NT}	EAN	Weight	Pallet	PU
90140050 4,0 x 50/30	6(+1)	4(+1)	45	100	521533	0.255	145000	500
90140060 4,0 x 60/35	6(+1)	4(+1)	45	105	521540	0.302	110000	500
90140070 4,0 x 70/35	6(+1)	4(+1)	45	115	521557	0.349	72000	200

GH screw Ø x L	Full NT $n_{90°}$	Full HT $n_{90°}$	Partial NT $n_{90°}$	Partial HT $n_{90°}$	EAN	Weight	Pallet	PU
505050 5,0 x 50	2	6	2	4	400029	0.427	72000	200
505060 5,0 x 60	2	6	2	4	400036	0.480	58000	200
505070 5,0 x 70	2	6	2	4	400043	0.554	58000	200

Load directions



Load attack points



Statics TOP UV 20

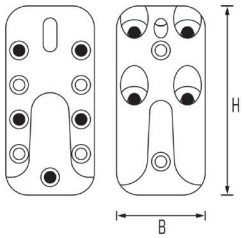
Timber / Timber

Art. No.	W(B)	H	T(S)	Secondary beam GH 4.0xL [mm]	Main beam GH 5.0xL [mm] 50 $F_{1,R}$	$F_{2,Rk}$	$F_{3,Rk}$	e=0 mm $F_{4,Rk}$	e=35 mm $F_{4,Rk}$	60 $F_{1,R}$	$F_{2,Rk}$	$F_{3,Rk}$	e=0 mm $F_{4,Rk}$	e=35 mm $F_{4,Rk}$	70 $F_{1,R}$	$F_{2,Rk}$	$F_{3,Rk}$	e=0 mm $F_{4,Rk}$	e=35 mm $F_{4,Rk}$
Full screw fitting				50	1,45	8,40	1,40	5,06	1,75	1,76	8,40	1,40	5,06	1,75	2,08	8,40	1,40	5,06	1,75
1103070	30	70	16,0	60	1,45	9,67	1,61	5,20	1,80	1,76	9,67	1,61	5,20	1,80	2,08	9,67	1,61	5,20	1,80
				70	1,45	12,2	2,04	5,49	1,90	1,76	12,2	2,04	5,49	1,90	2,08	12,2	2,04	5,49	1,90
Partial screw fitting				50	1,45	5,60	1,40	3,79	1,52	1,76	5,60	1,40	3,79	1,52	2,08	5,60	1,40	3,79	1,52
1103070	30	70	16,0	60	1,45	6,45	1,61	3,90	1,57	1,76	6,45	1,61	3,90	1,57	2,08	6,45	1,61	3,90	1,57
				70	1,45	8,15	2,04	4,12	1,65	1,76	8,15	2,04	4,12	1,65	2,08	8,15	2,04	4,12	1,65

Table values apply to partially threaded screws with the following thread lengths and pull-out parameters:
4 x 50: l_g = 33 mm, 4 x 60: l_g = 38 mm, 4 x 70: l_g = 48 mm, $f_{ax,k}$ = 12 N/mm² (r_a = 350 kg/m³)

TOPLINE DCSTATIK ETA-11 0036

NKL 2 Aluminium



TOP UV CONNECTORS

UV 30 TIMBER/TIMBER 2

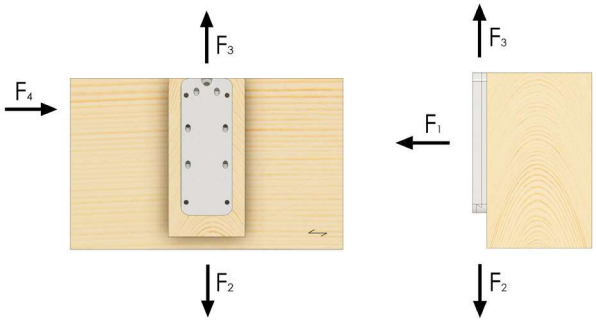
Timber / Timber

Art. No.	Type	Dimensions [mm] W(B) x H x T(S)	Milled groove [mm] Width	Depth	EAN 4019346	Weight kg	Pallet	PU
1104085	UV 30	40 x 85 x 16,0	40	16,0	018927	0.123	2400	25

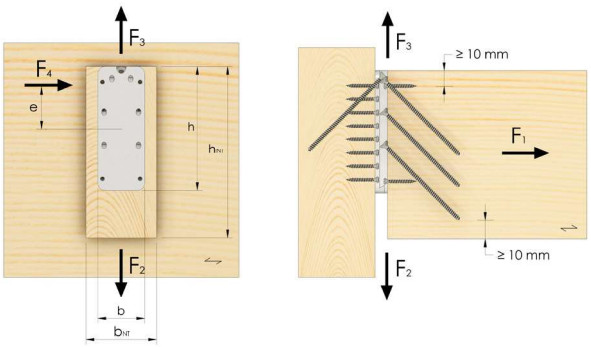
TOP UV full thread screw Ø x L	Full NT $n_{45°}$	Partial NT $n_{45°}$	Minimum timber cross-diameter B_{NT}	H_{NT}	EAN	Weight	Pallet	PU
116100	6,0 x 100	4(+1)	4(+1)	60	120	019009	1.178	39000	100
116120	6,0 x 120	4(+1)	4(+1)	60	130	019016	1.387	39000	100
116140	6,0 x 140	4(+1)	4(+1)	60	145	019023	1.629	39000	100
116160	6,0 x 160	4(+1)	4(+1)	60	160	019030	1.851	26800	100
116200	6,0 x 200	4(+1)	4(+1)	60	190	019047	2.313	26800	100

GH screw Ø x L	Full NT $n_{90°}$	Full HT $n_{90°}$	Partial NT $n_{90°}$	Partial HT $n_{90°}$	EAN	Weight	Pallet	PU
505050	5,0 x 50	2	9	2	5	400029	0.427	72000	200
505060	5,0 x 60	2	9	2	5	400036	0.480	58000	200
505070	5,0 x 70	2	9	2	5	400043	0.554	58000	200

Load directions



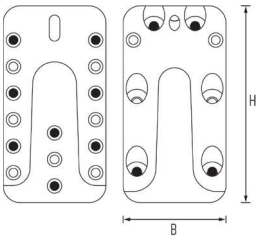
Load attack points



Statics TOP UV 30

Timber / Timber

Art. No.	W(B)	H	T(S)	Secondary beam GH VG 6.0xL [mm]	Main beam GH 5.0xL [mm] 50 $F_{1,R}$	$F_{2,Rk}$	$F_{3,Rk}$	50 e=0 mm $F_{4,Rk}$	50 e=43 mm $F_{4,Rk}$	60 $F_{1,R}$	$F_{2,Rk}$	$F_{3,Rk}$	60 e=0 mm $F_{4,Rk}$	60 e=43 mm $F_{4,Rk}$	70 $F_{1,R}$	$F_{2,Rk}$	$F_{3,Rk}$	70 e=0 mm $F_{4,Rk}$	70 e=43 mm $F_{4,Rk}$
Full screw fitting				100	1,45	19,21	5,31	5,20	1,50	1,76	20,39	5,31	5,44	1,57	2,08	21,22	5,31	5,67	1,64
				120	1,45	19,21	6,53	5,20	1,50	1,76	20,39	6,53	5,44	1,57	2,08	21,57	6,53	5,67	1,64
1104085	40	85	16,0	140	1,45	19,21	7,50	5,20	1,50	1,76	20,39	7,50	5,44	1,57	2,08	21,57	7,50	5,67	1,64
				160	1,45	19,21	8,72	5,20	1,50	1,76	20,39	8,72	5,44	1,57	2,08	21,57	8,72	5,67	1,64
				180	1,45	19,21	9,72	5,20	1,50	1,76	20,39	9,72	5,44	1,57	2,08	21,57	9,72	5,67	1,64
				200	1,45	19,21	9,72	5,20	1,50	1,76	20,39	9,72	5,44	1,57	2,08	21,57	9,72	5,67	1,64
Partial screw fitting				100	1,45	10,67	5,31	5,20	1,50	1,76	11,33	5,31	5,44	1,57	2,08	11,99	5,31	5,67	1,64
				120	1,45	10,67	6,53	5,20	1,50	1,76	11,33	6,53	5,44	1,57	2,08	11,99	6,53	5,67	1,64
1104085	40	85	16,0	140	1,45	10,67	7,50	5,20	1,50	1,76	11,33	7,50	5,44	1,57	2,08	11,99	7,50	5,67	1,64
				160	1,45	10,67	8,72	5,20	1,50	1,76	11,33	8,72	5,44	1,57	2,08	11,99	8,72	5,67	1,64
				180	1,45	10,67	9,72	5,20	1,50	1,76	11,33	9,72	5,44	1,57	2,08	11,99	9,72	5,67	1,64
				200	1,45	10,67	9,72	5,20	1,50	1,76	11,33	9,72	5,44	1,57	2,08	11,99	9,72	5,67	1,64



TOPLINE DCSTATIK ETA-11 0036

NKL 2 Al Aluminium

TOP UV CONNECTORS

2 UV 40 TIMBER/TIMBER

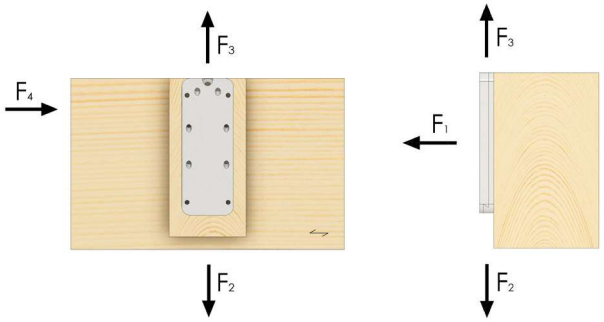
Timber / Timber

Art. No.	Type	Dimensions [mm] W(B) x H x T(S)	Milled groove [mm] Width	Depth	EAN 4019346	Weight kg	Pallet	PU
11060110	UV 40	60 x 115 x 16,0	60	16,0	018903	0.260	2400	25

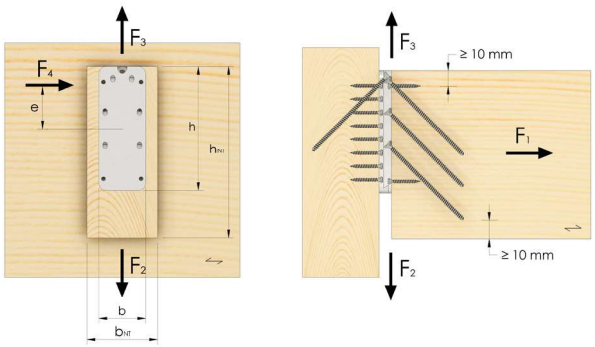
TOP UV full thread screw Ø x L	Full NT $n_{45°}$	Partial NT $n_{45°}$	Minimum timber cross-diameter B_{NT}	H_{NT}				
116100	6,0 x 100	6(+1)	4(+1)	80	175	019009	1.178	39000	100
116120	6,0 x 120	6(+1)	4(+1)	80	185	019016	1.387	39000	100
116140	6,0 x 140	6(+1)	4(+1)	80	200	019023	1.629	39000	100
116160	6,0 x 160	6(+1)	4(+1)	80	215	019030	1.851	26800	100
116200	6,0 x 200	6(+1)	4(+1)	80	245	019047	2.313	26800	100

GH screw Ø x L	Full NT $n_{90°}$	Full HT $n_{90°}$	Partial NT $n_{90°}$	Partial HT $n_{90°}$				
505050	5,0 x 50	2	15	2	8	400029	0.427	72000	200
505060	5,0 x 60	2	15	2	8	400036	0.480	58000	200
505070	5,0 x 70	2	15	2	8	400043	0.554	58000	200

Load directions



Load attack points

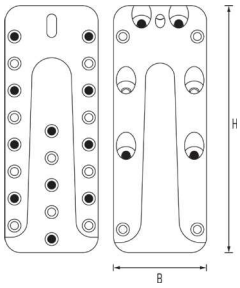


Statics TOP UV 40

Timber / Timber

Art. No.	W(B)	H	T(S)	Secondary beam GH VG 6,0xL [mm]	Main beam GH 5.0xL [mm] 50 $F_{1,R}$	$F_{2,Rk}$	$F_{3,Rk}$	e=0 mm $F_{4,Rk}$	e=43 mm $F_{4,Rk}$	60 $F_{1,R}$	$F_{2,Rk}$	$F_{3,Rk}$	e=0 mm $F_{4,Rk}$	e=43 mm $F_{4,Rk}$	70 $F_{1,R}$	$F_{2,Rk}$	$F_{3,Rk}$	e=0 mm $F_{4,Rk}$	e=43 mm $F_{4,Rk}$
Full screw fitting				100	1,45	31,84	5,31	6,94	2,59	1,76	31,84	5,31	7,25	2,70	2,08	31,84	5,31	7,57	2,82
				120	1,45	32,01	6,53	6,94	2,59	1,76	33,98	6,53	7,25	2,70	2,08	35,96	6,53	7,57	2,82
11060110	60	115	16,0	140	1,45	32,01	7,50	6,94	2,59	1,76	33,98	7,50	7,25	2,70	2,08	35,96	7,50	7,57	2,82
				160	1,45	32,01	8,72	6,94	2,59	1,76	33,98	8,72	7,25	2,70	2,08	35,96	8,72	7,57	2,82
				180	1,45	32,01	9,72	6,94	2,59	1,76	33,98	9,72	7,25	2,70	2,08	35,96	9,72	7,57	2,82
				200	1,45	32,01	9,72	6,94	2,59	1,76	33,98	9,72	7,25	2,70	2,08	35,96	9,72	7,57	2,82
Partial screw fitting				100	1,45	17,07	5,31	5,20	2,18	1,76	18,12	5,31	5,44	2,28	2,08	19,18	5,31	5,67	2,38
				120	1,45	17,07	6,53	5,20	2,18	1,76	18,12	6,53	5,44	2,28	2,08	19,18	6,53	5,67	2,38
11060110	60	115	16,0	140	1,45	17,07	7,50	5,20	2,18	1,76	18,12	7,50	5,44	2,28	2,08	19,18	7,50	5,67	2,38
				160	1,45	17,07	8,72	5,20	2,18	1,76	18,12	8,72	5,44	2,28	2,08	19,18	8,72	5,67	2,38
				180	1,45	17,07	9,72	5,20	2,18	1,76	18,12	9,72	5,44	2,28	2,08	19,18	9,72	5,67	2,38
				200	1,45	17,07	9,72	5,20	2,18	1,76	18,12	9,72	5,44	2,28	2,08	19,18	9,72	5,67	2,38

TOPLINE DCSTATIK ETA-11 0036 NKL 2 Aluminium



TOP UV CONNECTORS

UV 60 TIMBER/TIMBER 2

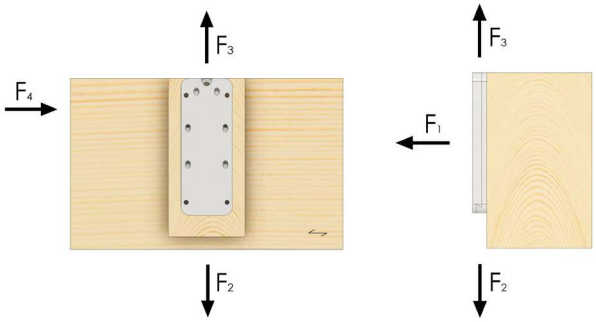
Timber / Timber

Art. No.	Type	Dimensions [mm] W(B) x H x T(S)	Milled groove [mm] Width	Depth	EAN 4019346	Weight kg	Pallet	PU
11060160	UV 60	60 x 160 x 16,0	60	16,0	018941	0.384	960	10

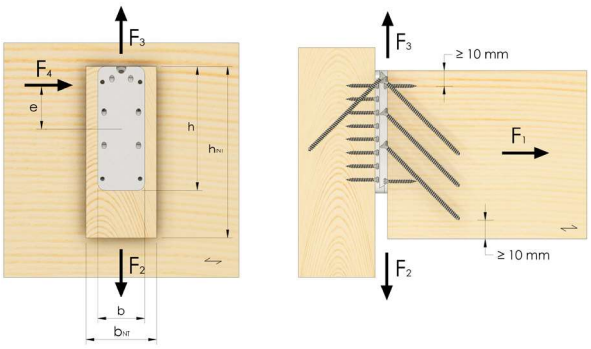
TOP UV full thread screw Ø x L	Full NT $n_{45°}$	Partial NT $n_{45°}$	Minimum timber cross-diameter B_{NT}	H_{NT}	EAN	Weight	Pallet	PU
116100 6,0 x 100	6(+1)	4(+1)	80	175	019009	1.178	39000	100
116120 6,0 x 120	6(+1)	4(+1)	80	185	019016	1.387	39000	100
116140 6,0 x 140	6(+1)	4(+1)	80	200	019023	1.629	39000	100
116160 6,0 x 160	6(+1)	4(+1)	80	215	019030	1.851	26800	100
116200 6,0 x 200	6(+1)	4(+1)	80	245	019047	2.313	26800	100

GH screw Ø x L	Full NT $n_{90°}$	Full HT $n_{90°}$	Partial NT $n_{90°}$	Partial HT $n_{90°}$	EAN	Weight	Pallet	PU
505050 5,0 x 50	4	21	4	11	400029	0.427	72000	200
505060 5,0 x 60	4	21	4	11	400036	0.480	58000	200
505070 5,0 x 70	4	21	4	11	400043	0.554	58000	200

Load directions



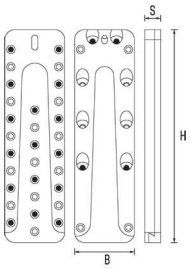
Load attack points



Statics TOP UV 60

Timber / Timber

Art. No.	B	H	S	Secondary beam GH VG 6.0xL [mm]	Main beam GH 5.0xL [mm] 50 $F_{1,R}$	$F_{2,Rk}$	$F_{3,Rk}$	e=0 mm $F_{4,Rk}$	e=43 mm $F_{4,Rk}$	60 $F_{1,R}$	$F_{2,Rk}$	$F_{3,Rk}$	e=0 mm $F_{4,Rk}$	e=43 mm $F_{4,Rk}$	70 $F_{1,R}$	$F_{2,Rk}$	$F_{3,Rk}$	e=0 mm $F_{4,Rk}$	e=43 mm $F_{4,Rk}$
Secondary beam				100	2,90	31,84	5,31	8,67	3,01	3,53	31,84	5,31	9,06	3,15	4,16	31,84	5,31	9,46	3,28
				120	2,90	39,15	6,53	8,67	3,01	3,53	39,15	6,53	9,06	3,15	4,16	39,15	6,53	9,46	3,28
11060160	60	160	16,0	140	2,90	44,81	7,50	8,67	3,01	3,53	45,01	7,50	9,06	3,15	4,16	45,01	7,50	9,46	3,28
				160	2,90	44,81	8,72	8,67	3,01	3,53	47,57	8,72	9,06	3,15	4,16	50,34	8,72	9,46	3,28
				180	2,90	44,81	9,72	8,67	3,01	3,53	47,57	9,72	9,06	3,15	4,16	50,34	9,72	9,46	3,28
				200	2,90	44,81	9,72	8,67	3,01	3,53	47,57	9,72	9,06	3,15	4,16	50,34	9,72	9,46	3,28
Partial screw fitting				100	2,90	21,22	5,31	6,94	2,71	3,53	21,22	5,31	7,25	2,83	4,16	21,22	5,31	7,57	2,95
				120	2,90	23,47	6,53	6,94	2,71	3,53	24,92	6,53	7,25	2,83	4,16	26,10	6,53	7,57	2,95
11060160	60	160	16,0	140	2,90	23,47	7,50	6,94	2,71	3,53	24,92	7,50	7,25	2,83	4,16	26,37	7,50	7,57	2,95
				160	2,90	23,47	8,72	6,94	2,71	3,53	24,92	8,72	7,25	2,83	4,16	26,37	8,72	7,57	2,95
				180	2,90	23,47	9,72	6,94	2,71	3,53	24,92	9,72	7,25	2,83	4,16	26,37	9,72	7,57	2,95
				200	2,90	23,47	9,72	6,94	2,71	3,53	24,92	9,72	7,25	2,83	4,16	26,37	9,72	7,57	2,95



TOPLINE DCSTATIK ETA-11 0036

NKL 2 Aluminium

TOP UV CONNECTORS

2

UV 80 TIMBER/TIMBER

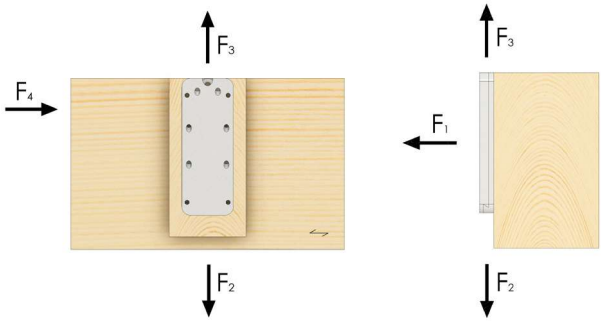
Timber / Timber

Art. No.	Type	Dimensions [mm] W(B) x H x T(S)	Milled groove [mm] Width	Depth	EAN 4019346	Weight kg	Pallet	PU
11060215	UV 80	60 x 215 x 16,0	60	16,0	018965	0.515	960	10

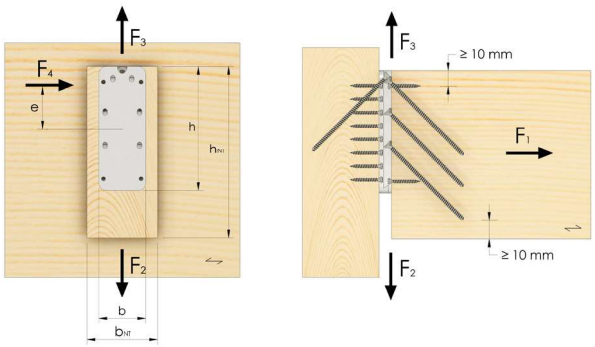
TOP UV full thread screw Ø x L	Full NT $n_{45°}$	Partial NT $n_{45°}$	Minimum timber cross-diameter B_{NT}	H_{NT}	EAN	Weight	Pallet	PU
116100 6,0 x 100	8(+1)	4(+1)	80	215	019009	1.178	39000	100
116120 6,0 x 120	8(+1)	4(+1)	80	230	019016	1.387	39000	100
116140 6,0 x 140	8(+1)	4(+1)	80	245	019023	1.629	39000	100
116160 6,0 x 160	8(+1)	4(+1)	80	260	019030	1.851	26800	100
116200 6,0 x 200	8(+1)	4(+1)	80	285	019047	2.313	26800	100

GH screw Ø x L	Full NT $n_{90°}$	$n_{90°}$	Partial NT $n_{90°}$	HT $n_{90°}$	EAN	Weight	Pallet	PU
505050 5,0 x 50	4	30	4	16	400029	0.427	72000	200
505060 5,0 x 60	4	30	4	16	400036	0.480	58000	200
505070 5,0 x 70	4	30	4	16	400043	0.554	58000	200

Load directions



Load attack points



Statics TOP UV 80

Timber / Timber

Art. No.	W(B)	H	T(S)	Secondary beam GH VG 6.0xL [mm]	Main beam GH 5.0xL [mm] 50 $F_{1,R}$	$F_{2,Rk}$	$F_{3,Rk}$	e=0 mm $F_{4,Rk}$	e=43 mm $F_{4,Rk}$	60 $F_{1,R}$	$F_{2,Rk}$	$F_{3,Rk}$	e=0 mm $F_{4,Rk}$	e=43 mm $F_{4,Rk}$	70 $F_{1,R}$	$F_{2,Rk}$	$F_{3,Rk}$	e=0 mm $F_{4,Rk}$	e=43 mm $F_{4,Rk}$
Full screw fitting				100	2,90	42,45	5,31	10,40	3,37	3,53	42,45	5,31	10,88	3,53	4,16	42,45	5,31	11,35	3,68
				120	2,90	52,21	6,53	10,40	3,37	3,53	52,21	6,53	10,88	3,53	4,16	52,21	6,53	11,35	3,68
11060215	60	215	16,0	140	2,90	60,01	7,50	10,40	3,37	3,53	60,01	7,50	10,88	3,53	4,16	60,01	7,50	11,35	3,68
				160	2,90	64,02	8,72	10,40	3,37	3,53	67,95	8,72	10,88	3,53	4,16	69,77	8,72	11,35	3,68
				180	2,90	64,02	9,72	10,40	3,37	3,53	67,95	9,72	10,88	3,53	4,16	71,91	9,72	11,35	3,68
				200	2,90	64,02	9,72	10,40	3,37	3,53	67,95	9,72	10,88	3,53	4,16	71,91	9,72	11,35	3,68
Partial screw fitting				100	2,90	21,22	5,31	6,94	2,78	3,53	21,22	5,31	7,25	2,90	4,16	21,22	5,31	7,57	3,03
				120	2,90	26,10	6,53	6,94	2,78	3,53	26,10	6,53	7,25	2,90	4,16	26,10	6,53	7,57	3,03
11060215	60	215	16,0	140	2,90	30,01	7,50	6,94	2,78	3,53	30,01	7,50	7,25	2,90	4,16	30,01	7,50	7,57	3,03
				160	2,90	34,14	8,72	6,94	2,78	3,53	34,89	8,72	7,25	2,90	4,16	34,89	8,72	7,57	3,03
				180	2,90	34,14	9,72	6,94	2,78	3,53	36,24	9,72	7,25	2,90	4,16	38,35	9,72	7,57	3,03
				200	2,90	34,14	9,72	6,94	2,78	3,53	36,24	9,72	7,25	2,90	4,16	38,35	9,72	7,57	3,03

Design example timber/concrete connection UV-B 80

Main beam: Reinforced concrete wall; secondary beam: NH C24 10/28
Proof of load capacity same as timber-timber connection

Determination of forces for the concrete with the maximum stress

Anchor forces from load $F_{2,Ed}$: $F_{B,2,lat,Ed} = F_{2/3,Ed} / n_B = 32,0 / 3 = 10,7$ kN

$F_{B,2,ax,Ed} = f_{2/3} \times F_{2/3,Ed} = 0,106 \times 32,0 = 3,39$ kN

Anchor forces from load $F_{4,Ed}$: $F_{B,4,lat,Ed} = f_4 \times F_{4,Ed} = 0,948 \times 1,20 = 1,14$ kN

$F_{B,4,ax,Ed} = 1,2 \times F_{4,Ed} / n_B = 1,2 \times 1,20 / 3 = 0,48$ kN

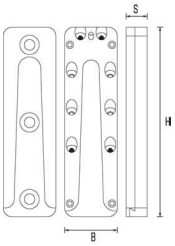
Addition of anchor forces: $F_{B,lat,Ed} = 10,7 + 1,14 = 11,8$ kN

$F_{B,ax,Ed} = 3,39 + 0,48 = 3,87$ kN

The load capacity of the concrete anchor must be verified for the impacts $F_{B,lat,Ed} = 11.8$ kN and $F_{B,ax} = 3.87$ kN.

Connecting element:

Concrete:	Concrete anchor M10	3	units
Secondary beam:	GH screws 5.0 x 60	4	units
	VG screws 6.0 x 160	8	units



TOPLINE DCSTATIK ETA-11 0036

NKL 2 Aluminium

TOP UVB CONNECTORS

2 UVB 40 TIMBER/CONCRETE

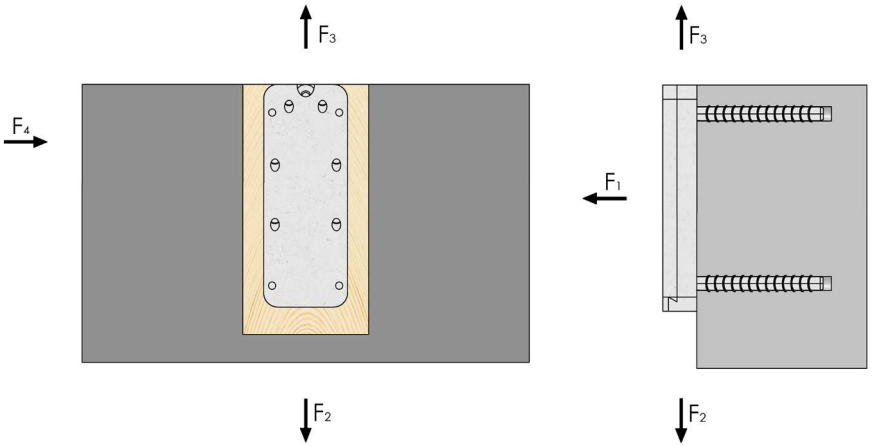
Timber / Concrete

Art. No.	Type	Dimensions [mm] W(B) x H x T(S)	Milled groove [mm] Width	Depth	EAN 4019346	Weight kg	Pallet	PU
12060115	UVB 40	60 x 115 x 24,0	60	24,0	018934	0.400	2400	10

TOP UV full thread screw Ø x L	Full NT $n_{45°}$	Partial NT $n_{45°}$	Minimum timber cross-diameter B_{NT}	H_{NT}				
116100	6,0 x 100	6	4	80	175	019009	1.178	39000	100
116120	6,0 x 120	6	4	80	185	019016	1.387	39000	100
116140	6,0 x 140	6	4	80	200	019023	1.629	39000	100
116160	6,0 x 160	6	4	80	215	019030	1.851	26800	100
116200	6,0 x 200	6	4	80	245	019047	2.313	26800	100
GH screw Ø x L	**Full NT $n_{90°}$**	**Partial NT $n_{90°}$**						
505050	5,0 x 50	2	2			400029	0.427	72000	200
505060	5,0 x 60	2	2			400036	0.480	58000	200
505070	5,0 x 70	2	2			400043	0.554	58000	200

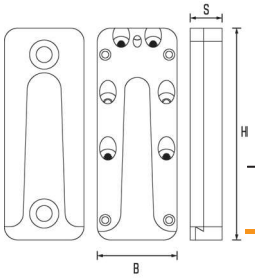
Incl. screws and washers for safety catch

Load directions



TOPLINE DCSTATIK ETA-11 0036

NKL 2 Aluminium



TOP UVB CONNECTORS

UVB 60 TIMBER/CONCRETE 2

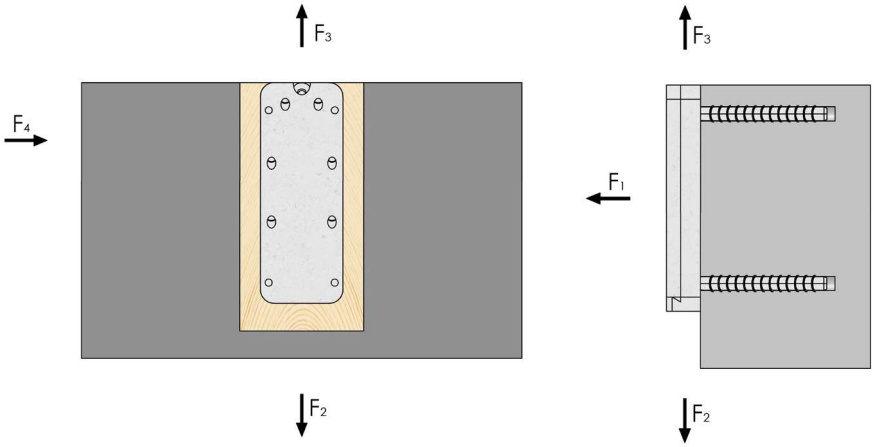
Timber / Concrete

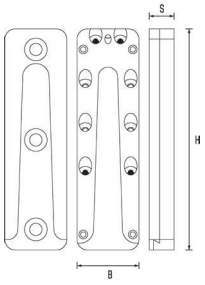
Art. No.	Type	Dimensions [mm] W(B) x H x T(S)	Milled groove [mm] Width	Depth	EAN 4019346	Weight kg	Pallet	PU
12060160	UVB 60	60 x 160 x 24,0	60	24,0	018958	0.574	960	10

TOP UV full thread screw Ø x L	Full NT $n_{45°}$	Partial NT $n_{45°}$	Minimum timber cross-diameter B_{NT}	H_{NT}	EAN	Weight	Pallet	PU
116100 6,0 x 100	6	4	80	175	019009	1.178	39000	100
116120 6,0 x 120	6	4	80	185	019016	1.387	39000	100
116140 6,0 x 140	6	4	80	200	019023	1.629	39000	100
116160 6,0 x 160	6	4	80	215	019030	1.851	26800	100
116200 6,0 x 200	6	4	80	245	019047	2.313	26800	100
GH screw Ø x L	Full NT $n_{90°}$	Partial NT $n_{90°}$						
505050 5,0 x 50	4	4			400029	0.427	72000	200
505060 5,0 x 60	4	4			400036	0.480	58000	200
505070 5,0 x 70	4	4			400043	0.554	58000	200

Incl. screws and washers for safety catch

Load directions





TOPLINE DCSTATIK ETA-11 0036

NKL 2 Aluminium

TOP UVB CONNECTORS

2 UVB 80 TIMBER/CONCRETE

Timber / Concrete

Art. No.	Type	Dimensions [mm] W(B) x H x T(S)	Milled groove [mm] Width	Depth	EAN 4019346	Weight kg	Pallet	PU
12060215	UVB 80	60 x 215 x 24,0	60	24,0	018972	0.774	960	10

TOP UV full thread screw Ø x L	Full NT $n_{45°}$	Partial NT $n_{45°}$	Minimum timber cross-diameter B_{NT}	H_{NT}				
116100 6,0 x 100	8	4	80	175	019009	1.178	39000	100
116120 6,0 x 120	8	4	80	185	019016	1.387	39000	100
116140 6,0 x 140	8	4	80	200	019023	1.629	39000	100
116160 6,0 x 160	8	4	80	215	019030	1.851	26800	100
116200 6,0 x 200	8	4	80	245	019047	2.313	26800	100
GH screw Ø x L	**Full NT $n_{90°}$**	**Partial NT $n_{90°}$**						
505050 5,0 x 50	4	4			400029	0.427	72000	200
505060 5,0 x 60	4	4			400036	0.480	58000	200
505070 5,0 x 70	4	4			400043	0.554	58000	200

Incl. screws and washers for safety catch

Load directions