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# WIDTH-ADJUSTABLE JOIST HANGERS CANTILEVER BRACKETS

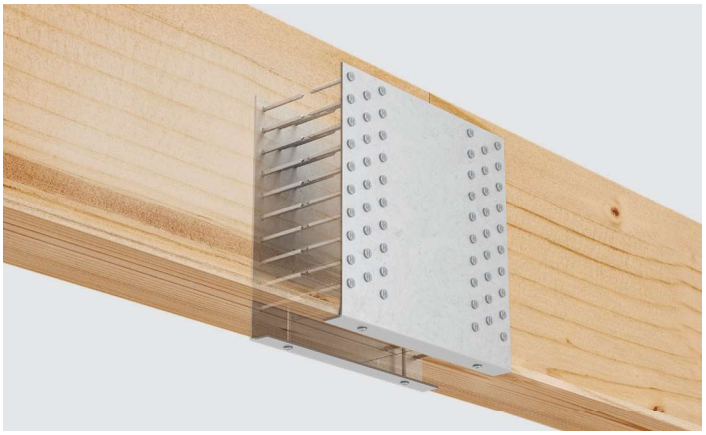
# WIDTH-ADJUSTABLE JOIST HANGERS CANTILEVER BRACKETS

## WIDTH-ADJUSTABLE JOIST HANGER TYPE 3 (2-PIECE)

GH width-adjustable joist hangers type 3 are used for the simple formation of width-adjustable purlins at the point of zero moment.
Both timbers are given a straight cut.

In addition to material costs, high production costs are also costs, as the production of notches and bolt holes is no longer necessary.

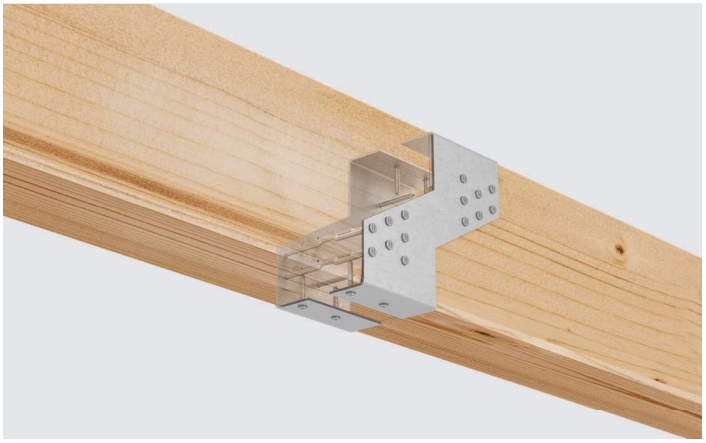
Due to the large spacing of the nail from the joint (120/2 = 60 mm), the nail spacing parallel to the grain (stressed edge) is also complied with.



Basics of statics **from page 240** / Products & statics **from page 242**

## WIDTH-ADJUSTABLE JOIST HANGER TYPE 2 (2-PIECE)

GH width-adjustable joist hangers type 2 are used for the simple formationof width-adjustable purlins at the point of zero moment. Both timbers are given a straight cut.



Products **from page 242**



## CANTILEVER BRACKETS

GH cantilever brackets are very strong connecting elements and are particularly suitable for fastening rafters on steep beams against lifting and tilting.

Basics of statics **from page 244** / Products & statics **from page 246**

# WIDTH-ADJUSTABLE JOIST HANGERS/CANTILEVER BRACKETS

## ASSORTMENT

| | Height [mm] | Width [mm] | Basics Statics from page | Products & Statics from page |
|---|---|---|---|---|
| WIDTH-ADJUSTABLE JOIST HANGER TYPE 3 (2-PIECE) | 90-380 | 220 | 240 | 242 |
| WIDTH-ADJUSTABLE JOIST HANGER TYPE 2 (2-PIECE) | 120-200 | 180 | | 242 |
| CANTILEVER BRACKETS | 90-250 | 45-150 | 244 | 246 |

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**CE symbol**

**Steel with indication of the steel quality and zinc coating**

**Timber/timber 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

# WIDTH-ADJUSTABLE JOIST HANGERS

## TECHNICAL FEATURES

### Geometry

| | |
|---|---|
| H | Height [mm] |
| W(B) | Width [mm] |
| T(S) | Material thickness [mm] |

### Tables

| | |
|---|---|
| $n_a$ | Number of connecting elements |
| NB | Nail pattern |
| $erf_h$ | Necessary cross-section height |
| $erf_b$ | Necessary cross-section width |
| VM | Connecting element Ø x length [mm] |
| Voll | Maximum number of connecting elements |

### Timber connecting element

GH threaded nails ETA-13/0523 Ø 4.0 x L [mm]

### Load directions

$F_{1,T;Rk}$ ↓ Characteristic load capacity in kN

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**Steel with indication of the steel quality and zinc coating**

**Timber/timber 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

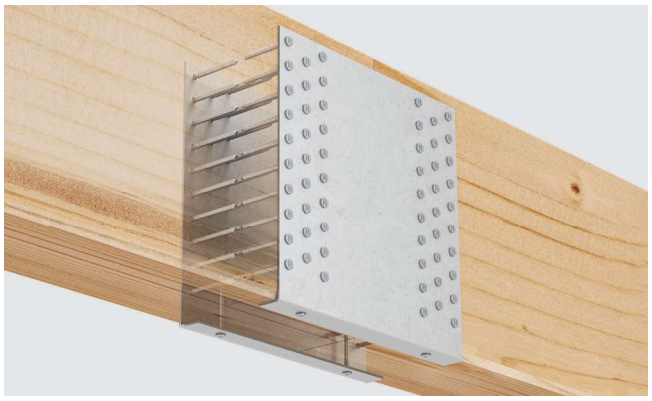
# WIDTH-ADJUSTABLE JOIST HANGERS

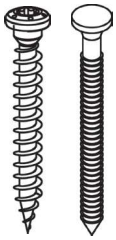
## APPLICATIONS

**Application:**
For simple formation of a joint with width-adjustable purlins
Point of zero moment.

**Materials:** 250 GD Z275

**Material thickness:**
2.0 mm





**Connecting element:**
GH threaded nails 4.0 x 35 / 40 / 50 / 60 / 75 / 100 mm
**Connecting elements from page 274**

**For use in usage classes**

NKL 1 NKL 2

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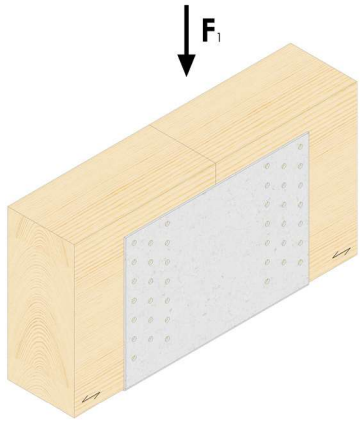
## Load directions

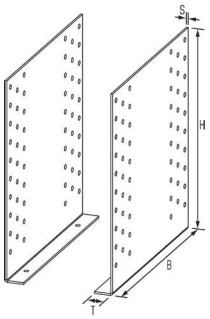



**Connection to timber**
Full nail fitting according to the statics table, under compliance minimum spacing

**Design tables**
Maximum characteristic load capacities in kN for one connector pair

**Minimum timber cross-diameter [mm]**

| $erf._h$ | $erf._B$ | | |
|---|---|---|---|
| | 4.0 x 40 mm | 4.0 x 50 mm | 4.0 x 60 mm |
| Height of connector + 30 mm | 54 | 64 | 74 |

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NKL 2

250 GD Z275

# WIDTH-ADJUSTABLE JOIST HANGERS

## TYPE 3 (2-PIECE)

| Art. No. | Dimensions [mm] | | | | | | | nN | nN | EAN | Weight | Pallet | PU | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | H | x | W(B) | x | T | x | T(S) | Ø 5 | Ø 5 | 4019346 | kg | | | | |
| 209 | 90 | x | 220 | x | 20 | x | 2,0 | 36 | 20 | 177051 | 0.812 | 480 | 20 | ■ | |
| 212 | 120 | x | 220 | x | 20 | x | 2,0 | 56 | 20 | 177068 | 1.015 | 480 | 20 | ■ | |
| 214 | 140 | x | 220 | x | 20 | x | 2,0 | 68 | 20 | 177006 | 1.150 | 480 | 20 | ■ | |
| 216 | 160 | x | 220 | x | 20 | x | 2,0 | 80 | 20 | 177075 | 1.285 | 480 | 20 | ■ | |
| 218 | 180 | x | 220 | x | 20 | x | 2,0 | 92 | 20 | 177013 | 1.421 | 360 | 15 | ■ | |
| 220 | 200 | x | 220 | x | 20 | x | 2,0 | 108 | 20 | 177020 | 1.556 | 360 | 15 | ■ | |
| 222 | 220 | x | 220 | x | 20 | x | 2,0 | 118 | 20 | 177037 | 1.691 | 360 | 15 | ■ | |
| 224 | 240 | x | 220 | x | 20 | x | 2,0 | 128 | 20 | 177082 | 1.827 | 240 | 10 | ■ | |
| 226 | 260 | x | 220 | x | 20 | x | 2,0 | 140 | 20 | 177044 | 1.962 | 240 | 10 | ■ | |
| 228 | 280 | x | 220 | x | 20 | x | 2,0 | 144 | 20 | 177099 | 1.981 | 480 | 10 | ■ | |
| 230 | 300 | x | 220 | x | 20 | x | 2,0 | 162 | 20 | 177105 | 2.120 | 480 | 10 | ■ | |
| 232 | 320 | x | 220 | x | 20 | x | 2,0 | 176 | 20 | 177112 | 2.260 | 240 | 10 | ■ | |
| 234 | 340 | x | 220 | x | 20 | x | 2,0 | 188 | 20 | 177129 | 2.400 | 240 | 10 | ■ | |
| 236 | 360 | x | 220 | x | 20 | x | 2,0 | 200 | 20 | 177136 | 2.540 | 240 | 10 | ■ | |
| 238 | 380 | x | 220 | x | 20 | x | 2,0 | 212 | 20 | 177143 | 2.680 | 240 | 10 | ■ | |
| 240 | 400 | x | 220 | x | 20 | x | 2,0 | 224 | 20 | 177150 | 2.832 | 240 | 10 | ■ | |
| 242 | 420 | x | 220 | x | 20 | x | 2,0 | 236 | 20 | 177167 | 2.967 | 240 | 10 | ■ | |

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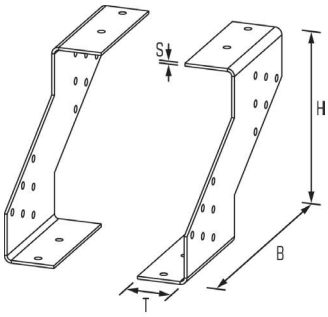
The width-adjustable joist hangers TYPE 3 (2-piece) can be used for various timber cross-sections, taking into account the minimum spacing to the edge in accordance with Eurocode 5 for various timber cross-sections.

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NKL 2

250 GD Z275

# WIDTH-ADJUSTABLE JOIST HANGERS

## TYPE 2 (2-PIECE)

| Art. No. | Dimensions [mm] | | | | | | | nN | EAN | Weight | Pallet | PU | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | H | x | W(B) | x | T | x | T(S) | Ø 5 | 4019346 | kg | | | | |
| 812 | 125 | x | 180 | x | 37 | x | 2,0 | 37 | 032626 | | 600 | 25 | ■ | |
| 814 | 140 | x | 180 | x | 37 | x | 2,0 | 37 | 032633 | 0.520 | 600 | 25 | ■ | |
| 816 | 160 | x | 180 | x | 37 | x | 2,0 | 37 | 032640 | 0.640 | 600 | 25 | ■ | |
| 818 | 180 | x | 180 | x | 37 | x | 2,0 | 37 | 032657 | 0.650 | 600 | 25 | ■ | |
| 820 | 200 | x | 180 | x | 37 | x | 2,0 | 37 | 032664 | 0.760 | 600 | 25 | ■ | |

# TYPE 3 (2-PIECE)

Timber / Timber

| Art. No. | H | W(B) | T(S) | $n_a$ | NB | $F_{1,T,Rk}$ 4.0 x 40 | 4.0 x 50 | 4.0 x 60 |
|---|---|---|---|---|---|---|---|---|
| 209 | 90 | 220 | 2,0 | 36 | Full | 6,9 | 8,1 | 8,7 |
| 212 | 120 | 220 | 2,0 | 56 | Full | 15,0 | 12,7 | 16,1 |
| 214 | 140 | 220 | 2,0 | 68 | Full | 17,2 | 20,3 | 21,7 |
| 216 | 160 | 220 | 2,0 | 80 | Full | 22,4 | 26,5 | 28,3 |
| 218 | 180 | 220 | 2,0 | 92 | Full | 28,3 | 33,4 | 35,7 |
| 220 | 200 | 220 | 2,0 | 104 | Full | 34,9 | 41,1 | 43,9 |
| 222 | 220 | 220 | 2,0 | 116 | Full | 42,0 | 49,6 | 52,9 |
| 224 | 240 | 220 | 2,0 | 124 | Full | 49,7 | 58,7 | 52,6 |
| 226 | 260 | 220 | 2,0 | 140 | Full | 58,0 | 68,4 | 73,0 |
| 228 | 280 | 220 | 2,0 | 152 | Full | 66,7 | 78,6 | 83,9 |
| 230 | 300 | 220 | 2,0 | 164 | Full | 75,8 | 89,4 | 85,5 |
| 232 | 320 | 220 | 2,0 | 176 | Full | 85,3 | 100,6 | 107,4 |
| 234 | 340 | 220 | 2,0 | 188 | Full | 95,2 | 112,3 | 119,9 |
| 236 | 360 | 220 | 2,0 | 200 | Full | 105,4 | 124,3 | 132,7 |
| 238 | 380 | 220 | 2,0 | 212 | Full | 115,9 | 136,6 | 145,9 |
| 240 | 400 | 220 | 2,0 | 224 | Full | 127,0 | 149,0 | 159,0 |
| 242 | 420 | 220 | 2,0 | 236 | Full | 138,0 | 162,0 | 173,0 |

# CANTILEVER BRACKETS

## TECHNICAL FEATURES

### Geometry

| | |
|---|---|
| H | Height (mm) |
| W(B) | Width (mm) |
| T(S) | Material thickness (mm) |

### Tables

| | |
|---|---|
| nN | Number of connecting elements |
| b | Purlin width (mm) |
| e | Height of the load attack point, above the beam top edge (mm) |

### Timber connecting element

GH threaded nails ETA-13/0523 Ø 4.0 x 40/60 (mm)

### Design

| | |
|---|---|
| $F_{\perp,Rk}$ ↑ | Characteristic load capacity for lifting loads (mm) |
| $F_{//,Rk}$ → | Characteristic load capacity for loads in beam longitudinal direction (kN) |




**Steel with indication of the steel quality and zinc coating**

**Timber/timber 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

# CANTILEVER BRACKETS

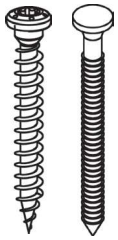
## APPLICATIONS

**Application:**
GH cantilever brackets are very strong connectors to fasten beams against lifting and tilting in combination with rafter anchors. Cantilever brackets are also suitable for tilt protection at the base point of the bracing strip fixing.

**Materials:**

250 GD Z275

**Material thickness:**
2.0 mm



**Connecting element:**
GH threaded nails 4.0 x 40/60

**Connecting elements from page 274**

**For use in usage classes**

NKL 1 NKL 2

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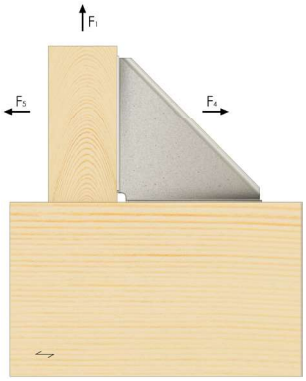
## Load directions

$F_{\perp,Rk}$ = Characteristic load capacity for lifting loads [kN]

$F_{//,Rk}$ = Characteristic load capacity for loads in beam longitudinal direction[kN]




**Conversion factors design values**

| Long | Medium | Very short |
|---|---|---|
| 0,538 | 0,615 | 0,846 |

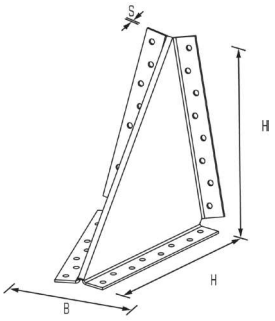
**Minimum and edge spacing**
Minimum spacing according to EN 1995-1-1, for threaded nails and screws in nail sheets, $\rho k \leq 420$ [kg/m³]
Maximum gap between timber components ≤ 3 mm.

**Connection to timber**
Full nail fitting
Min. 4.0 x 40 / purlins 4.0 x 60

**Design tables**
Characteristic value $F_{z,Rk}$ max. in kN
one cantilever bracket and one cantilever bracket in combination with a pair of rafter anchors
Characteristic raw density of timber: $\rho k$ = 350 kg/m³ (C24)

**Combined stress/proof of interaction:**
$(F_{\perp,Ed} / F_{\perp,Rd}) + (F_{//,Ed} / F_{//,Rd}) \leq 1$

# CANTILEVER

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NKL 2

250 GD Z275

| Art. No. | | | Dimensions [mm] | | | | nN | EAN | Weight | Pallet | PU | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Type | H | x | W(B) | x | T(S) | Ø 5 | 4019346 | kg | | | | |
| 20501 | 90 | 88 | x | 63 | x | 2 | 4x4 | 170007 | 0.180 | 2040 | 40 | ■ | |
| 20502 | 130 | 125 | x | 103 | x | 2 | 4x5 | 170014 | 0.410 | 1200 | 40 | ■ | |
| 20503 | 170 | 166 | x | 115 | x | 2 | 4x8 | 170021 | 0.550 | 800 | 20 | ■ | |
| 20504 | 210 | 207 | x | 133 | x | 2 | 4x10 | 170038 | 1.000 | 600 | 20 | ■ | |
| 20505 | 250 | 254 | x | 180 | x | 2 | 4x10 | 170045 | 1.500 | 320 | 20 | ■ | |

# STATICS

Timber / Timber

| Art. No. | Typ | H | B | S | Ø 5 | Load capacities of a cantilever bracket e=100 mm / b=0 $F_{\perp,Rk}$ | Load capacities of a cantilever bracket e=100 mm / b=0 $F_{//,Rk}$ | Load capacities of a cantilever bracket in combination with a pair of rafter anchors Length Rafter anchors | Load capacities of a cantilever bracket in combination with a pair of rafter anchors e=100 mm / b=0 $F_{\perp,Rk}$ | Load capacities of a cantilever bracket in combination with a pair of rafter anchors e=100 mm / b=0 $F_{//,Rk}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| 20501 | 90 | 88 | 63 | 2 | 16 | 0,50 | 0,40 | 170 | 5,60 | 4,90 |
| 20502 | 130 | 125 | 103 | 2 | 20 | 2,40 | 1,40 | 250 | 10,20 | 8,80 |
| 20503 | 170 | 166 | 115 | 2 | 24 | 4,10 | 3,20 | 290 | 10,20 | 11,60 |
| 20504 | 210 | 207 | 133 | 2 | 40 | 5,30 | 5,20 | 290 | 10,20 | 14,30 |
| 20505 | 250 | 254 | 180 | 2 | 40 | 7,00 | 8,30 | 290 | 10,20 | 17,00 |