UP LIFT

SYSTEM FOR BUILDINGS RAISED INSTALLATION

DURABILITY
It allows the construction of timber walls resting on a reinforced concrete kerb. The raised installation allows the wall to be moved away from the ground for optimal durability.

TOLERANCE MANAGEMENT
The reinforced concrete kerb is executed after the construction of the timber building, allowing maximum freedom in positioning the walls on the reinforced concrete foundation.

STRENGTH
The supports carry the weight of the building up to the completion of the reinforced concrete kerb and resist tensile and shear forces caused by earthquake or wind.

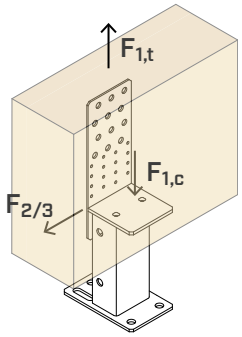
VIDEO

SERVICE CLASS SC1 SC2

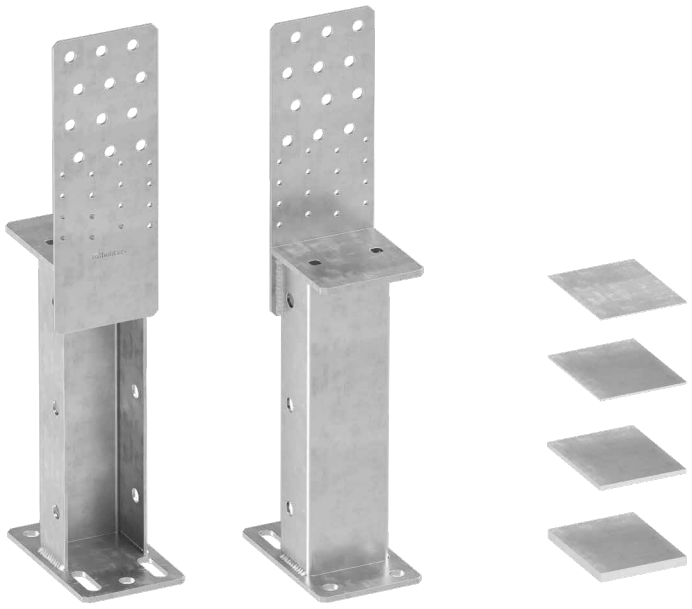
MATERIAL

S355 Fe/Zn20a — S355 + Fe/Zn20a carbon steel

EXTERNAL LOADS



VIDEO
Scan the QR Code and watch the video on our YouTube channel



FIELDS OF USE

Ground connection of timber walls installed on reinforced concrete kerb.
The kerb is cast after the construction of the timber building.
Fastening with LBA nails, LBS screws or HBS PLATE screws.

Can be applied to:
- TIMBER FRAME walls
- CLT and LVL panel walls

DISRUPTIVE

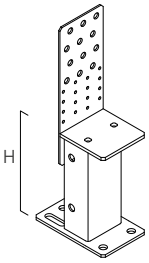
It reverses the concept of a timber construction site: first the timber building is installed and then the concrete support is poured.

STRUCTURAL RESTORATION

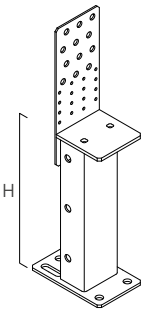
UP LIFT can be used In the case of walls that have deteriorated due to the presence of moisture, by cutting the wall and casting the kerb in sections.

CODES AND DIMENSIONS

FIXED-HEIGHT SUPPORTS



1



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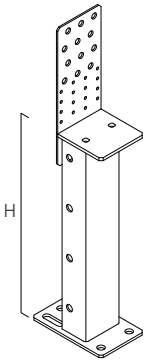


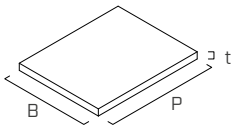
3

	CODE	H [mm]	n_V Ø11 [pcs]	n_V Ø5 [pcs]	n_H Ø14 [pcs]	n_H Ø14 x 30 [pcs]	pcs
1	**UPLIFT200**	200	12	16	3	2	1
2	**UPLIFT300**	300	12	16	3	2	1
3	**UPLIFT400**	400	12	16	3	2	1

SHIM PLATES

CODE	B [mm]	P [mm]	t [mm]	pcs
SHIMS10010001	100	100	1	50
SHIMS10010002	100	100	2	25
SHIMS10010005	100	100	5	10
SHIMS10010010	100	100	10	5

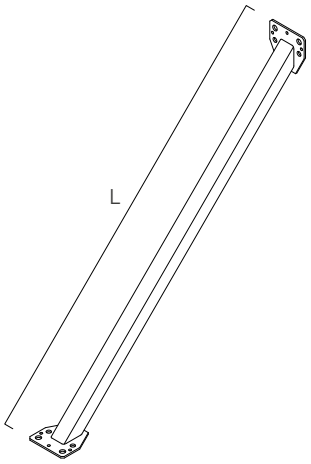
The shim plates are manufactured from carbon steel.



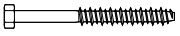
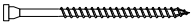
STABILIZATION SUPPORT

CODE	L [mm]	n Ø13 [pcs]	n Ø11 [pcs]	n Ø6 [pcs]	pcs
GIR451000	100	2+2	2+2	3+3	1

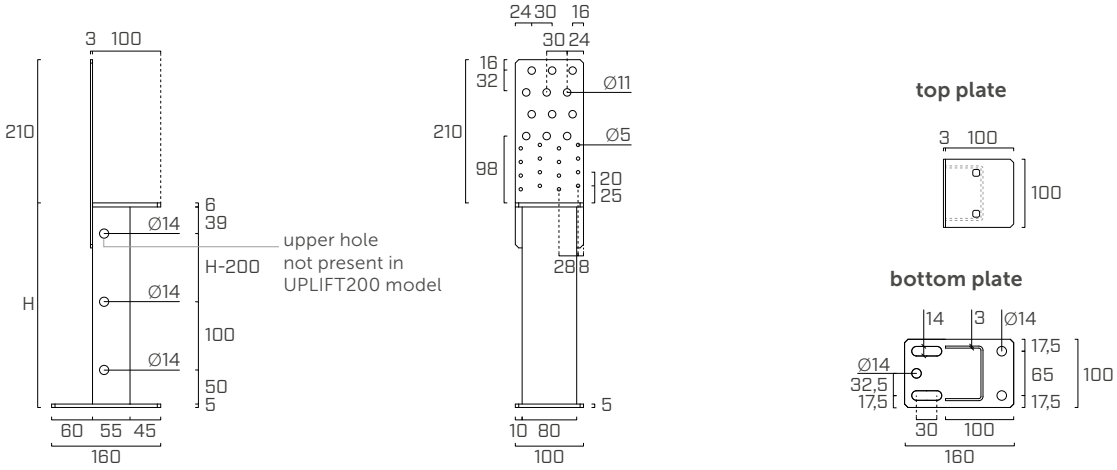
The stabilisation supports are manufactured from bright zinc-plated carbon steel.
The Ø13 holes can be used for fastening on concrete with Ø12 SKR anchors or on timber with Ø10 HBS PLATE screws.
The Ø11 holes can be used for fastening on timber with Ø8 HBS PLATE screws.
The Ø6 holes can be used for fastening on timber with Ø5 LBS screws.



FASTENERS

type	description		d [mm]	support
LBA	high bond nail		4	
LBS	round head screw		5	
SKR	screw-in anchor		12	
AB1	CE1 expansion anchor		12	
HBS PLATE	pan head screw		8	

GEOMETRY

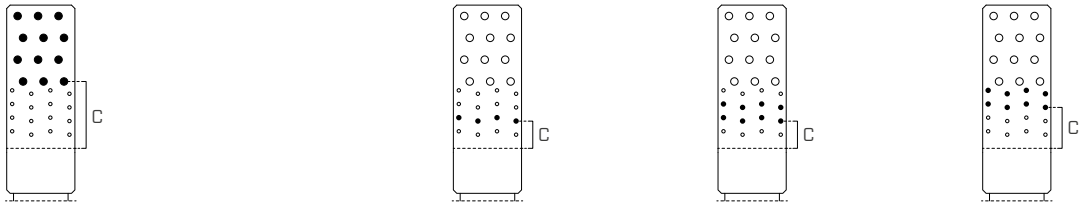


INSTALLATION

FASTENING PATTERNS

INSTALLATION ON CLT

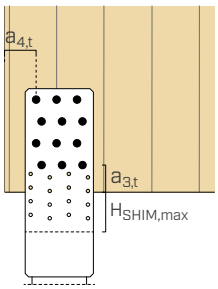
INSTALLATION ON TIMBER FRAME



pattern 1 | pattern 2 | pattern 3 | pattern 4

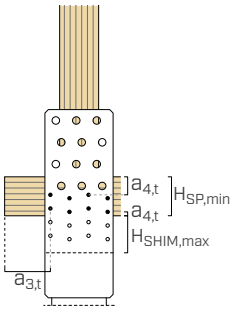
INSTALLATION ON CLT

configuration	fasteners n - type	c [mm]	$H_{SHIM,max}$ [mm]	minimum distances $a_{3,t}$ [mm]	minimum distances $a_{4,t}$ [mm]
pattern 1	12 - HBS PLATE Ø8	98	50	48	48



INSTALLATION ON TIMBER FRAME

configuration	fasteners n - type	c [mm]	$H_{SHIM,max}$ [mm]	$H_{SP,min}$ [mm]	minimum distances $a_{3,t}$ [mm]	minimum distances $a_{4,t}$ [mm]
pattern 2	4 - LBA Ø4	40	27	60	60	13
	4 - LBS Ø5				75	13
pattern 3	8 - LBA Ø4	40	27	80	60	13
	8 - LBS Ø5				75	13
pattern 4	8 - LBA Ø4	60	47	100	60	13
	8 - LBS Ø5				75	13



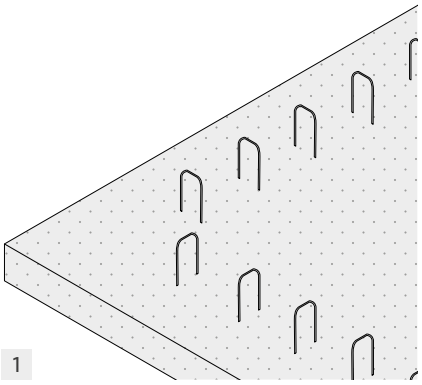
NOTES

- $H_{SHIM,max}$ is the maximum permissible height for shim plates.
- $H_{SP,min}$ is the maximum thickness of the timber element to be fastened, in the case of installation on framed walls.
- The maximum height of the $H_{SHIM,max}$ levelling shims is determined taking into account the regulatory requirements for timber fastenings shown in the INSTALLATION section:
  - CLT: minimum distances according to ÖNORM EN 1995-1-1 (Annex K) for nails and ETA-11/0030 for screws.
  - C/GL: minimum distances for solid timber or glulam consistent with EN 1995-1-1:2014 according to ETA considering a timber density $\rho_k \leq 420$ kg/m^3.
- The minimum platform thickness $H_{SP,min}$ was determined by considering $a_{4,t} \geq 13$ mm in accordance with the requirements of ETA-22/0089.
- The anchor system of the UP LIFT support to the reinforced concrete kerb is the responsibility of the structural designer of the work. In the side holes of the UP LIFT support there are holes for the insertion of Ø12 rods to improve the anchoring system to the kerb.

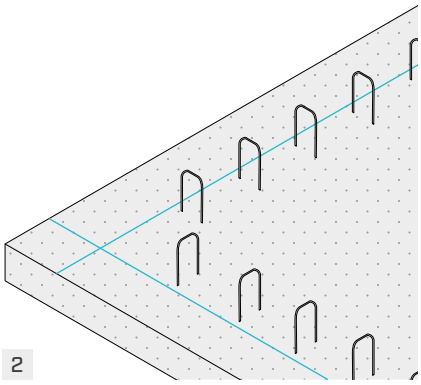
MOUNTING

UP LIFT supports make it possible to construct timber buildings in which the walls are installed on a reinforced concrete kerb in order to ensure the necessary durability. Usually, reinforced concrete kerbs are constructed with a geometric tolerance that is incompatible with the precision of timber walls, resulting in problems on site that lead to wasted time and money.
UP LIFT allows the reinforced concrete kerb to be built after the timber walls have been installed, so that these inconveniences are eliminated. The builder of the timber building must place the UP LIFT supports on the reinforced concrete foundation in order to lay the raised walls. Following the assembly of the timber structures, the kerb can be constructed, which acts as a transfer element for the compressive stresses from the walls.

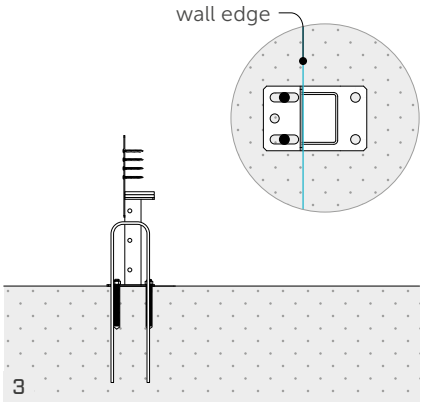
The construction sequence is shown schematically.



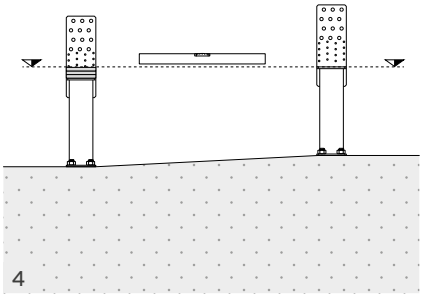
Prepare the reinforced concrete base with the reinforcement brackets for future connection to the reinforced concrete kerb.



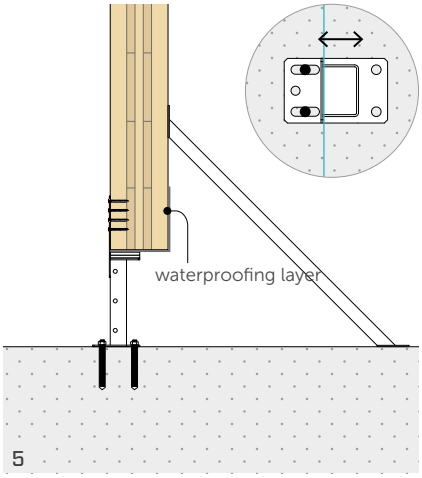
On the surface of the foundation, trace the line of the timber walls using a powder marker. The flush can be either internal or external depending on the choice of the direction in which the supports are to be installed (external or internal plate). Along the length of the walls trace the position of the UP LIFT supports.



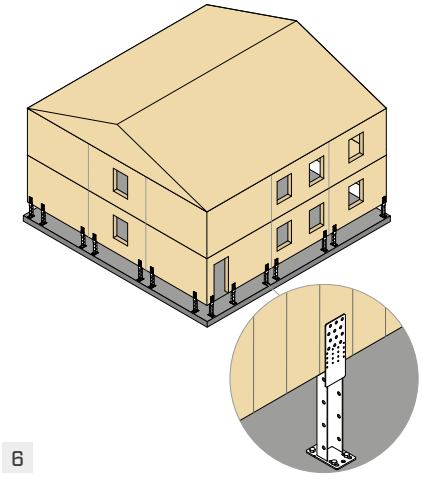
Position the UP LIFT supports and align the base plate with the outer edge of the timber wall. Fasten the supports with SKR screw-in anchors positioned in the centre of the slotted holes.



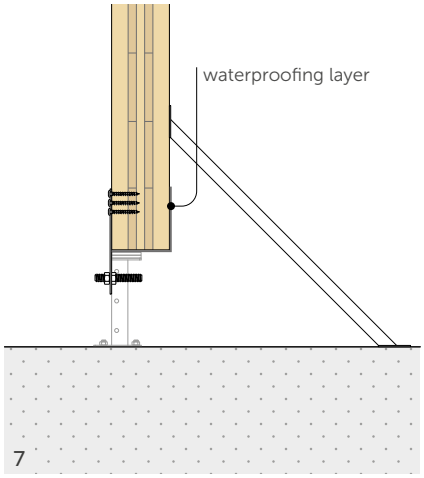
Locate the support with the highest elevation. This will be the reference point for installing the walls. Place SHIM shims on the other UP LIFT supports to bring them to the same height as the reference point.



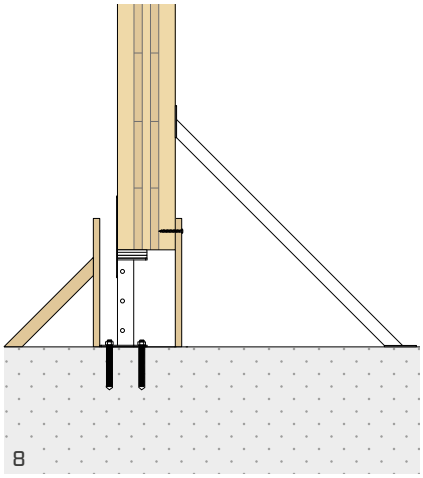
Place the timber walls on the supports and fasten them with HBS PLATE or LBS screws. Slots on the base plate allow for possible adjustment of the position of the supports in the event of tracking errors (± 15 mm). If necessary, the GIR451000 supports can be inserted to stabilise the base of the walls for out-of-plane movements. If required, an alternative fastening can be used in the centre of the slotted holes.



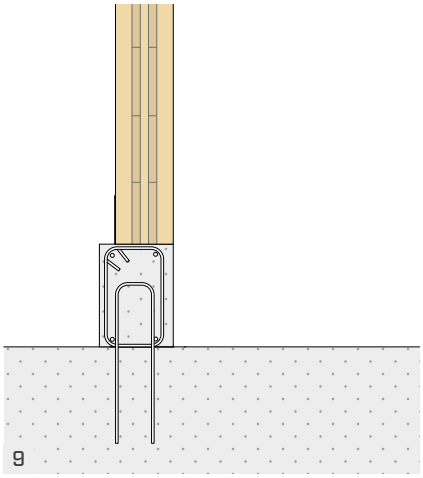
Complete the construction of the timber building making sure to leave the GIR451000 supports in place at the base of the walls. GIR3000 or GIR4000 supports can be used to stabilise the top of the walls while waiting for the first floor to be installed. The number of UP LIFT supports must take into account the loads resulting from the building's self-weight up to the construction of the kerb.



Complete the installation of the ground fastenings (see ALTERNATIVE FASTENING section).



Position the formwork for casting the kerb. On one side the formwork can be directly screwed to the wall, while on the other side it must be spaced at least 60 mm to allow the concrete to be poured.

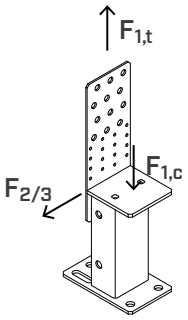


Complete the casting of the kerb. When cured, remove the GIR451000 formwork and supports.

The preparation of the reinforcement rods for the reinforced concrete kerb can be carried out in several steps depending on requirements. It is recommended to perform it after step 3 (after installing the UP LIFT supports) or after step 7 (after installing the walls). In any case, it is possible to use the holes provided on the UP LIFT support to insert 12 mm diameter rods in order to improve the supports anchor system to the reinforced concrete kerb.

STRUCTURAL VALUES | $F_{1,c}$ | $F_{1,t}$ | $F_{2/3}$

configuration	fasteners type	fasteners Ø x L [mm]	n_V [pcs]	$R_{1t,k\ timber}$ [kN]	$R_{2/3,k\ timber}$ [kN]	$R_{2/3,k\ steel}$ [kN]	$R_{1c,k\ steel}$ [kN]
pattern 1	HBS PLATE	Ø8 x 100	12	**57,2**[2]	**57,2**	**24,9**[1]	**88,2**[1]
pattern 2	LBA nails	Ø4 x 60	4	-	**11,3**	-[2]	
	LBS screws	Ø5 x 70		-	**9,8**		
pattern 3	LBA nails	Ø4 x 60	8	-	**22,6**	-[2]	
	LBS screws	Ø5 x 70		-	**19,5**		
pattern 4	LBA nails	Ø4 x 60	8	-	**22,6**	-[2]	
	LBS screws	Ø5 x 70		-	**19,5**		



[1]Su UPLIFT400
[2]The steel-side values are over-resistance compared to the timber-side strength

GENERAL PRINCIPLES

- A timber density of ρ_k = 350 kg/m^3 was considered for the calculation process. The tensile $R_{1t,k\ timber}$ and shear $R_{2/3,k\ timber}$ strengths refer to the failure of the timber-side connection. The steel-side strength is considered to be satisfied.
- The design values for tensile stress $F_{1,t}$ or shear stress $F_{2/3}$ are derived from the values in the table as follows:

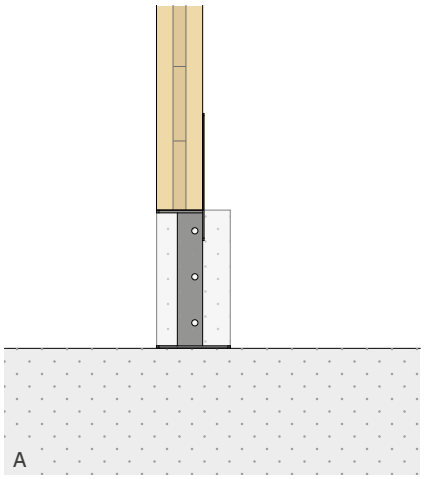
$$R_d = min \begin{cases} \frac{R_{k,\ timber} \cdot k_{mod}}{\gamma_M} \\ \frac{R_{ik,\ steel}}{\gamma_{M1}} \end{cases}$$

The coefficients k_{mod} and γ_M, γ_{M1} should be taken according to the current regulations used for the calculation.

- The compressive strength can be verified considering the actual loads acting during installation. In addition to the $R_{1c,k\ steel}$ verification, the designer must carry out the verification on the timber side. UP LIFT supports are intended as temporary supports for transferring compressive forces waiting for the casting of the reinforced concrete kerb.
- The verification of tensile or shear stresses transfer from the UP LIFT support to the reinforced concrete kerb is the responsibility of the structural designer of the work. Ø12 rods can be placed in the UP LIFT support to ensure anchorage to the reinforced concrete kerb.
- The design of the number and position of the UP LIFT supports must take into account the presence of openings in the wall and, for TIMBER FRAME walls, the position of the studs.

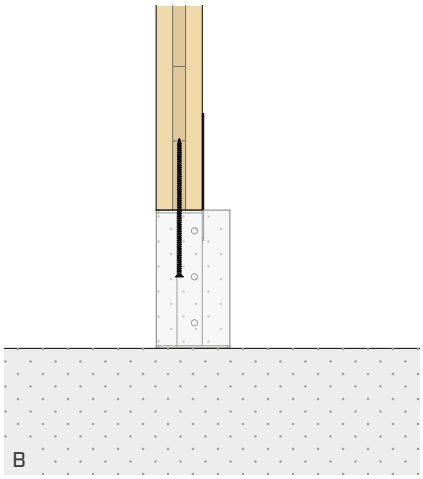
ALTERNATIVE FASTENING

UP LIFT supports can be used as structural elements to resist tensile or shear stress. Furthermore, many other connection systems in the Rothoblaas range can be used. A few examples are given.



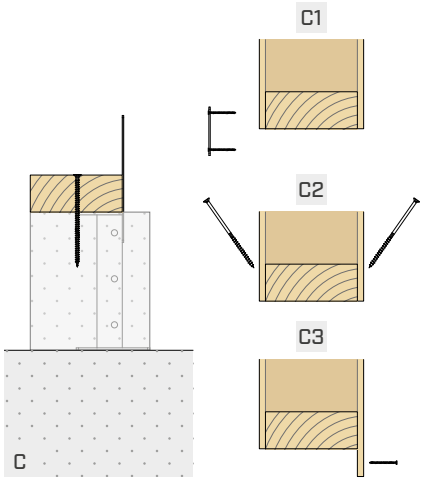
UP LIFT

UP LIFT supports can be used as a ground fastening system. The strength verification on the concrete side must be carried out by the designer. Inside the UP LIFT support there are holes for the insertion of Ø12 rods useful for anchoring to the concrete kerb.



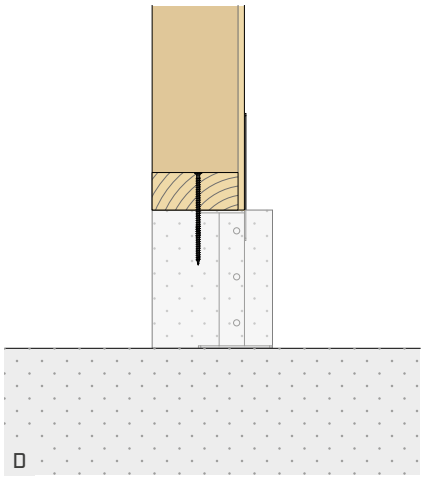
TC FUSION WITH BOTTOM INSERTION

VGS screws or RTR rods act as a connection to the concrete kerb. In this case, screws must be prepared before the walls are installed.



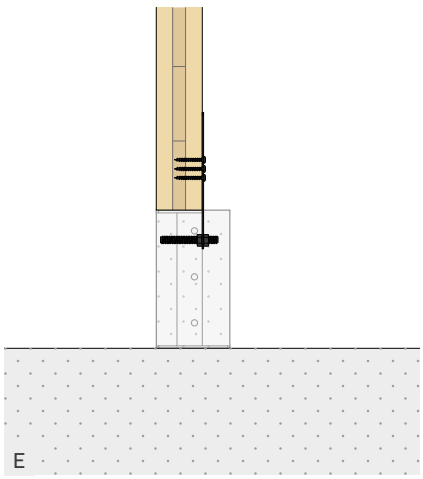
TC FUSION WITH BASE PLATE

A timber base plate can be installed directly on UP LIFT supports. After installing the beam, the VGS screws are inserted from top to bottom. The wall is then installed and fastened to the base plate using, for example, TITAN PLATE T plates (C1), inclined HBS screws (C2) or by directly nailing the OSB panels (C3).



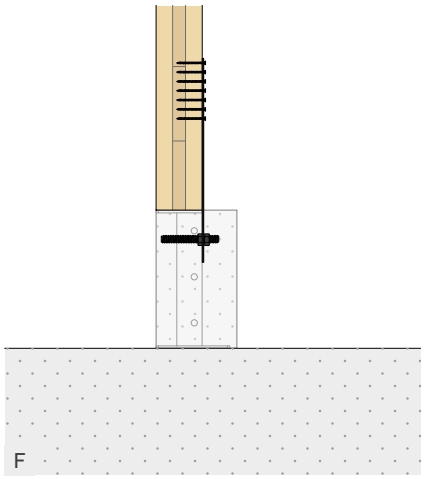
TC FUSION WITH TOP INSERTION

For open TIMBER FRAME walls, the VGS screws can be installed from top to bottom once the wall has been installed.



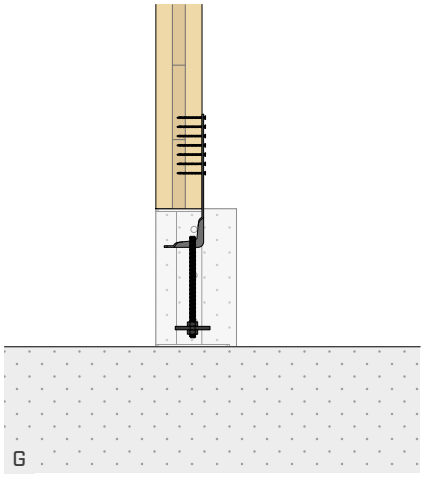
TITAN PLATE C

The transfer of $F_{2/3}$ shear stresses is possible by means of TITAN PLATE C plates installed on the wall prior to the kerb construction. Instead of reinforced concrete anchors, it is possible to pre-install bolts or threaded rods with nut and lock nut. The calculation of the concrete-side connection must be carried out by the designer.



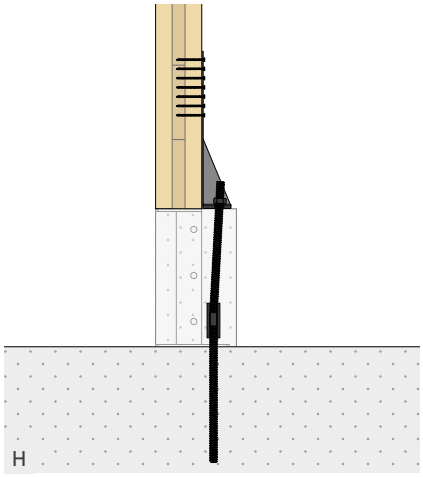
WHT PLATE C

The transfer of F_1 tensile stresses is possible by means of WHT PLATE C plates installed on the wall prior to the kerb construction. Instead of reinforced concrete anchors, it is possible to pre-install bolts or threaded rods with nut and lock nut. The calculation of the concrete-side connection must be carried out by the designer.



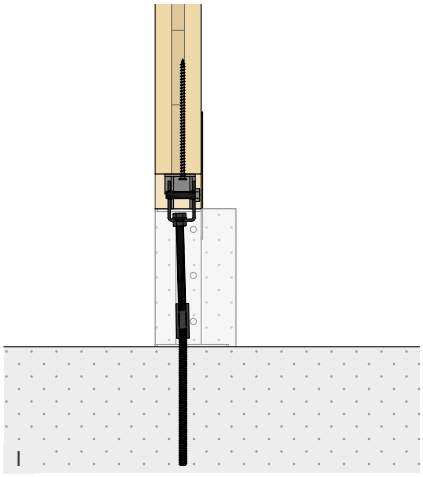
WKR

The transfer of F_1 tensile forces is possible using WKR hold-downs with the bracket turned towards the wall.



WHT

The transfer of F_1 tensile forces is possible using WHT hold-downs. In this case, it is possible to anchor the angle bracket directly to the concrete support, bypassing the kerb.



RADIAL / RING

The transfer of F_1 tensile forces is possible using the RADIAL or RING connectors pre-installed in the wall. In this case, it is possible to anchor the angle bracket directly to the concrete support, bypassing the kerb.

The table gives an overview of the application possibilities for the various fastening solutions on CLT and TIMBER FRAME.

configuration		CLT		TIMBER FRAME	
		$F_{1,t}$	$F_{2/3}$	$F_{1,t}$	$F_{2/3}$
A	**UP LIFT**	●	●	-	●
B	**TC FUSION with bottom insertion**	●	●	●	●
C	**TC FUSION with base plate**	-	●	-	●
D	**TC FUSION with top insertion**	-	-	-	●
E	**TITAN PLATE C**	-	●	-	●
F	**WHT PLATE C**	●	-	●	-
G	**WKR**	●	-	●	-
H	**WHT**	●	-	●	-
I	**RADIAL / RING**	●	-	-	-

REQUIREMENTS FOR THE EXECUTION OF CONCRETE CASTING

Concrete can be cast using the portion of the kerb free of wall (diagram 1). In this case, it is recommended that the kerb is of adequate width. Alternatively, openings can be made in the wall as shown in Diagram 2. It is preferable to use concrete with a fluid consistency class.