PA2 Anchor Design Principles

PA Anchorbracket - System

Triangular upper part
2 point fixing alternative

Triangular upper part
1 point fixing alternative

Stirup upper part
1 point fixing alternative

HAZ-PA2
Anchor

HAZ-DS
Restraint
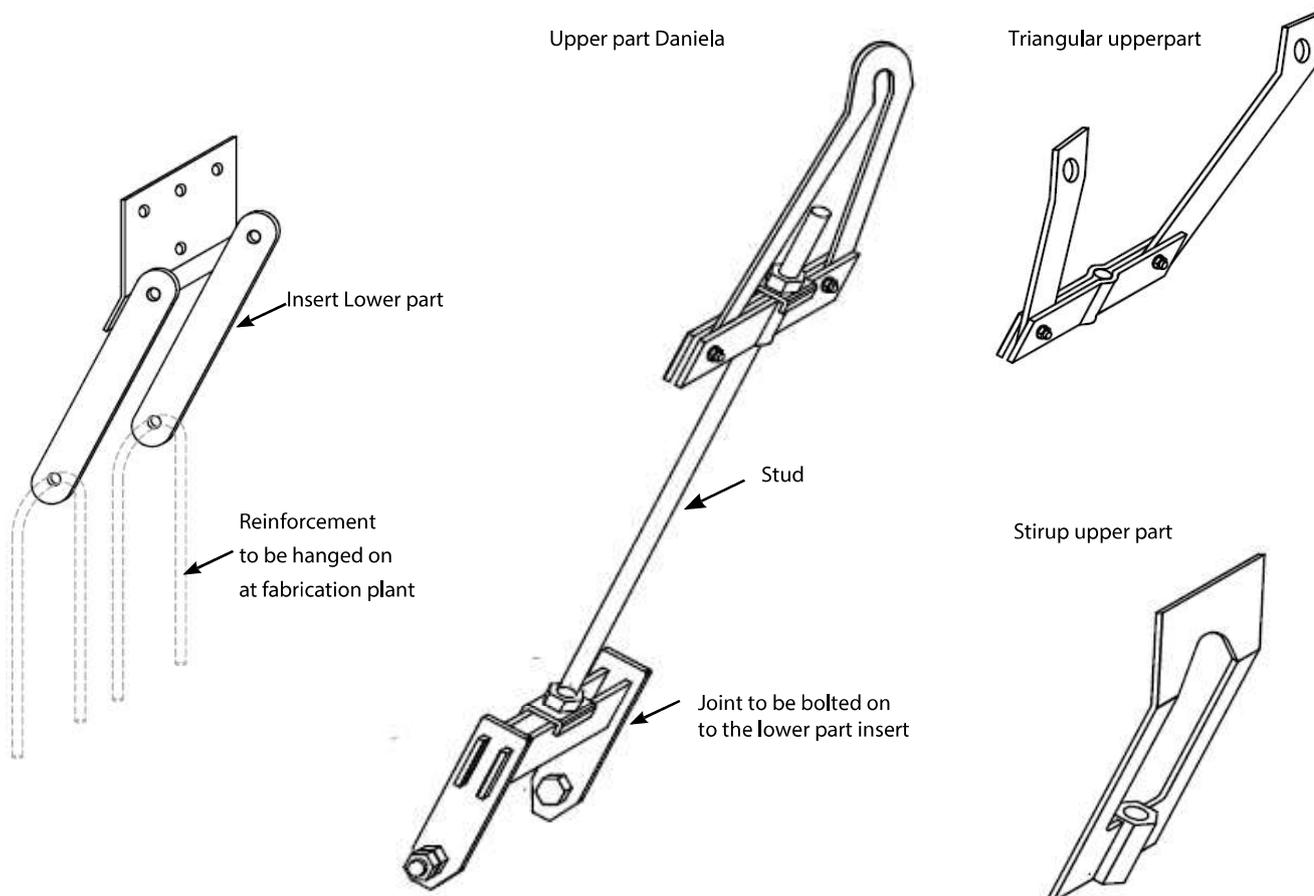bolts

HAZ-BR
Restraint
Bolts
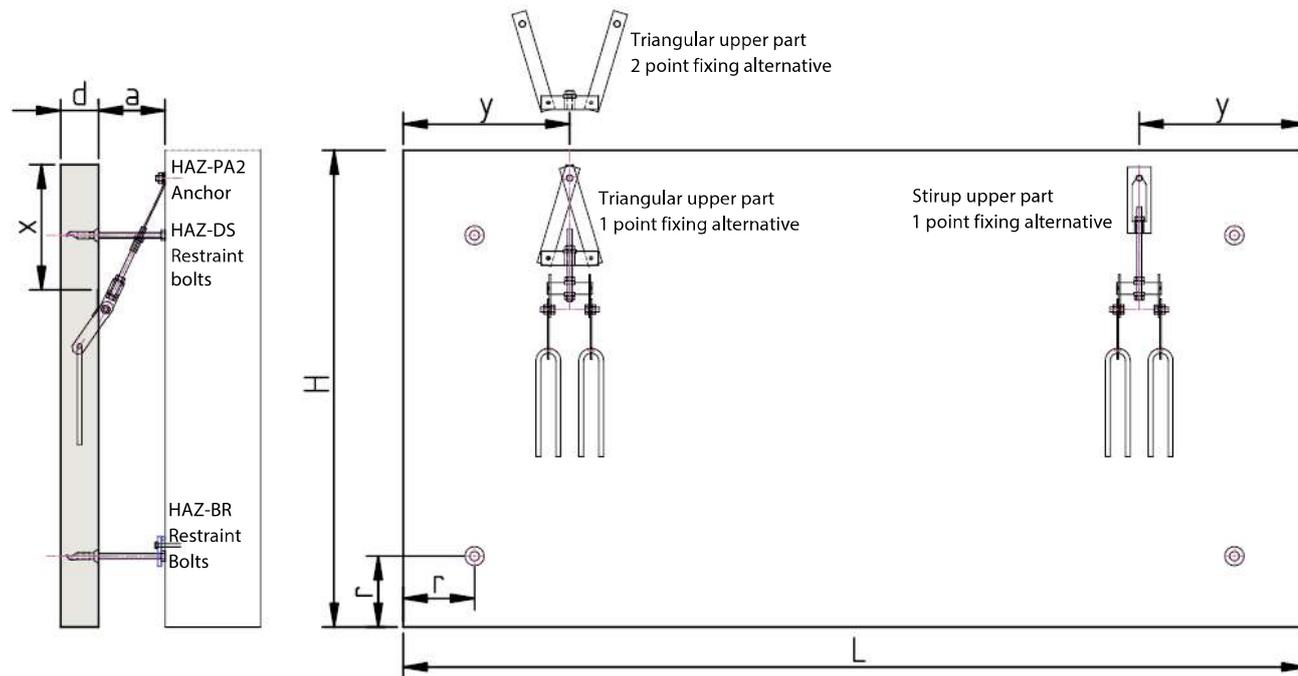
PA2 Lower part insert

The Lower part insert is to be placed in the concrete panel during production at the prefabrication plant

PA2-Fixing part: Upper part - stud - Joint

Three part Fixing Elements to be assembled at site during installation

Upper part Daniela

Triangular upperpart

Insert Lower part

Reinforcement
to be hanged on
at fabrication plant

Stud

Joint to be bolted on
to the lower part insert

Stirup upper part

HAZ Panel Anchor PA2, System and Dimensioning

As a rule, two precast panel brackets are arranged as symmetrically as possible per concrete panel. For narrow slabs, one panel bracket usually suffices.

The pressure screws serve as spacers. If the façade slabs are arranged one above the other, the lower pressure screws are usually replaced by thorns (pincers).

When the wind suction forces are applied, the pressure screws must be held horizontally by suction cups.

Loading
H = Height of panel
L = Length of panel
d = Thickness of panel

Panel Bracket PA2:

$V_d = g_G * G + g_{G,} * Z$
$H_d = Vd * tan\ a$
$R_{,d} = root\quad (V_d^2 + H_d^2)$

Pressure bolts for Hd:
$Do_{g,d} = Hd * eu / (eo + eu)$
$Du_{g,d} = Hd * eo / (eo + eu)$

Pressure bolts for Wind load:
$Wd_{,d}$ = wind pressure per bracket
$Ws_{,d}$ = windsuction per bracket

for symmetrical bracket positioning
$Wd_{,d} = g_G * Wd * L * H / 2$
$Ws_{,d} = g_G * Ws * L * H / 2$

max $Dow_{,d} = Wd_{,d} * (H/2 - xu) / (eo + eu)$
max $Duw_{,d} = Wd_{,d} * (H/2 - xo) / (eo + eu)$

min $Dow_{,d} = Ws_{,d} * (H/2 - xu) / (eo + eu)$
min $Duw_{,d} = Ws_{,d} * (H/2 - xo) / (eo + eu)$

Wind suction for Do
Case Do $_{g,d}$ - abs(min $Do_{w,d}$) < 1,0

Wind suction for Du
Case Du $_{g,d}$ - abs(min $Du_{w,d}$) < 1,0

Anchor bolt

Reinforcement at the plant

Restraint plate

Distance bolts

Alternative Dowel placement

Effects:
V = Vertical load from dead load
z.B: V = L * H * d * g(concrete volume) * 1/2
for symmetrical bracket positioning
L = Length of panel
H = Height of panel
A load or an additional load
may have to be considered

Wd = Wind pressure per bracket
Ws = Wind suction per bracket

Partial safety factors:
g_G= 1,35 (Static load)
g_Q= 1,50 (Windload)

Please download or inquire design software from:
www.hazmetal.com
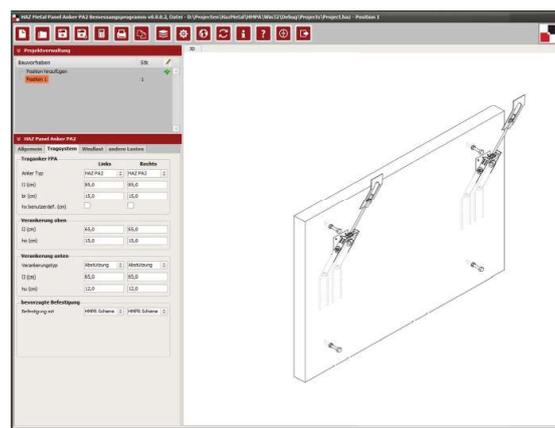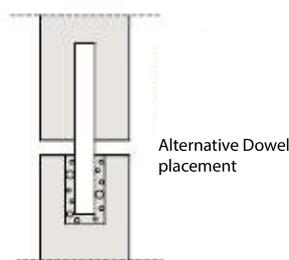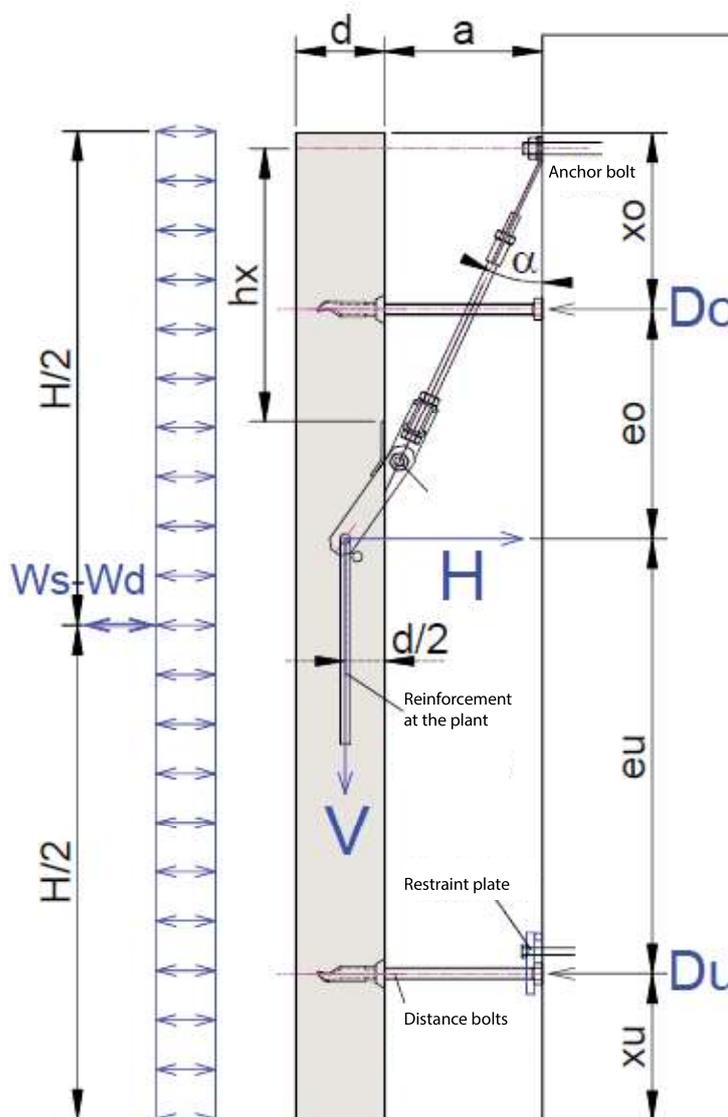
PA2 Panel Anchor Technical Details & Dimensioning

Load range, minimum edge distances, minimum plate thickness

Load capacity (kN)	Fv,d (kN)	Threaded Rod	Min d (mm)	Min y (mm)	Min x (mm)	Min r (mm)
6,0	8,10	M8	80	100	20	80
9,0	12,15	M10	80	110	20	90
13,0	17,55	M12	90	120	20	100
18,0	24,30	M12	90	130	20	110
25,0	33,75	M16	100	140	20	120
35,0	47,25	M20	100	150	20	130
45,0	60,75	M24	120	180	20	150

Other load capacities available upon request

## Dimensions for mounting part and supplementary reinforcement
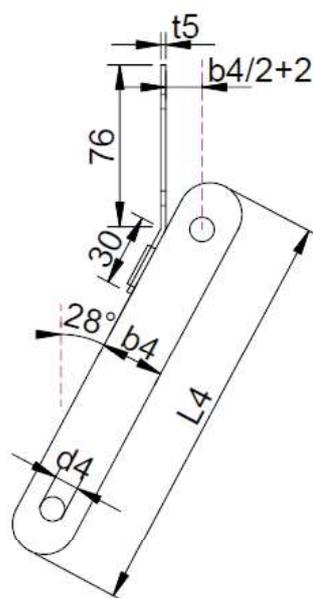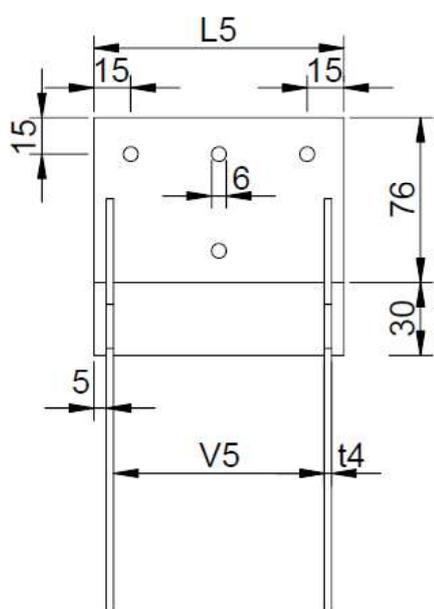
Steel reinforcing bar strength grade B500B

The length of the supplementary reinforcement can be reduced by a factor of 0.7 if the push-on hanger is formed with an angle hook.

Load capacity (kN)	b4 (mm)	t4 (mm)	d4 (mm)	L4 (mm)	v4 (mm)	L5 (mm)	t5 (mm)	d6 (mm)	b6 (mm)	L6 (mm)
6,0	26	3	11	157	86,5	103	3	6	24	250
9,0	26	3	11	168	86,5	103	3	6	24	250
13,0	26	4	11	178	88,5	107	3	8	32	250
18,0	32	4	11	206	88,5	107	3	8	32	300
25,0	34	4	11	230	92,5	111	3	10	40	350
35,0	40	5	13	276	96,5	117	3	12	48	350
45,0	40	6	13	291	98,5	121	4	12	48	400

Daniela type Upper part Dimensions
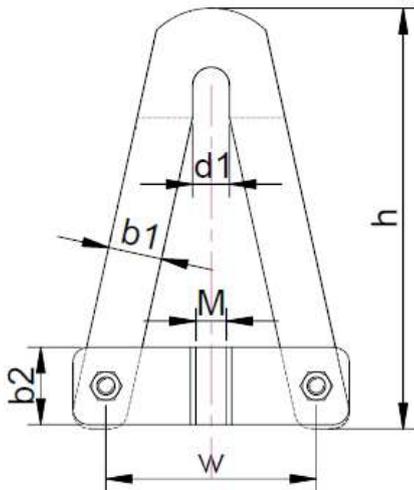
Load capacity	h	b1	b2	d1	w	M
(kN)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
6,0	163	21	31	16	82	10 (8)
9,0	163	21	31	16	82	10
13,0	163	21	31	16	82	10
18,0	190	25	40	17	93	12
25,0	206	28	42	21	100	16
35,0	228	36	55	24	118	20
45,0	228	36	55	24	118	20

Triangular type Upper part Dimensions
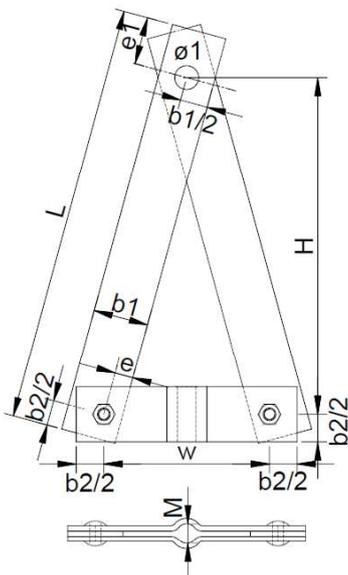
Load capacity	H	b1	Ø1	b2	e1	w	M
(kN)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
6,0	180	24	13	23	26	90	8
9,0	180	26	13	28	26	90	10
13,0	180	32	13	32	32	90	10
18,0	184	36	17	38	32	92	12
25,0	188	36	17	40	36	94	16
35,0	200	36	17	40	36	100	20
45,0	200	40	17	50	38	100	20

Joint type Upper part Dimensions
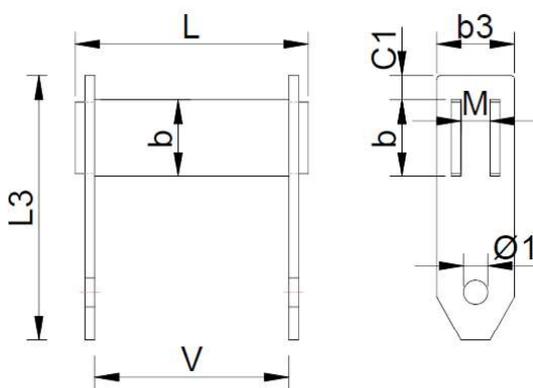
Load capacity	L	b	V	L3	b3	Ø1	C1	M
(kN)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
6,0	92	28	80	88	26	10,5	8	8
9,0	92	28	80	96	26	10,5	8	10
13,0	96	30	80	100	26	10,5	10	10
18,0	96	32	80	110	32	10,5	10	12
25,0	104	34	84	131	34	10,5	13	16
35,0	106	42	86	159	40	12,5	13	20
45,0	106	48	86	167	40	12,5	15	20

Threaded Rod Dimensions
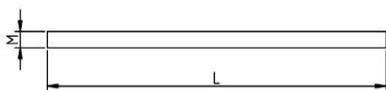
Projection (mm)	100	150	200	250	300	350	400
L (mm)	120	235	350	465	580	690	800