MODERSOHN®
Stainless Steel

www.modersohn.eu

MOSO® precast fixings for concrete facades

COMING SOON: toothed anchor channel
Adjustable wind restraint
Update to MOSOCON 3.0

Panel hanger:
FB-H

Go to product page

Parapet anchor:
FB-E

Go to product page

Restraint anchor:
FB-DS, FB-DZA

Go to product page

Serrated restraint anchor:
FB-ZH, FB-ZW, FB-ZK

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Dowel connection:
FB-VD

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Gallow anchor:
FB-G

Go to product page

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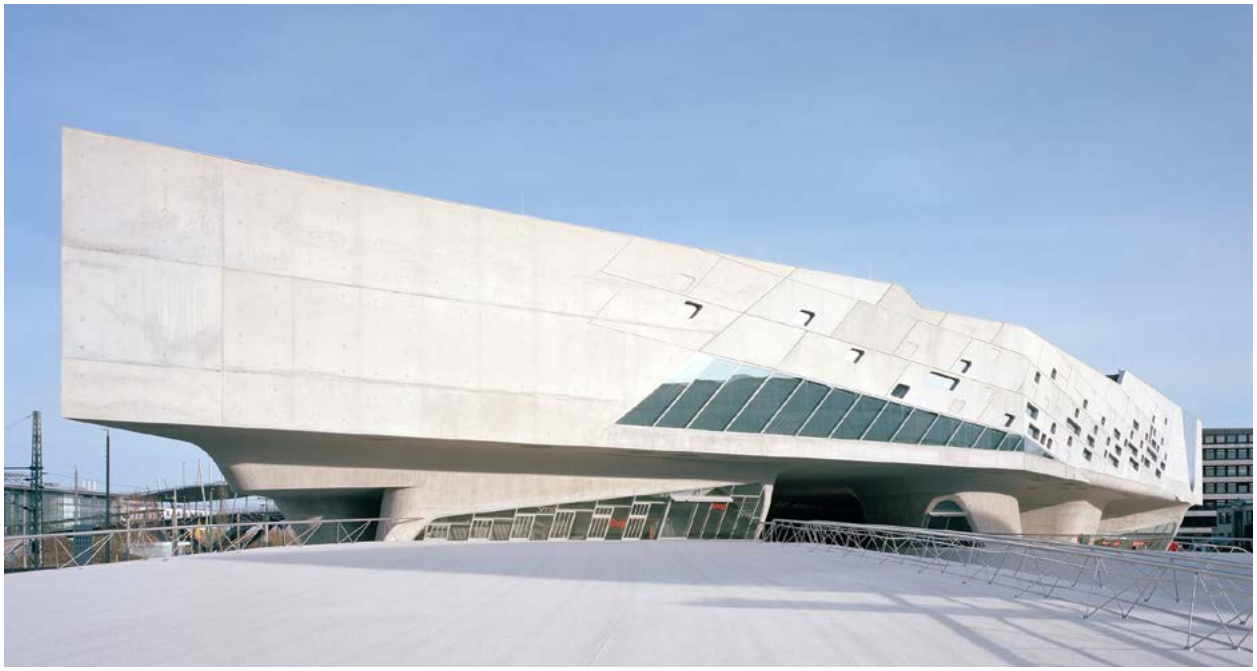
DUPLEX rostfrei

LEAN DUPLEX STAINLESS STEEL
The better alternative

SYSTEM
Façade fastenings concrete

Products



▲ phæno in Wolfsburg, photographer: Klemens Ortmeyer

Delivery service for standard and special anchors for concrete

Stainless steel? Modersohn!

In architecture today, precast concrete parts are being used more and more for the building envelope. Over the life of a building, facade elements subject to wind forces and self-weight must be anchored reliably to the shell of the building.

For over 30 years, Wilhelm Modersohn GmbH & Co.KG has developed and produced stainless steel constructions for building construction. In this catalogue, we would like to introduce the systems we have developed for the professional anchoring of precast concrete parts using products made from approved stainless steel.

In the future, demands placed on the thermal insulation of facades will have an ever greater impact on technology for bracing precast concrete facade panels. Even today, the systems developed by Modersohn GmbH & Co.KG can make shell distances of up to 500 mm a reality.

Depending on the anchoring base, loads of up to 70.0 kN may be borne per anchoring point. The European Technical Assessment for anchor channels and the national technical approval for panel hangers gives planners the security needed to meet the ever greater challenges posed by new standards and by ever more complex planning processes.

In this respect, the calculation software "MOSOCONstructor" developed by Modersohn GmbH & Co.KG represents a helpful tool for preparing elaborate, yet quick and verifiable calculations. The structural design is in accordance with CEN/TS 1992-4-3.

As a foundation of quality, our business is certified according to DIN EN 1090-2 and has manufacturer qualification for welding steel structures according to DIN 18800-7:2008-11 Class E.

Please feel welcome to visit our homepage for more information: www.modersohn.eu

Yours sincerely,

Wilhelm Modersohn

Additional concrete anchors in our product range for which our construction engineers can provide verifiable static measurements, depending on the requirements:

- **Bearing and restraining anchor for prefabricated elements**
  Especially facade anchoring constructions for prefabricated wall coverings, balcony fixings (e.g. panel hangers, parapet anchors, screw-on and supporting constructions) or serrated restraint anchors, as well as pressure supports
- **Rebar reinforcing elements**
  Including cut-to-size parts and special constructions made from approved high-yield steels, now also available in tool steel 1.4362 as an alternative to V4A !
- **Parapet and covering channels, e.g. FUG 6 for sealing materials and joints**
  delivered with matching dowels
- **Edge protection profiles and edge protection frames**
  with flat or high-yield steel or anchor bolts, e.g. our MOSO®
  stair tread profiles with slotted tread edge
- **Recess units and pipe penetrations**
- **Heavy-duty dowel systems**
  as supporting partners of well-known dowel manufacturers
- **Elastomer compensating bearings with and without approval**
- **Lifting and transport anchor systems**
- **Centring systems for precast columns**

▲ Modersohn company building

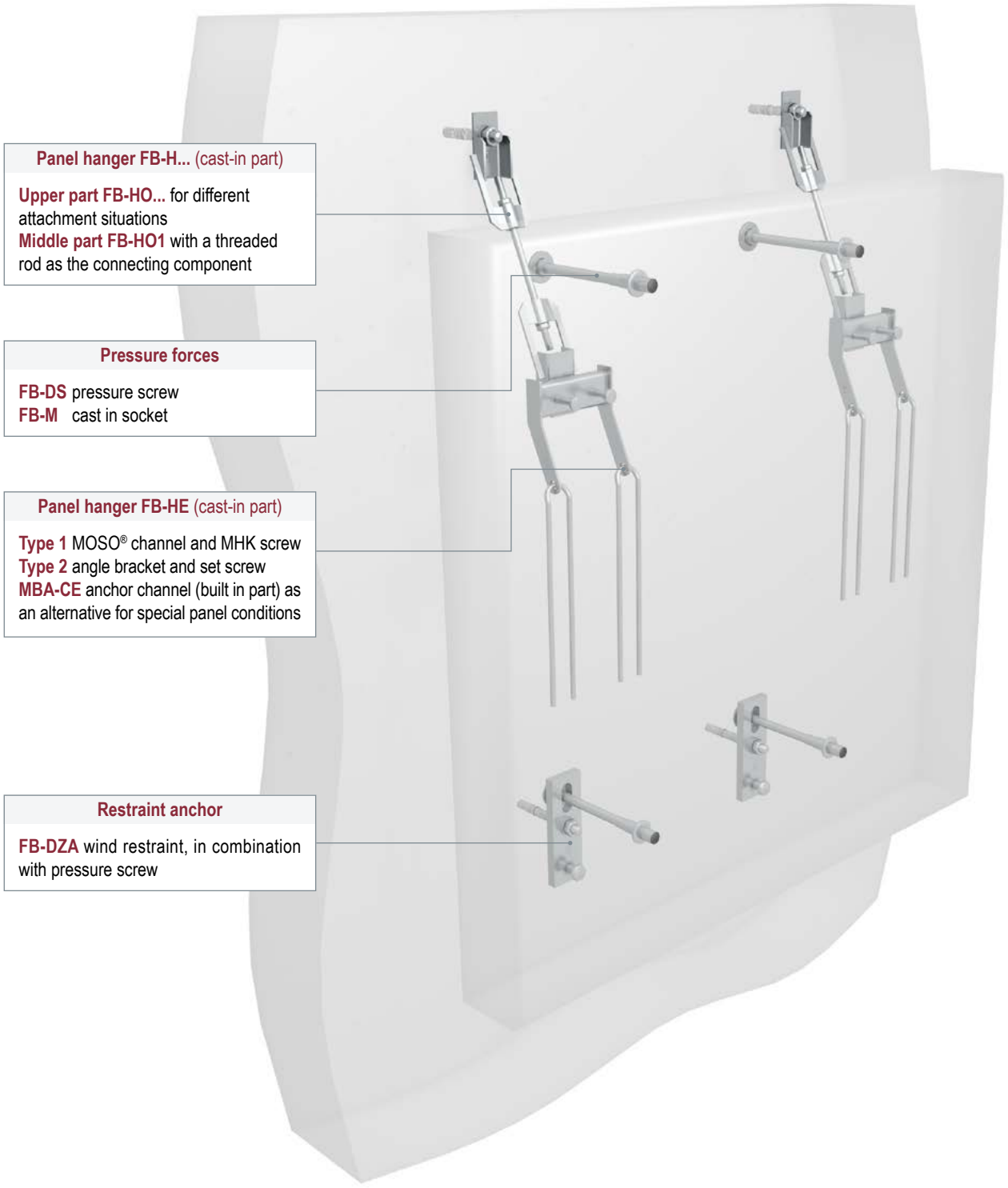
The MOSO® panel hanger is an officially approved system. It consists of an upper part, a middle part and a cast-in part.

There are several models of the upper part available depending on the structural situation. The standard upper part FB-HO1 is fastened to a vertical surface of the structure. The top of slab type FB-HO1A is available for top of slab. If a single point fixing is not sufficient, version FB-HO2 and FB-HO2A are available for the double bolt.

The cast-in part FB-HE was developed for slender precast concrete units. With a low load range and a simultaneously large concrete core, MOSO® CE anchor channels are an affordable alternative to the cast-in part FB-HE.

Product information

- Load range: 6.0 - 70.0 kN
- Material: approved stainless steel
- Certificate: national technical approval



Panel hanger FB-H... (cast-in part)

Upper part FB-HO... for different attachment situations
Middle part FB-HO1 with a threaded rod as the connecting component

Pressure forces

FB-DS pressure screw
FB-M cast in socket

Panel hanger FB-HE (cast-in part)

Type 1 MOSO® channel and MHK screw
Type 2 angle bracket and set screw
MBA-CE anchor channel (built in part) as an alternative for special panel conditions

Restraint anchor

FB-DZA wind restraint, in combination with pressure screw

Panel hanger - Cast-in part

FB-HE

With DIBt approval Z-21.8-2012

Together with the additional reinforcement included in the scope of supply, the cast-in parts form an officially approved system.

Type 1 covers load range from 6.0 kN to 22.0 kN inclusive.
Type 2 was designed for loads from 38.0 kN to 70.0 kN inclusive.

By default the additional reinforcement is used with B500B. With increased requirements in the concrete cover, the additional reinforcement B500A NR has to be chosen.

Please refer to the table for the dimensions

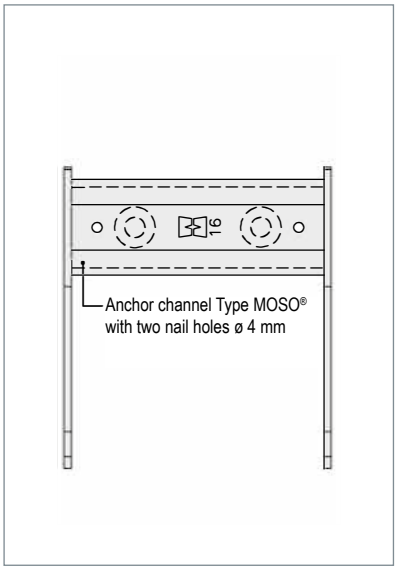
Product information

- Load range: 6.0 - 70.0 kN
- Material: approved stainless steel
- Certificate: national technical approval

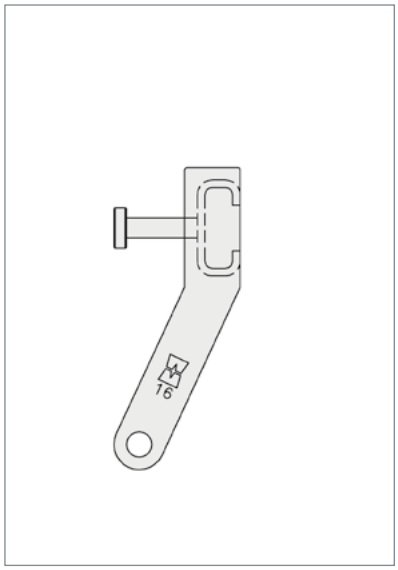
▲ Type 1

▲ Type 2

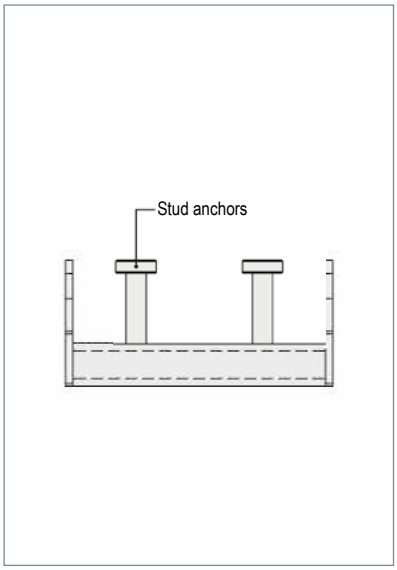
Cast-in part: load range 6.0 – 22.0 kN



▲ Front view

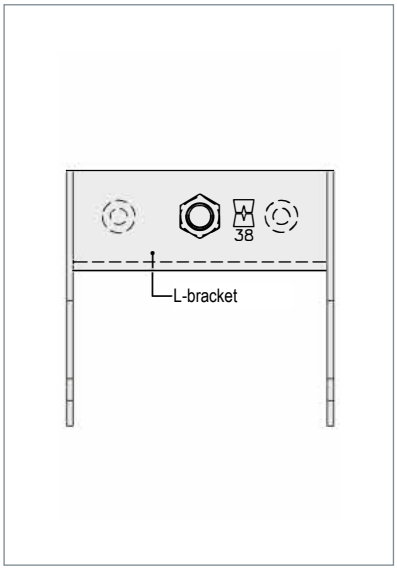


▲ Side view

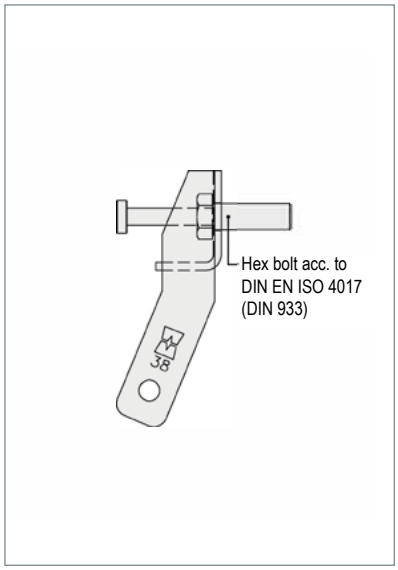


▲ Top view

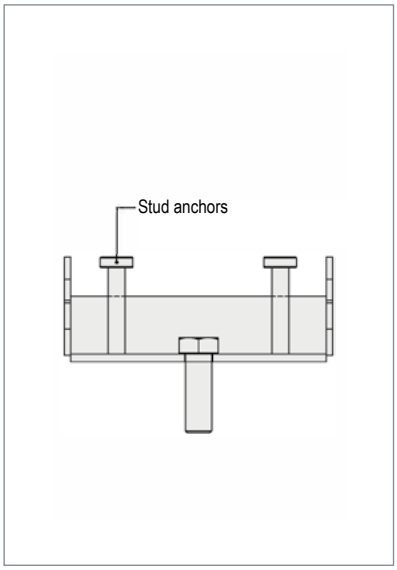
Cast-in part: load range 38.0 – 70.0 kN



▲ Front view



▲ Side view



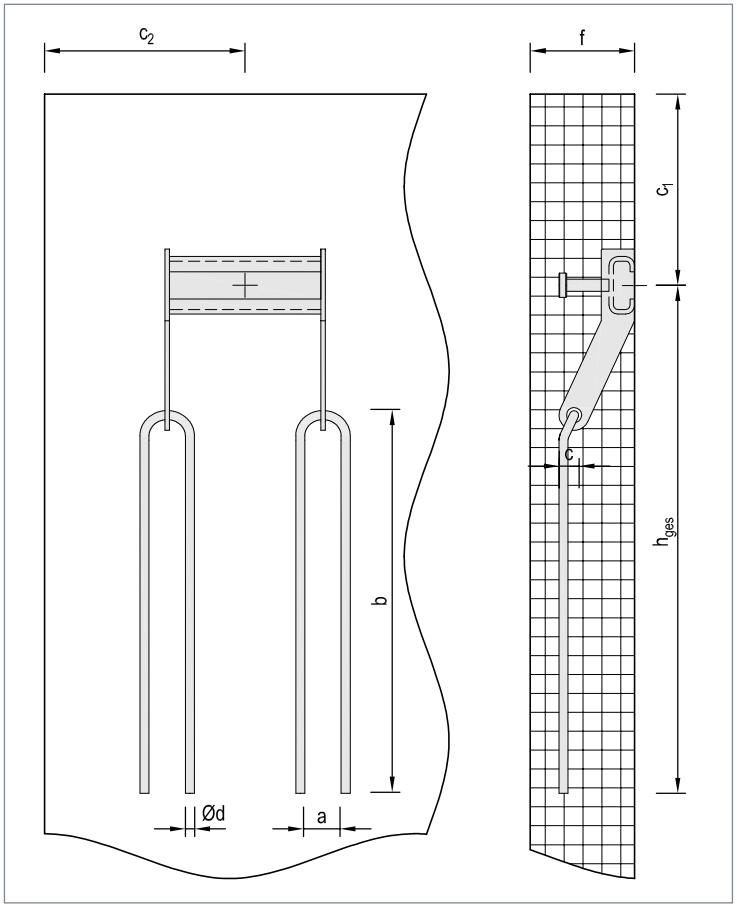
▲ Top view

Technical data / Measurement table

FB-HE

	Load range	Design load V_{Rd}	Boundary conditions [mm]				Required reinforcement [mm]				Min. concrete quality	Attaching bolt size
			f_{min} ①	$c_{1,min}$	$c_{2,min}$	h_{ges}	Ø d	a	b	c		
Type 1	6,0 kN	8,10 kN	70	50	110	335	6	24	250	13	C25/30	MHK 38/17 M10
	8,5 kN	11,48 kN	70	100	125	335	6	24	250	13	C25/30	MHK 40/25 M12
	13,5 kN	18,23 kN	80	125	125	340	8	32	250	22	C25/30	MHK 50/30 M16
	16,0 kN	21,60 kN	80	175	175	390	8	32	300	22	C25/30	MHK 50/30 M16
	22,0 kN	29,70 kN	90	200	200	525	8	32	400	22	C30/37	MHK 50/30 M20
Type 2	38,0 kN	51,30 kN	100	200	200	630	10	40	500	30	C30/37	SKM M20 (DIN934)
	48,0 kN	64,80 kN	115	225	225	685	12	48	500	33	C30/37	SKM M20 (DIN934)
	70,0 kN	94,50 kN	125	225	225	805	12	48	600	35	C30/37	SKM M24 (DIN934)

① When panel thickness f_{min} then $c_{nom,a}$ = 20 mm
When the panel thickness $f \leq f_{min}$ + 20 mm, then select the reinforcement from B500A NR (Assumption XC4)

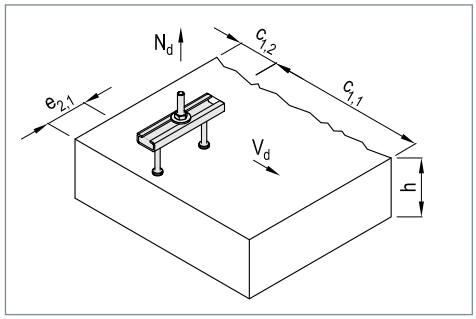


Additional reinforcement

The built in part FB-HE is designed for large and thin precast panels. To find safe solutions for narrow columns or low spandrel panels, the MOSO® CE anchor channel is a suitable alternative. The table further down shows examples for different combinations with our panel hanger. For every special case an engineer has to check if the conditions, resulting from our ETA permission, are met.

Combination		Boundary conditions ③				
LS	MBA-CE	$c_{1,1}$	$c_{1,2}$	$e_{2,1}$	h	MHK
6,0 kN	28/15	425	75	100	80	M10
	38/17	300	50	50	107	
8,5 kN	38/17	425	75	75	107	M12
	50/31 ②	300	75	50	136	
13,5 kN	38/17 ②	450	100	150	107	M16
	50/31	400	100	125	136	
16,0 kN	50/31	500	100	150	136	M16
	52/34	400	100	100	189	
22,0 kN	50/31 ②	650	125	150	136	M20
	52/34	600	125	125	189	

② If this anchor channel is used V_{RD} is reduced by a factor of 0.80
③ Assumed concrete quality C30/37; c_{nom} 30mm; 3 near edges



Order example: FB - HE - 13.5

Type
Design
Load range

Scope of supply

- Cast-in part
- 2x B500B additional reinforcement

Cross-references for additional information

Page	Topic
26, 28, 36	Accessories - precast concrete slabs DZA; DS and VD
14 - 17	Basic static data, assembly instruction
41	MOSO® CE anchor channel

Text for invitation to tender

... pc. MOSO® precast fixing FB-HE-13.5 [1] including additional reinforcement, delivery and proper installation.

[1] Load range acc. to table

Panel hanger - Standard design

FB-HO1

The upper mounting is fixed to the in-situ concrete with an officially approved dowel or a MOSO® CE anchor channel.

Prior to delivery, the upper mounting is pre-assembled with the accessories included in the scope of supply.

Please refer to the table for the dimensions.

Note:
Due to the new manner of construction, no offset torque must be considered when calculating the attachment point!

Product information

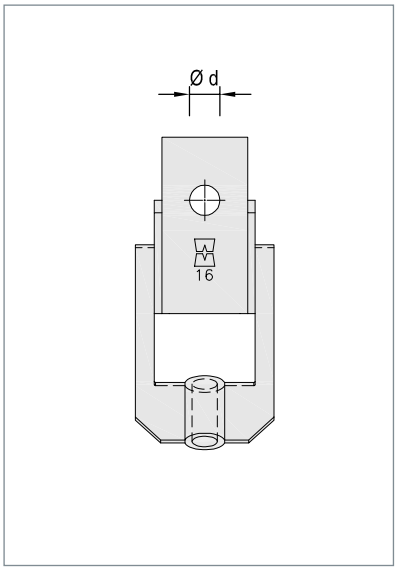
- Load range: 6.0 - 70.0 kN
- Cavity: up to 500 mm
- Material: approved stainless steel
- Certificate: national technical approval

Technical data / Measurement table

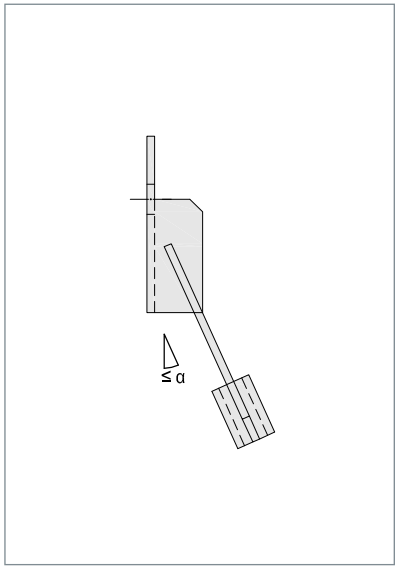
FB-HO1

Load range	Design load V_{Rd}	Connection angle α for the cavity b in mm ①												Dim.	
		60	70	80	90	100	110	120	130	140	150	160	> 160	Ø d [mm]	Dowel [-]
6,0 kN	8,10 kN	18,0°	→		25,0°	→							25,0°	12	M10
8,5 kN	11,48 kN	18,0°	→			25,0°	→						25,0°	14	M12
13,5 kN	18,23 kN	16,0°	18,0°	→			25,0°	→					25,0°	18	M16
16,0 kN	21,60 kN	15,0°	18,0°	→					25,0°	→			25,0°	18	M16
22,0 kN	29,70 kN	13,0°	15,0°	→				22,5°	→				22,5°	22	M20
38,0 kN	51,30 kN	-	13,0°	15,0°	→					22,5°	→		22,5°	22	M20
48,0 kN	64,80 kN	-	-	-	-	15,0°	→						20,0°	22	M20
70,0 kN	94,50 kN	-	-	-	-	-	13,0°	15,0°	→				15,0°②	26	M24

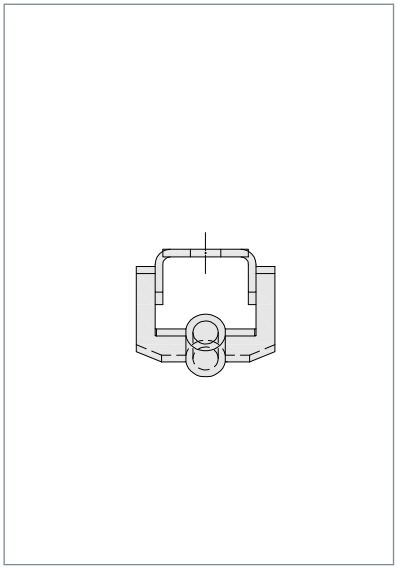
① Please refer to page 12 for more information about the installation part.
② cavity > 200 mm connection angle α = 20°



▲ Front view



▲ Side view



▲ Top view

Panel hanger - Double bolt

FB-HO2

The double bolt type of the upper part is fastened to the in-situ concrete with two officially approved dowels or a MOSO® CE anchor channel.

Prior to delivery, the upper part is pre-assembled with the accessories included in the scope of supply.

Please refer to the table for the dimensions.

Note:
Due to the new manner of construction, no offset torque must be accounted for when calculating the attachment point!

Product information

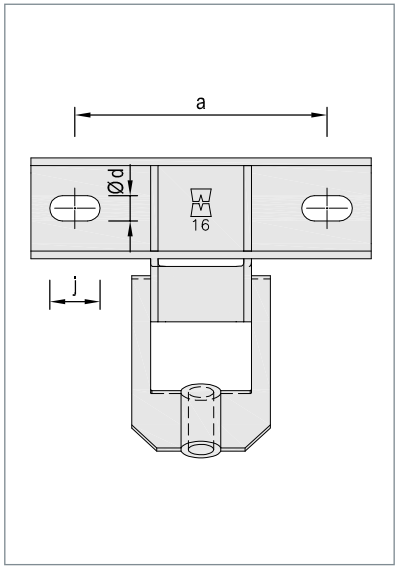
- Load range: 6.0 - 70.0 kN
- Cavity: up to 500 mm
- Material: approved stainless steel
- Certificate: national technical approval

Technical data / Measurement table

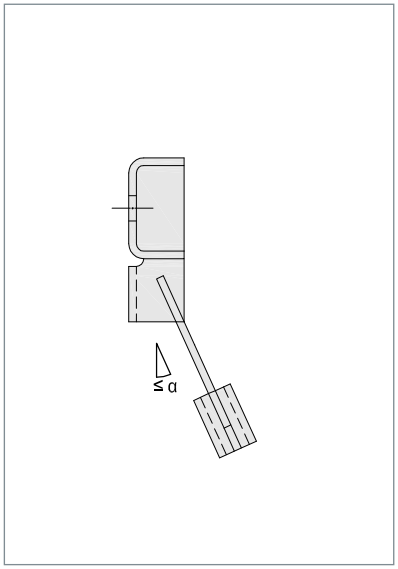
FB-HO2

Load range	Design load V_{Rd}	Connection angle α for the cavity b in mm ①												Dimensions			
		60	70	80	90	100	110	120	130	140	150	160	>160	Ø d [mm]	j [mm]	a [mm]	Dowel [-]
6,0 kN	8,10 kN	18,0°	→	→	25,0°	→	→	→	→	→	→	→	25,0°	10	20	100	M8
8,5 kN	11,48 kN	18,0°	→	→	→	25,0°	→	→	→	→	→	→	25,0°	12	20	100	M10
13,5 kN	18,23 kN	16,0°	18,0°	→	→	→	25,0°	→	→	→	→	→	25,0°	14	25	115	M12
16,0 kN	21,60 kN	15,0°	18,0°	→	→	→	→	→	25,0°	→	→	→	25,0°	14	25	115	M12
22,0 kN	29,70 kN	13,0°	15,0°	→	→	→	→	22,5°	→	→	→	→	22,5°	18	30	130	M16
38,0 kN	51,30 kN	-	13,0°	15,0°	→	→	→	→	→	22,5°	→	→	22,5°	18	40	150	M16
48,0 kN	64,80 kN	-	-	-	-	15,0°	→	→	→	→	→	→	20,0°	18	40	180	M16
70,0 kN	94,50 kN	-	-	-	-	-	13,0°	15,0°	→	→	→	→	15,0°②	22	60	205	M20

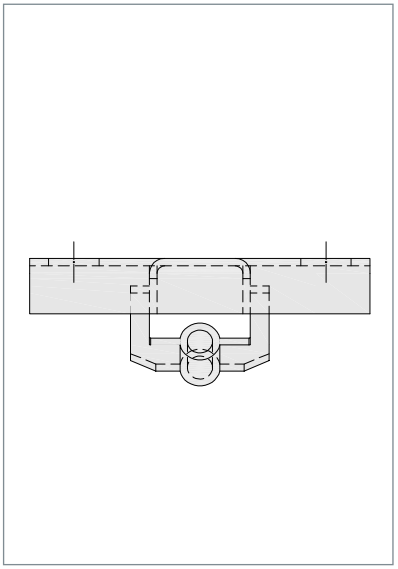
① Please refer to page 12 for more information about the installation part.
② cavity > 200 mm connection angle α = 20°



▲ Front view



▲ Side view



▲ Top view

Panel hanger - Top of slab

FB-HO1A

The upper mounting is fixed to the top of slab with an officially approved dowel or a MOSO® CE anchor channel.

Prior to delivery, the upper mounting is pre-assembled with the accessories included in the scope of supply.

Please refer to the table for the dimensions.

Product information

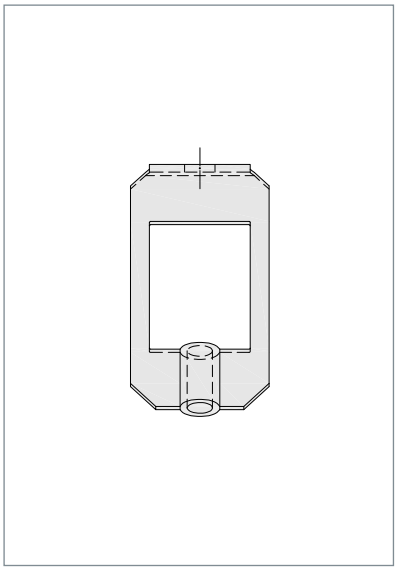
- Load range: 6.0 - 70.0 kN
- Cavity: up to 500 mm
- Material: approved stainless steel
- Certificate: national technical approval

Technical data / Measurement table

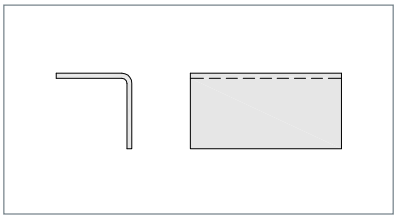
FB-HO1A

Load range	Design load V_{Rd}	Connection angle α for the cavity b in mm ①												Dimensions		
		60	70	80	90	100	110	120	130	140	150	160	>160	Ø d [mm]	c_{min} ② [mm]	Dowel [-]
6,0 kN	8,10 kN	14,0°	18,0°	→	→	25,0°	→	→	→	→	→	→	25,0°	12	45	M10
8,5 kN	11,48 kN	14,0°	18,0°	→	→	→	25,0°	→	→	→	→	→	25,0°	12	60	M10
13,5 kN	18,23 kN	14,0°	18,0°	→	→	→	25,0°	→	→	→	→	→	25,0°	14	60	M12
16,0 kN	21,60 kN	12,0°	12,0°	18,0°	→	→	→	→	25,0°	→	→	→	25,0°	14	65	M12
22,0 kN	29,70 kN	12,0°	12,0°	15,0°	→	→	→	22,5°	→	→	→	→	22,5°	14	65	M12
38,0 kN	51,30 kN	-	12,0°	15,0°	→	→	→	→	→	→	22,5°	→	22,5°	18	80	M16
48,0 kN	64,80 kN	-	-	-	-	12,0°	15,0°	→	→	→	→	→	20,0°	18	90	M16
70,0 kN	94,50 kN	-	-	-	-	-	12,0°	→	→	15,0°	→	→	15,0°③	22	120	M20

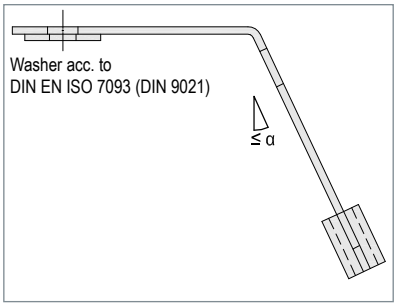
① Please refer to page 13 for more information about the installation part.
② $c \geq c_{min}$; can be adapted to requirements of the shell and fixing material
③ cavity > 210 mm connection angle α = 20°



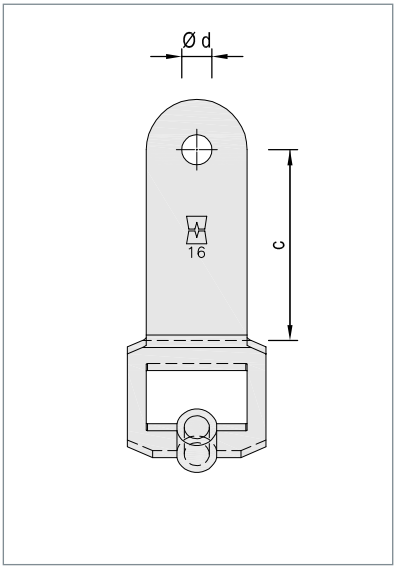
▲ Front view



▲ Edge protection profile



▲ Side view



▲ Top view

Panel hanger - Top of slab double bolt

FB-HO2A

The double bolt of the upper part is fastened to the top of slab with two officially approved dowels or a MOSO® CE anchor channel.

Prior to delivery, the upper part is pre-assembled with the accessories included in the scope of supply.

Please refer to the table for the dimensions.

Product information

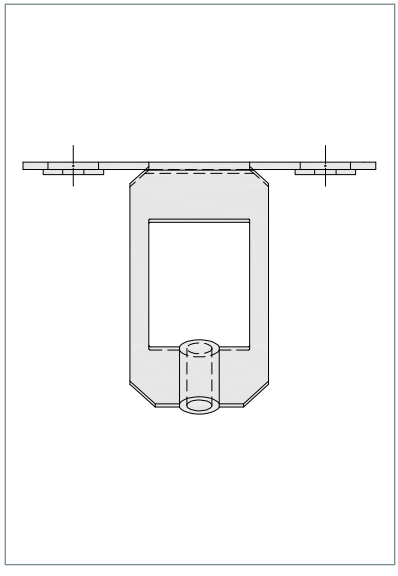
- Load range: 6.0 - 70.0 kN
- Cavity: up to 500 mm
- Material: approved stainless steel
- Certificate: national technical approval

Technical data / Measurement table

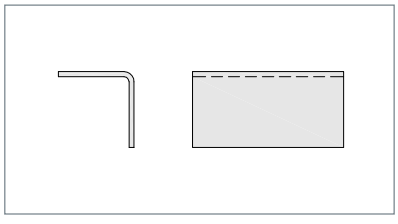
FB-HO2A

Load range	Design load V_{Rd}	Connection angle α for the cavity b in mm ①												Dimensions				
		60	70	80	90	100	110	120	130	140	150	160	>160	Ø d [mm]	j [mm]	a [mm]	c_{min} ② [mm]	Dowel [-]
6,0 kN	8,10 kN	14,0°	18,0°	→		25,0°	→						25,0°	10	20	100	80	M8
8,5 kN	11,48 kN	14,0°	18,0°	→			25,0°	→					25,0°	10	20	100	85	M8
13,5 kN	18,23 kN	14,0°	18,0°	→			25,0°	→					25,0°	12	20	115	85	M10
16,0 kN	21,60 kN	12,0°	12,0°	18,0°	→				25,0°	→			25,0°	12	20	115	90	M10
22,0 kN	29,70 kN	12,0°	12,0°	15,0°	→			22,5°	→				22,5°	12	20	130	90	M10
38,0 kN	51,30 kN	-	12,0°	15,0°	→						22,5°	→	22,5°	14	40	150	125	M12
48,0 kN	64,80 kN	-	-	-	-	12,0°	15,0°	→					20,0°	18	40	180	160	M16
70,0 kN	94,50 kN	-	-	-	-	-	12,0°	→		15,0°	→		15,0°③	18	40	205	180	M16

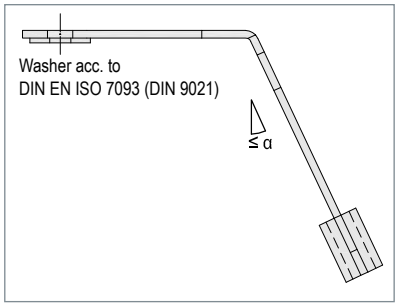
① Please refer to page 13 for more information about the installation part.
② $c \geq c_{min}$; can be adapted to requirements of the shell and fixing material
③ cavity > 210 mm connection angle α = 20°



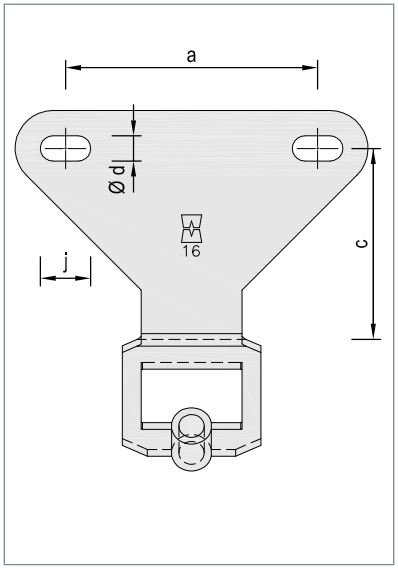
▲ Front view



▲ Edge protection profile



▲ Side view



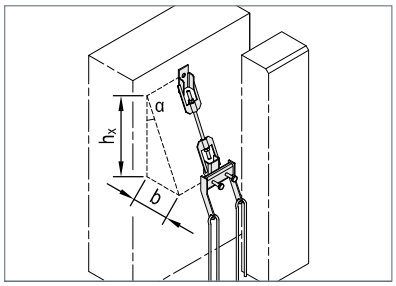
▲ Top view

Panel hanger - Overview
Technical data / Measurement table

FB-H1 / FB-H2

Load range	6,0 kN		8,5 kN		13,5 kN		16,0 kN		22,0 kN		38,0 kN		48,0 kN		70,0 kN	
Design load V_{Rd}	8,10 kN		11,48 kN		18,23 kN		21,60 kN		29,70 kN		51,30 kN		64,80 kN		94,50 kN	
Cavity b [mm]	h_x [mm]	α	h_x [mm]	α	h_x [mm]	α	h_x [mm]	α	h_x [mm]	α	h_x [mm]	α	h_x [mm]	α	h_x [mm]	α
60	185	18,0°	185	18,0°	210	16,0°	225	15,0°	260	13,0°	-	-	-	-	-	-
70	215	↓	215	↓	215	18,0°	215	18,0°	260	15,0°	285	13,0°	-	-	-	-
80	245		245		245	↓	245	↓	300	↓	300	15,0°	-	-	-	-
90	195	25,0°	275		275		275		335		335	↓	-	-	-	-
100	215	↓	215	25,0°	310		310		375		375		375	15,0°	-	-
110	235		235	↓	235	25,0°	340		410		410		410	↓	475	13,0°
120	255		255		255	↓	370		290	22,5°	450		450		450	15,0°
130	280		280		280		280	25,0°	315	↓	485		485		485	↓
140	300		300		300		300	↓	340		340	22,5°	520		520	
150	320		320		320		320		360		360	↓	560		560	
160	345		345		345		345		385		385		440	20,0°	595	
170	365		365		365		365		410		410		465	↓	635	
180	385		385		385		385		435		435		495		670	
190	405		405		405		405		460		460		520		710	
200	430		430		430		430		485		485		550		550	20,0°
210	450		450		450		450		505		505		575		575	↓
220	470		470		470		470		530		530		605		605	
230	495		495		495		495		555		555		630		630	
240	515		515		515		515		580		580		660		660	
250	535	25,0°	535	25,0°	535	25,0°	535	25,0°	605	22,5°	605	22,5°	685	20,0°	685	20,0°
> 250	on request															
Cast-in part	FB-HE-6,0		FB-HE-8,5		FB-HE-13,5		FB-HE-16,0		FB-HE-22,0		FB-HE-38,0		FB-HE-48,0		FB-HE-70,0	
Threaded rod	M8		M10		M12		M16		M16		M20		M24		M27	

FB-H1



Scope of supply

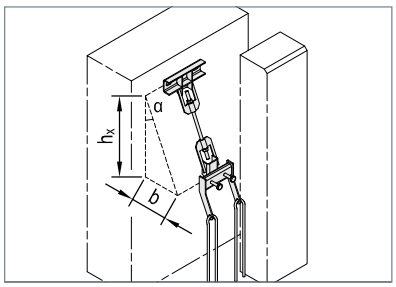
- Panel hanger, standard, upper part
- Panel hanger, middle part
- 3x hex nut DIN EN ISO 4032 (DIN 934)
- 3x washer DIN EN ISO 7089 (DIN 125)
- Threaded rod A4-70
- MHK bolt up to LL 22.0 kN

Text for invitation to tender

... pc. MOSO® precast fixing FB-H1-150[1]-22.0[2] including officially approved dowel for cracked concrete[3], delivery and proper installation.

[1] Cavity acc. to table
[2] Load range acc. to table
[3] Attachment in-situ concrete acc. to documentation

FB-H2



Scope of supply

- Panel hanger, double bolt, upper part
- Panel hanger, middle part
- 3x hex nut DIN EN ISO 4032 (DIN 934)
- 3x washer DIN EN ISO 7089 (DIN 125)
- 2x washer DIN EN ISO 7093 (DIN 9021)
- Threaded rod A4-70
- MHK bolt up to LL 22.0 kN

Text for invitation to tender

... pc. MOSO® precast fixing FB-H2-150[1]-22.0[2] including officially approved dowel for cracked concrete[3], delivery and proper installation.

[1] Cavity acc. to table
[2] Load range acc. to table
[3] Fixing in-situ concrete acc. to documentation

Order example: FB - H1 - 150 - 22.0

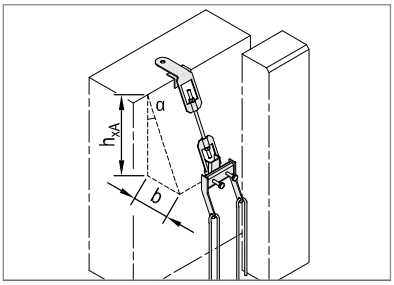
Type
Design
Cavity
Load range

Panel hanger - Overview
Technical data / Measurement table

FB-H1A / FB-H2A

Load range	6,0 kN		8,5 kN		13,5 kN		16,0 kN		22,0 kN		38,0 kN		48,0 kN		70,0 kN	
Design load V_{Rd}	8,10 kN		11,48 kN		18,23 kN		21,60 kN		29,70 kN		51,30 kN		64,80 kN		94,50 kN	
Cavity b [mm]	h_{xA} [mm]	α	h_{xA} [mm]	α	h_{xA} [mm]	α	h_{xA} [mm]	α	h_{xA} [mm]	α	h_{xA} [mm]	α	h_{xA} [mm]	α	h_{xA} [mm]	α
60	225	14,0°	225	14,0°	225	14,0°	260	12,0°	260	12,0°	-	-	-	-	-	-
70	205	18,0°	205	18,0°	205	18,0°	310	12,0°	310	12,0°	300	12,0°	-	-	-	-
80	235	↓	235	↓	235	↓	230	18,0°	280	15,0°	275	15,0°	-	-	-	-
90	265	↓	265	↓	265	↓	265	↓	320	↓	315	↓	-	-	-	-
100	205	25,0°	295	↓	295	↓	295	↓	355	↓	350	↓	435	12,0°	-	-
110	230	↓	225	25,0°	225	25,0°	325	↓	395	↓	390	↓	380	15,0°	475	12,0°
120	250	↓	250	↓	250	↓	355	↓	280	22,5°	425	↓	420	↓	520	↓
130	270	↓	270	↓	270	↓	270	25,0°	305	↓	465	↓	455	↓	570	↓
140	295	↓	290	↓	290	↓	290	↓	325	↓	500	↓	495	↓	490	15,0°
150	315	↓	315	↓	315	↓	310	↓	350	↓	350	22,5°	530	↓	525	↓
160	335	↓	335	↓	335	↓	335	↓	375	↓	370	↓	565	↓	565	↓
170	355	↓	355	↓	355	↓	355	↓	400	↓	395	↓	445	20,0°	600	↓
180	380	↓	375	↓	375	↓	375	↓	425	↓	420	↓	475	↓	640	↓
190	400	↓	400	↓	400	↓	400	↓	450	↓	445	↓	500	↓	675	↓
200	420	↓	420	↓	420	↓	420	↓	470	↓	470	↓	530	↓	715	↓
210	445	↓	440	↓	440	↓	440	↓	495	↓	490	↓	555	↓	550	20,0°
220	465	↓	465	↓	465	↓	460	↓	520	↓	515	↓	580	↓	580	↓
230	485	↓	485	↓	485	↓	485	↓	545	↓	540	↓	610	↓	605	↓
240	505	↓	505	↓	505	↓	505	↓	570	↓	565	↓	635	↓	635	↓
250	530	25,0°	530	25,0°	530	25,0°	525	25,0°	595	22,5°	590	22,5°	665	20,0°	660	20,0°
> 250	on request															
Cast-in part	FB-HE-6,0		FB-HE-8,5		FB-HE-13,5		FB-HE-16,0		FB-HE-22,0		FB-HE-38,0		FB-HE-48,0		FB-HE-70,0	
Threaded rod	M8		M10		M12		M16		M16		M20		M24		M27	

FB-H1A



Scope of supply

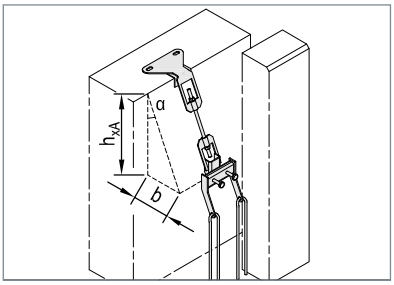
- Panel hanger, top of slab, upper part
- Panel hanger, middle part
- 3x hex nut DIN EN ISO 4032 (DIN 934)
- 3x washer DIN EN ISO 7089 (DIN 125)
- 2x washer DIN EN ISO 7093 (DIN 9021)
- Threaded rod A4-70
- MHK bolt up to LL 22.0 kN
- Edge protection profile

Text for invitation to tender

... pc. MOSO® precast fixing FB-H1A-150[1]-22.0[2] including officially approved dowel for cracked concrete[3], delivery and proper installation.

[1] Cavity acc. to table
[2] Load range acc. to table
[3] Fixing in-situ concrete acc. to documentation

FB-H2A



Scope of supply

- Panel hanger, double bolt, upper part
- Panel hanger, middle part
- 3x hex nut DIN EN ISO 4032 (DIN 934)
- 3x washer DIN EN ISO 7089 (DIN 125)
- 4x washer DIN EN ISO 7093 (DIN 9021)
- Threaded rod A4-70
- MHK bolt up to LL 22.0 kN
- Edge protection profile

Text for invitation to tender

... pc. MOSO® precast fixing FB-H2A-150[1]-22.0[2] including officially approved dowel for cracked concrete[3], delivery and proper installation.

[1] Cavity acc. to table
[2] Load range acc. to table
[3] Fixing in-situ concrete acc. to documentation

Cross-references for additional information

Side	Topic
26, 28, 36	Accessories - precast concrete slabs DZA; DS and VD
14 - 15	Basic static data
16 - 17	Assembly and mounting instructions

Basic static data

Determination of anchoring forces and the selection of the required fixing material for anchoring a facade panel:
For fastening a suspended facade panel, two panel hangers are required for vertical loads due to self-weight and four horizontal anchors (generally pressure screws) to secure the cavity.

Actions (DIN EN 1991-1):

G_k	=	vertical load from proportionate self-load of panel (½ weight of panel when suspended symmetrically)
W_k	=	wind load per horizontal anchor (¼ wind load on panel; with differing projections of supports or with peak suction, the horizontal loads must be determined more precisely)
$W_{D,k}$	=	$c_{pe,1} * q_{ref} *$ proportionate surface (wind pressure)
$W_{S,k}$	=	$c_{pe,1} * q_{ref} *$ proportionate surface (wind suction)

Partial safety factors for actions:

Proof of supporting structure:

$\gamma_{G,sup}$	=	1.35	constant actions with self-weight
γ_Q	=	1.50	variable actions with wind load

Proof of position stability

$\gamma_{G,stb}$	=	0.90	constant actions (stabilising) with self-weight
γ_Q	=	1.50	variable actions with wind load

Anchoring forces:

Panel hangers

V_d	=	$\gamma_G * G_k$	vertical load in anchor
H_d	=	$V_d * \tan \alpha$	horizontal load in anchor
R_d	=	$\sqrt{V_d^2 + H_d^2}$	resulting oblique tension load in anchor

Pressure screws:

$D_{o,d}$	=	$D_{o,G,d} + D_{o,W,d}$	horizontal load top
$D_{u,d}$	=	$D_{u,G,d} + D_{u,W,d}$	horizontal load bottom
$D_{o,G,d}$	=	$\gamma_{G,sup} * G_k$	horizontal load from self-weight
max. $D_{o,W,d}$	=	$\gamma_Q * W_{D,k}$	horizontal load top (wind pressure)
min. $D_{o,W,d}$	=	$\gamma_Q * W_{S,k}$	horizontal load bottom (wind suction)
$D_{u,G,d}$	=	$\gamma_{G,sup} * G_k$	horizontal load bottom from self-weight
max. $D_{u,W,d}$	=	$\gamma_Q * W_{D,k}$	horizontal load bottom (wind pressure)
min. $D_{u,W,d}$	=	$\gamma_Q * W_{S,k}$	horizontal load bottom (wind suction)

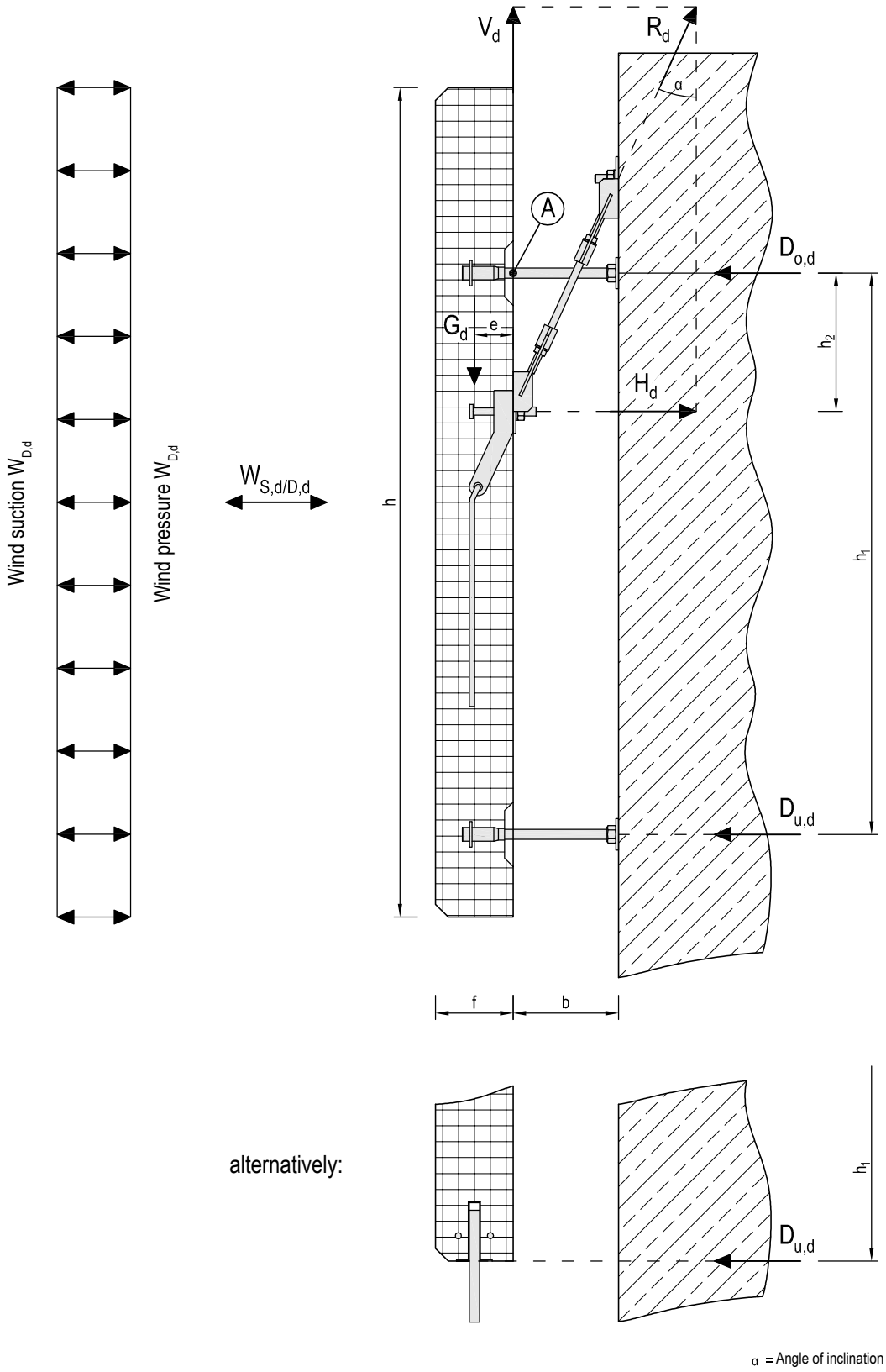
Inspection of position stability (DIN EN 1990):

If $\gamma_{G,stb} *$ min. $D_{o,G,k} + \gamma_Q *$ min. $D_{o,W,k} < 0$ → suction protection required for top (e.g. restraint anchor)
If $\gamma_{G,stb} *$ min. $D_{u,G,k} + \gamma_Q *$ min. $D_{u,W,k} < 0$ → suction protection required for bottom (e.g. restraint anchor)

Calculation:

$\Sigma M_A = 0$:	$D_{u,G,d}$	=	$(H_d * h_2 + V_d * e) / h_1$
	max. $D_{u,d}$	=	$D_{u,G,d}$ + max. $D_{u,W,d}$
	min. $D_{u,d}$	=	$D_{u,G,d}$ - min. $D_{u,W,d}$
$\Sigma H = 0$:	$D_{o,G,d}$	=	$H_d - D_{u,G,d}$
	max. $D_{o,d}$	=	$D_{o,G,d}$ + max. $D_{o,W,d}$
	min. $D_{o,d}$	=	$D_{o,G,d}$ - min. $D_{o,W,d}$
with:	h_1	=	distance between pressure screws (see sketch)
	h_2	=	distance between panel hanger and pressure screw, top (see sketch)
	e	=	half thickness of panel (f/2)

Static system



alternatively:

α = Angle of inclination

Cross-references for additional information

Page	Subject
42	Software MOSOCONstructor

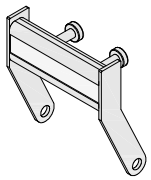
Please note

Due to the new manner of construction, no offset torque must be considered when calculating the attachment point!

Assembly instructions FB-H

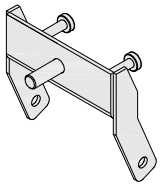
1.1 Components of cast-in part type 1

The cast-in part with load range 6.0 kN - 22.0 kN consists of an MOSO® anchor channel, two head bolts and two lateral plates for connecting the reinforcement loops. The MOSO® anchor channel contains a recess unit made of PE foam.



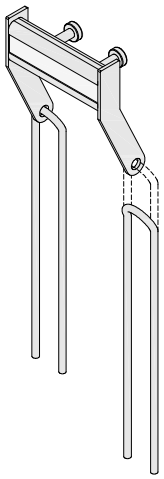
1.2 Components of cast-in part type 2

The cast-in part with load range 38.0 kN - 70.0 kN consists of a bracket, two head bolts and two lateral plates for connecting the reinforcement loops.



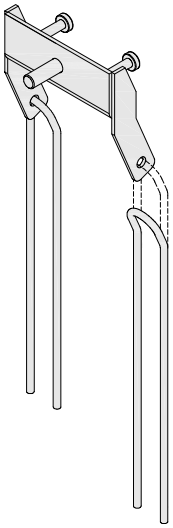
2.1 Assembly of the reinforcement

The reinforcement loops are hooked into the designated holes in the lateral plates.



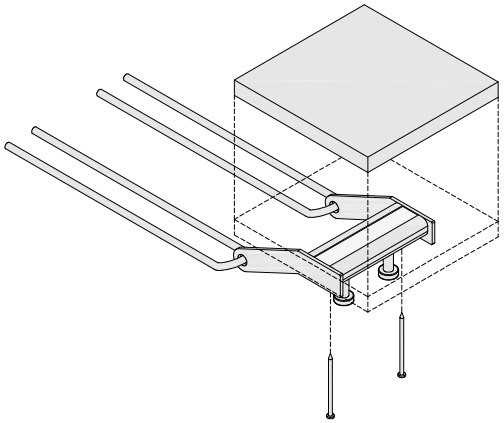
2.2 Assembly of the reinforcement

The reinforcement loops are hooked into the designated holes in the lateral plates.



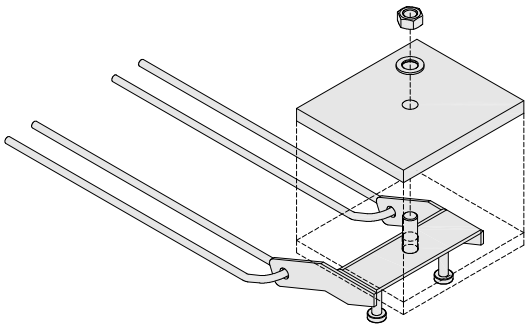
3.1 Attaching the formwork

The cast-in part can be attached to the formwork (e.g. board) with the help of two nails. There are two nail holes on the back of the MOSO® anchor channel for this purpose. The auxiliary construction and the cast-in part can subsequently be flush-mounted to the formwork.



3.2 Attaching the formwork

The cast-in part can be fixed to an auxiliary construction (e.g. board) with the help of an included hexagon nut and a washer. The formwork must have a hole to match the size of the hexagon nut. The auxiliary construction and the cast-in part can subsequently be flush-mounted to the formwork.



Load range	T_{inst} [Nm]	Connection bolt	Width across flat
6,0 kN	15	M10	17
8,5 kN	25	M12	19
13,5 kN	60	M16	24
16,0 kN	60	M16	24
22,0 kN	120	M20	30
38,0 kN	240	M20	30
48,0 kN	240	M20	30
70,0 kN	420	M24	36

General information

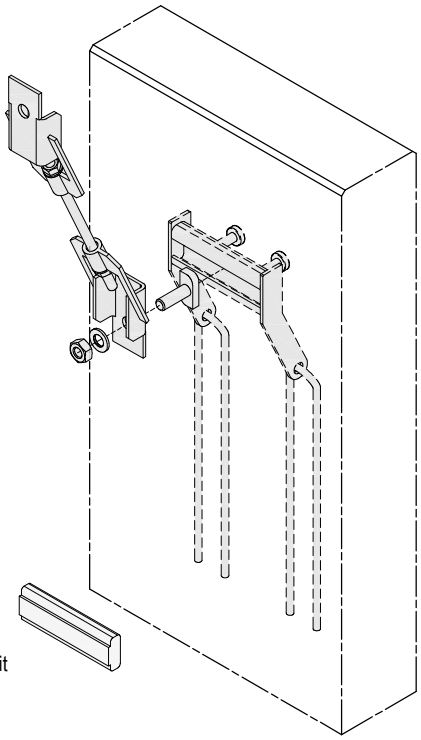
① The precast part remains suspended on the crane over the entire assembly process.

② The hexagon nut on the threaded rod in the middle part of the panel hanger system may only be rotated manually to adjust the height. To do this, the precast part must be lifted to allow for a load relief.

③ If the horizontal distance b between the in-situ concrete and the precast part should deviate after the panel hanger system has been delivered, the vertical mounting dimension h_x or h_{xA} also changes accordingly. This may make it necessary to adjust the threaded rod in the middle part.

4.1 Attaching the mounting part to the cast-in part

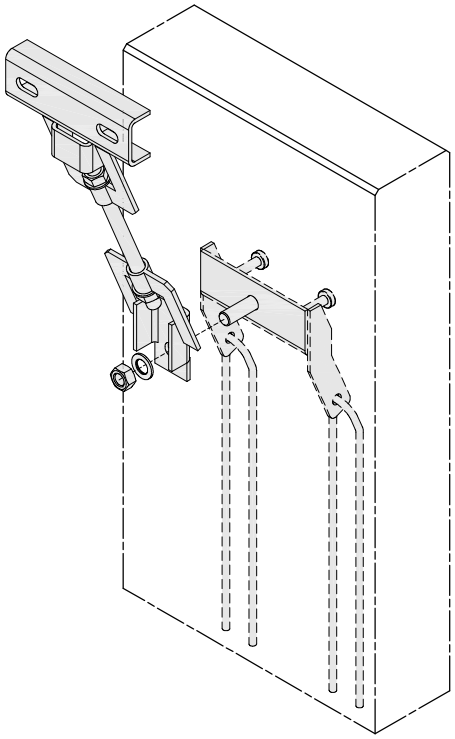
The mounting part of the panel hanger system consists of an upper part (available in four different designs) and a middle part (available in two different designs). This mounting part is delivered completely pre-assembled. Prior to installing the panel hanger, the recess unit must be removed from the MOSO® anchor channel. Then the installation part is connected to the cast-in part with the aid of an MHK bolt, a washer and hexagon nut. The anchor channel allows a horizontal adjustment. The tightening torques indicated in the table on page 16 must be adhered to.



Recess unit

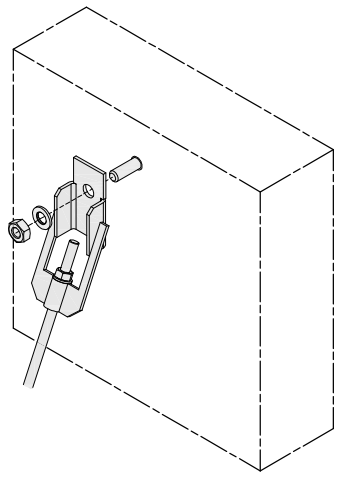
4.2 Attaching the mounting part to the cast-in part

The mounting part of the panel hanger system consists of an upper part (available in four different designs) and a middle part (available in two different designs). This mounting part is delivered completely pre-assembled. The installation part is connected to the cast-in part with the aid of a washer and a hexagon nut. The tightening torques indicated in the table on page 16 must be adhered to.



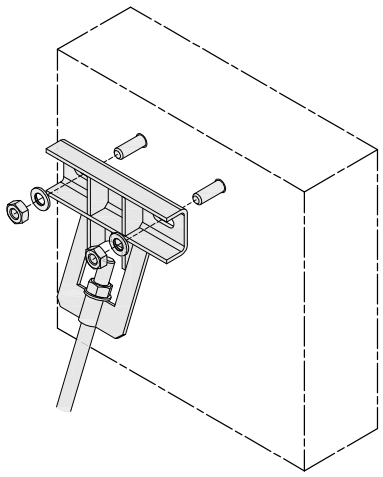
5.1 Attaching the mounting part to the in-situ concrete

The upper part of the panel hanger system is fastened to the in-situ concrete with an officially approved dowel or a MOSO® CE anchor channel. The tightening torques must be taken from the respective approvals and must be adhered to. A vertical adjustment of the precast part can be done by the continuous adjustment of the hexagon nut on the threaded rod. In order to minimise the risk of cold welding, a lubricant must be applied (e.g. Molykote® - can be ordered separately).



5.2 Attaching the mounting part to the in-situ concrete

The upper part of the panel hanger system is fastened to the in-situ concrete with an officially approved dowel or a MOSO® CE anchor channel. The tightening torques must be taken from the respective approvals and must be adhered to. The slotted holes in the upper part allow a horizontal adjustment. A vertical adjustment of the precast part can be done by the continuous adjustment of the hexagon nut on the threaded rod. In order to minimise the risk of cold welding, a lubricant must be applied (e.g. Molykote® - can be ordered separately).



Parapet anchor - Standard design

FB-E

The MOSO® precast fixing FB-E is a parapet anchor for supporting parapet elements. In order to achieve a uniform distribution of load, each concrete element is braced with at least two anchors. When using more than two anchors, the design with adjusting screw must be used.

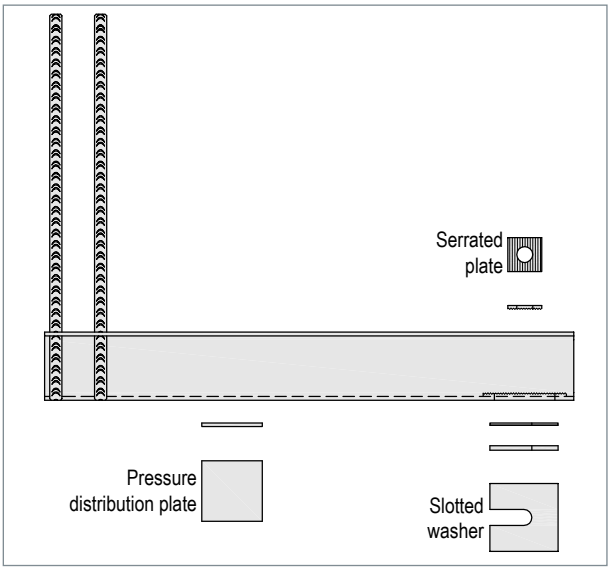
By default the parapet reinforcement is used with B500B. With increased requirements in the concrete cover, the parapet reinforcement B500A NR has to be chosen.

The parapet anchor is fastened to the in-situ concrete with an officially approved dowel or a MOSO® CE anchor channel.

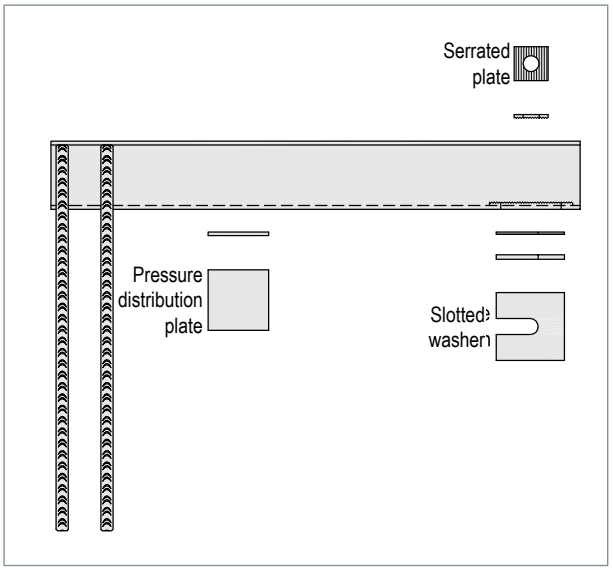
Please refer to the table for the dimensions.

Product information

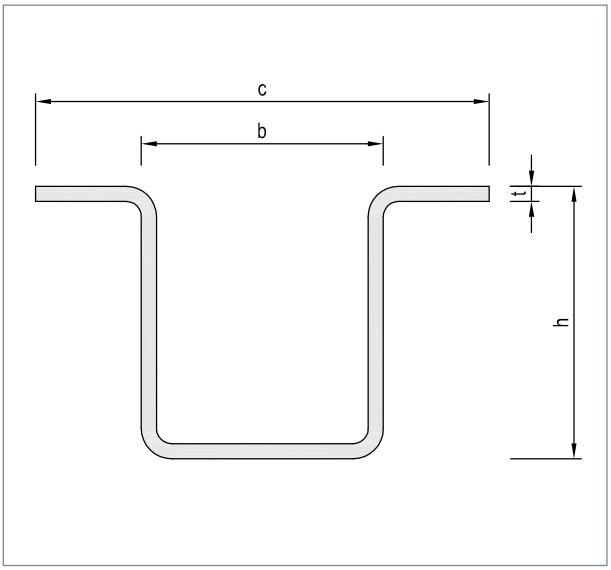
- Types: 1 - 8
- Cavity: up to 200 mm (> on request)
- Materials: approved stainless steel for shape of cross section
  approved reinforcement B500B
  approved reinforcement B500A NR $d_s \leq 14$ mm
- Certification: structural analysis



▲ Standard design FB-E



▲ Top of slab design FB-EA



▲ Profile cross-section

FB-E FB-EA	c [mm]	b [mm]	h [mm]	t [mm]
1	102	62	45	3
2	106	62	48	3
3	126	76	55	4
4	134	76	66	4
5	138	78	70	5
6	148	78	83	5
7	160	80	84	6
8	190	90	85	8

Technical data / Measurement table

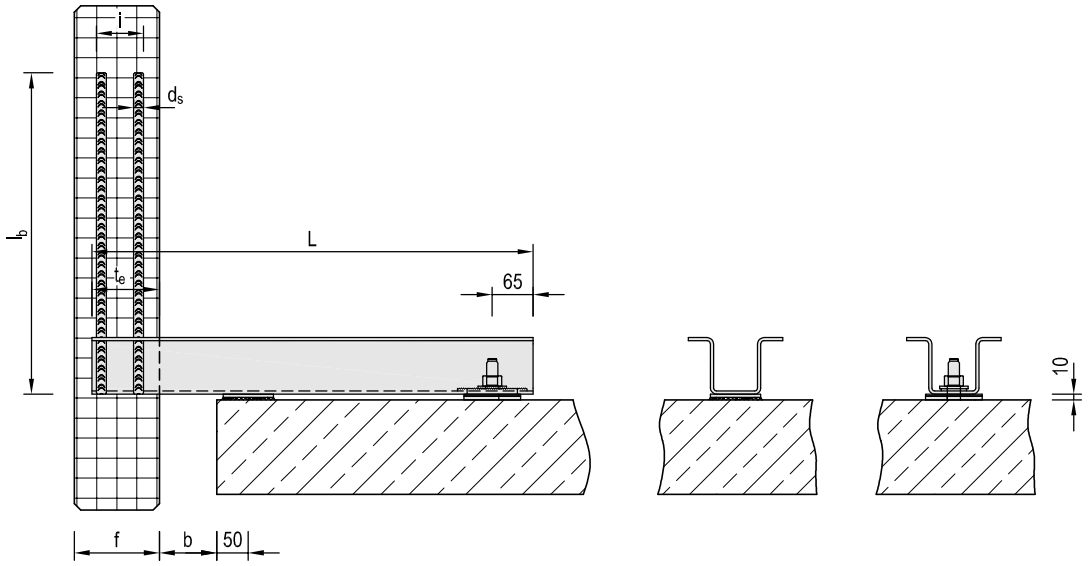
FB-E / FB-EA

	Standard lengths L in mm with cavity b				Slotted hole	Anchoring depth	Panel thickness ①	Parapet reinforcement		
	0 - 40 mm	50 - 100 mm	110 - 140 mm	150 - 200 mm	SH [mm]	t_e [mm]	f_{min} [mm]	d_s [mm]	i [mm]	l_b [mm]
1	400	450	500 ②	600 ②	18 x 80	70	100	Ø 10	40	350
2	450	500	550	650	18 x 80	72	100	Ø 10	40	400
3	500	550	600	700	18 x 80	82	110	Ø 12	50	450
4	550	600	650	750	18 x 80	92	120	Ø 14	60	500
5	550	600	650	750	22 x 80	102	130	Ø 14	70	525
6	600	650	700	800	22 x 80	108	135	Ø 16	75	600
7	650	700	750	850	22 x 80	123	150	Ø 16	90	625
8	700	750	800	900	22 x 80	125	150	Ø 20	90	700

① f_{min} with $c_{nom,i}$ = 25 mm and $c_{nom,a}$ = 35 mm ② Select accessories set 2 with size M16.

Fixing accessories

	Max. size	W t = 3 mm		W t = 6 mm		serr. W t = 5 mm		PDP	
		Length [mm]	SL Ø [mm]	Length [mm]	SL Ø [mm]	Length [mm]	RL Ø [mm]	Length [mm]	t [mm]
1	M12	50	13	50	13	34	13	70	5
2	M16	65	17	65	17	40	17	70	5
3	M16	65	17	65	17	40	17	70	5
4	M16	65	17	65	17	40	17	70	5
5	M20	90	21	90	21	45	21	90	5
6	M20	90	21	90	21	45	21	90	5
7	M20	90	21	90	21	45	21	90	5
8	M20	90	21	90	21	45	21	90	5



Order example: FB - E - 4 - 600

- Type
- Design
- Profile
- Length

Scope of supply

- Parapet anchor
- Serrated plate
- 1x slotted plate t = 3 mm
- 1x slotted plate t = 6 mm
- Pressure distribution plate

Cross-references for additional information

Page	Topic
22 - 23	Basic static data
24 - 25	Assembly and mounting instructions

Text for invitation to tender

... pc. MOSO® precast fixing FB-E-4[1)]-600[2)] including officially approved dowel for cracked concrete, delivery and proper installation.

[1)] Profile size acc. to table

[2)] Profile length acc. to table

Parapet anchor - with adjustment

FB-EJ

The MOSO® precast fixing FB-EJ is a parapet anchor for parapet elements. The system allows for the quick and easy compensation of structural tolerances using the adjusting screw. In order to achieve a uniform distribution of load, each concrete element is braced with at least two anchors. When using more than two anchors, a uniform distribution of load must also be ensured.

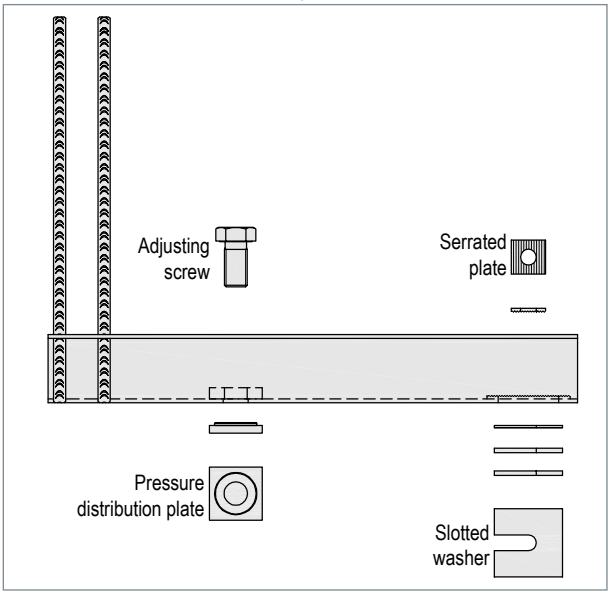
By default the parapet reinforcement is used with B500B. With increased requirements in the concrete cover, the parapet reinforcement B500A NR has to be chosen.

The parapet anchor is fastened to the in-situ concrete with an officially approved dowel or a MOSO® CE anchor channel.

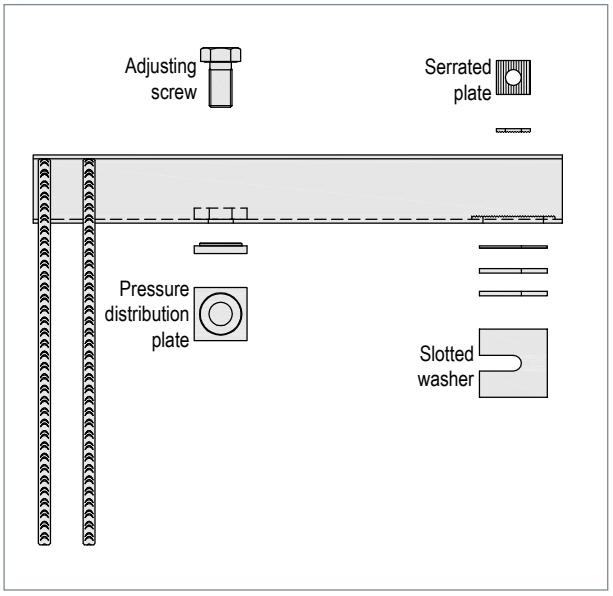
Please refer to the table for the dimensions.

Product information

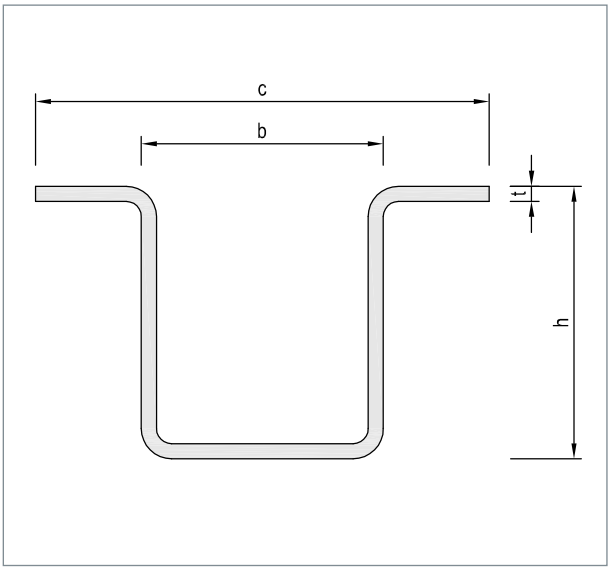
- Types: 1 - 8
- Cavity: up to 200 mm (> on request)
- Material: approved stainless steel for shape of cross section
  approved reinforcement B500B
  approved reinforcement B500A NR $d_s \leq 14$ mm
- Certification: structural analysis



▲ Standard design FB-EJ



▲ Top of slab design FB-EJA



▲ Profile cross-section

FB-EJ FB-EJA	c [mm]	b [mm]	h [mm]	t [mm]
1	102	62	45	3
2	106	62	48	3
3	126	76	55	4
4	134	76	66	4
5	138	78	70	5
6	148	78	83	5
7	160	80	84	6
8	190	90	85	8

Technical data / Measurement table

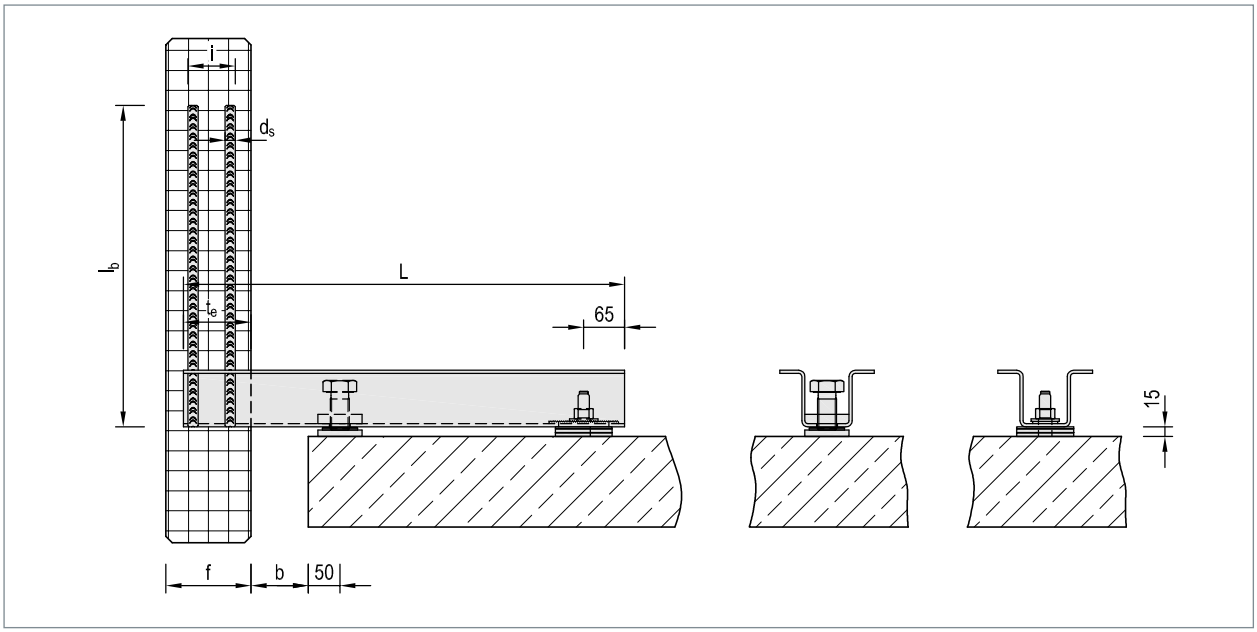
FB-EJ / FB-EJA

	Standard lengths L in mm with cavity b				Slotted hole	Anchoring depth	Panel thickness ①	Parapet reinforcement		
	0 - 40 mm	50 - 100 mm	110 - 140 mm	150 - 200 mm	SH [mm]	t_e [mm]	f_{min} [mm]	d_s [mm]	i [mm]	l_b [mm]
1	400	450	500 ②	600 ②	18 x 80	70	100	Ø 10	40	350
2	450	500	550	650	18 x 80	72	100	Ø 10	40	400
3	500	550	600	700	18 x 80	82	110	Ø 12	50	450
4	550	600	650	750	18 x 80	92	120	Ø 14	60	500
5	550	600	650	750	22 x 80	102	130	Ø 14	70	525
6	600	650	700	800	22 x 80	108	135	Ø 16	75	600
7	650	700	750	850	22 x 80	123	150	Ø 16	90	625
8	700	750	800	900	22 x 80	125	150	Ø 20	90	700

① f_{min} with $c_{nom,i}$ = 25 mm and $c_{nom,a}$ = 35 mm ② Select accessories set 2 with size M16.

Fixing accessories

	Max. size	W t = 3 mm		W t = 6 mm		serr. W t = 5 mm		PDP		Pressure screw
		Length [mm]	SL Ø [mm]	Length [mm]	SL Ø [mm]	Length [mm]	RL Ø [mm]	Length [mm]	t [mm]	
1	M12	50	13	50	13	34	13	40	6	M16
2	M16	65	17	65	17	40	17	40	6	M16
3	M16	65	17	65	17	40	17	40	8	M20
4	M16	65	17	65	17	40	17	50	8	M24
5	M20	90	21	90	21	45	21	70	10	M30
6	M20	90	21	90	21	45	21	70	10	M30
7	M20	90	21	90	21	45	21	70	10	M30
8	M20	90	21	90	21	45	21	70	10	M30



Order example: FB - EJ - 4 - 600

- Type
- Design
- Profile
- Length

Scope of supply

- Parapet anchor
- Serrated plate
- 1x slotted plate t = 3 mm
- 2x slotted plate t = 6 mm
- Hexagon nut acc. to DIN EN ISO 4017 (DIN 933)
- Pressure distribution plate

Cross-references for additional information

Page	Topic
22 - 23	Basic static data
24 - 25	Assembly and mounting instructions

Text for invitation to tender

... pc. MOSO® precast fixing FB-EJ-4[1)]-600[2)] including officially approved dowel for cracked concrete, delivery and proper installation.

[1)] Profile size acc. to table

[2)] Profile length acc. to table

Basic static data

Determination of anchoring forces and the selection of the required fixing material for anchoring a facade panel:
The required profile of the parapet anchor is roughly determined by defining the torque $M_{y,d}$ and the shear force $V_{z,d}$ on support A of the parapet anchor for all forces acting on the respective anchor (facade panel, wind, beam load, etc.) and then balancing them with the bearing values according to the table.

Actions (DIN EN 1991-1):

G_k	=	vertical load from proportionate self-load of facade panel
V_k	=	vertical load from proportionate self-load (e.g. flower trough)
H_k	=	horizontal load from beam load
W_k	=	horizontal load from wind load

If the parapet anchors are arranged symmetrically, ½ of the panel length must be applied as the load drawing length for each. If the varying load drawing lengths vary, they must be determined more precisely.

Partial safety factors for actions:

$\gamma_{G,sup}$	=	1.35	constant action with self-weight
γ_Q	=	1.50	variable action with beam and wind load

Anchoring forces:

D_d	=	max. $\{V_{z,d}$; $M_{y,d} / y\}$	support A
Z_d	=	$M_{y,d} / y$	support B
Q_d	=	N_d	support B
with: y	=	z - b - 50 mm - 65 mm	inner lever arm
z	=	L - t_e	visible part of parapet anchor

Calculation:

$V_{z,d}$	=	$\gamma_{G,sup} * G_k + \gamma_{G,sup} * V_k$	vertical load on support A
N_d	=	$\gamma_Q * H_k + \gamma_Q * W_k$	horizontal load on support B
$M_{y,d}$	=	$\gamma_{G,sup} * G_k * (f/2 + b + 50\ mm)$	from self-weight
	+	$\gamma_{G,sup} * V_k * (a1 + f/2 + b + 50\ mm)$	from self-weight (e.g. flower trough)
	+	$\gamma_Q * H_k * h_1$	from horizontal load (e.g. beam load)
	+	$\gamma_Q * W_k * e_w$	from wind load
$V_{R,d}$	≥	$V_{z,d}$	shear load analysis
ω_v	≤	$\left(M_{y,k} * a * \left(\frac{L_i}{3} + \frac{a}{2}\right)\right) / \left(E * I_y\right)$	vertical adjustment
max. ω_v	=	(t_e + b + 50 mm) / 150	
with: a	=	f/2 + b + 50 mm	
L_i	=	z - 65 mm + f/2	

Cross-section values

Profile type		1	2	3	4	5	6	7	8
A	[mm²]	487	529	798	950	1.235	1.445	1.730	2.322
I_y	[mm⁴]	139.941	175.900	340.700	593.575	842.722	1.401.930	1.674.320	2.186.660
I_z	[mm⁴]	264.882	344.000	687.600	1.072.900	1.534.760	2.250.970	2.777.130	4.647.530
$W_{y,el}$	[mm³]	6.220	7.328	12.390	17.987	24.078	33.782	39.865	51.451
$W_{z,el}$	[mm³]	6.160	7.320	12.730	17.305	23.612	30.835	37.529	56.677

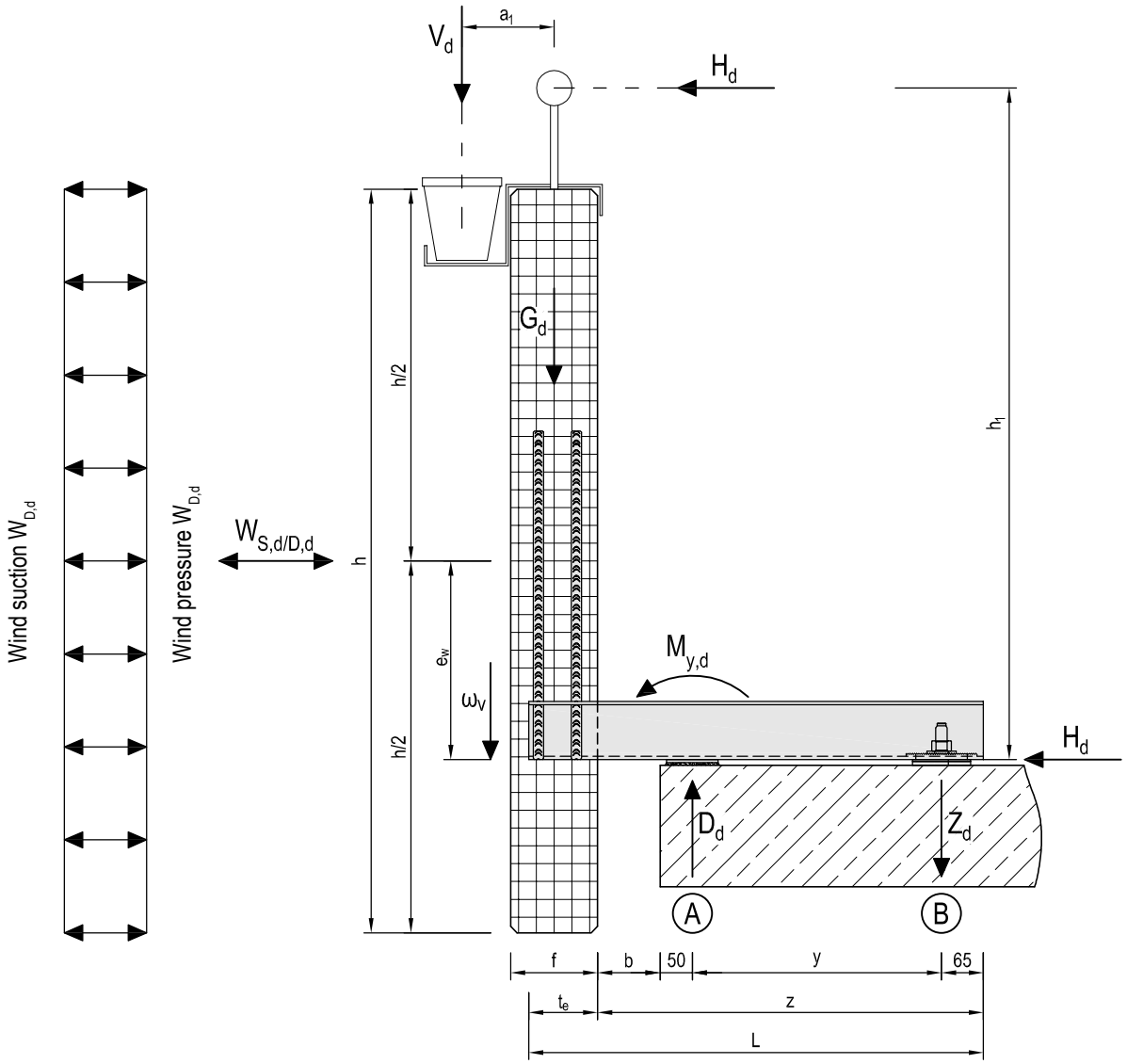
Material constants

		1	2	3	4	5	6	7	8
$f_{y,k}$	[N/mm²]	400	400	400	400	400	400	400	400
E-Modul	[N/mm²]	200.000	200.000	200.000	200.000	200.000	200.000	200.000	200.000

Bearing values

Profile type		1	2	3	4	5	6	7	8
$M_{pl,y,d}$	[kNcm]	275	321	550	790	1072	1493	1785	2366
$M_{pl,z,d}$	[kNcm]	280	333	579	787	1073	1401	1706	2576
$N_{pl,d}$	[kN]	177	192	290	346	449	525	629	844
$V_{pl,z,d}$	[kN]	52,9	56,7	85,7	104,1	136,5	163,8	196,5	258,7
V_{Rd}	[kN]	17,5	18,7	28,3	34,4	45,0	54,0	64,8	85,4

Static system



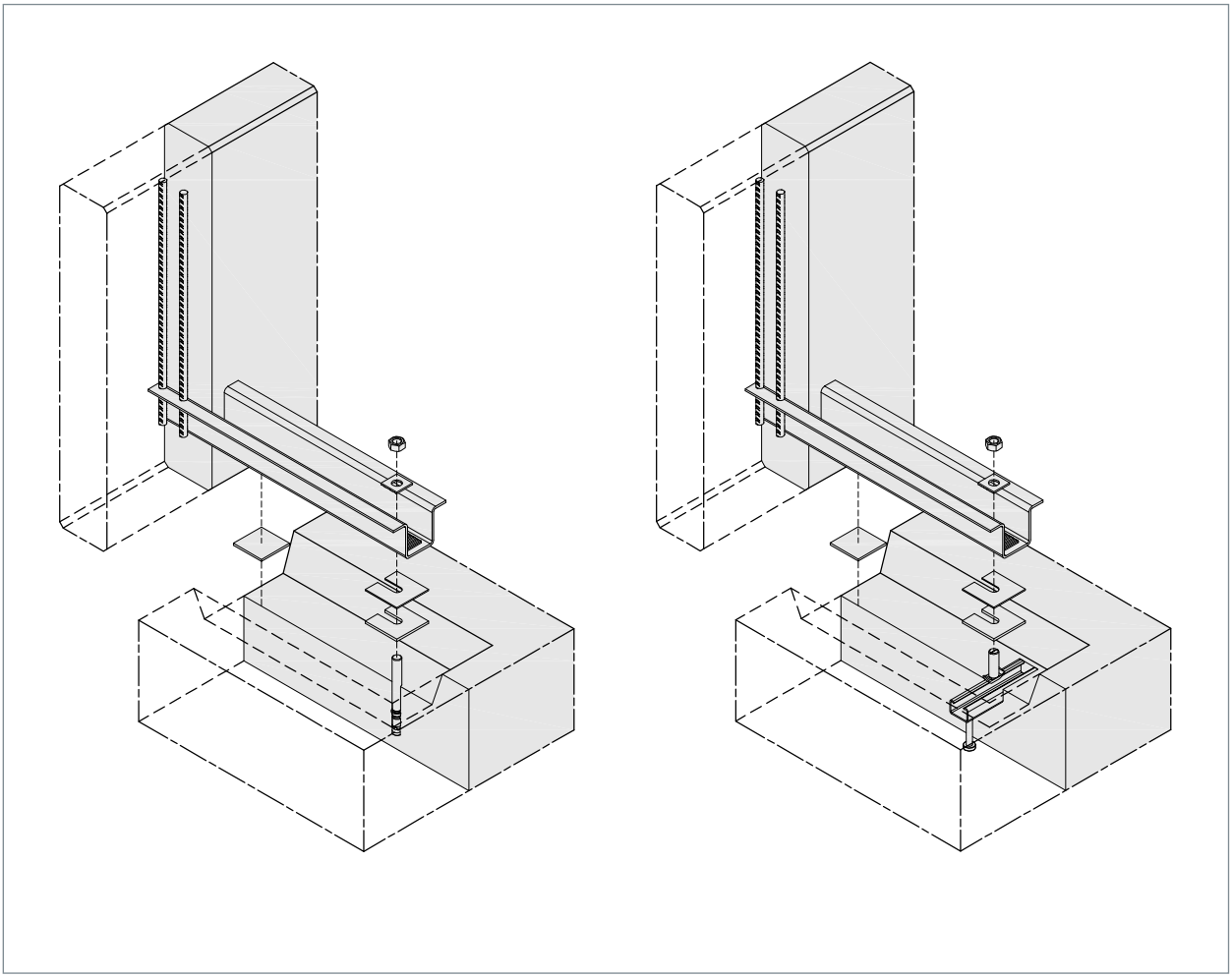
Cross-references for additional information

Page	Subject
42	Software MOSOCONstructor

Please note

In order to achieve a uniform distribution of load, each concrete element is braced with at least two anchors. When using more than two anchors, the design with adjusting screw must be used.

Assembly instructions FB-E



▲ FB-E: Dowel mounting

▲ FB-E: Channel mounting

Mounting the parapet anchor in the precast concrete unit

The parapet anchor is installed in the precast concrete unit that the rear reinforcement rods have a concrete covering towards the inside of the precast part of at least 25 mm. The reinforcement rods must have sufficient concrete covering around it.

Please note the following during installation:
The height of the cast-in part depends on the mounting level of the parapet anchor on the upper edge of the slab. The lower edge of the profile should be Δh = 5 - 10 mm above this mounting level so that there is enough clearance for the adjustment. If the parapet anchor is mounted in a recess, as shown in the sketches, the mounting measurement depends on the lower edge of this recess plus the measurement Δh.

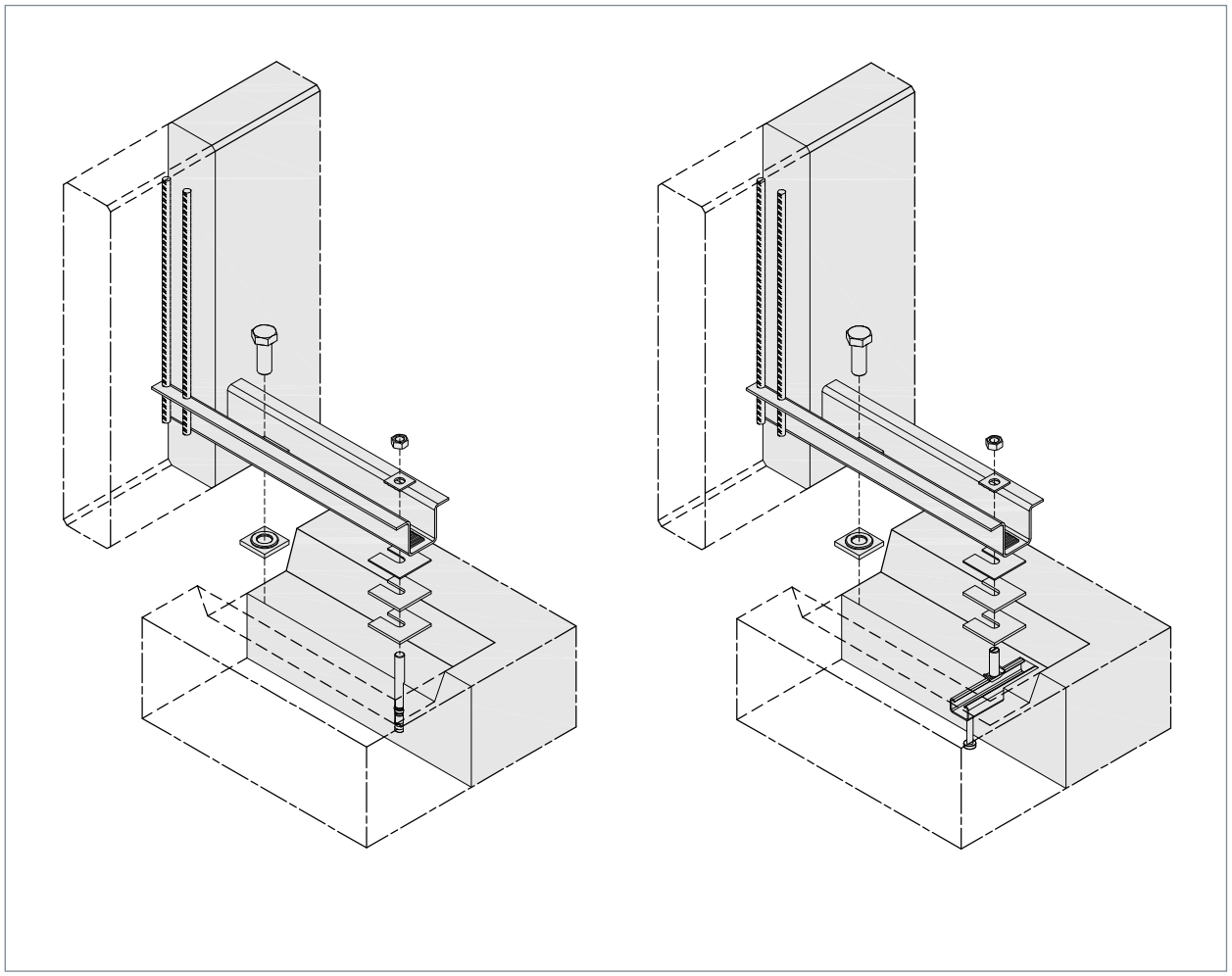
Mouting the parapet anchor on the slab

The parapet anchor is fastened to the slab with an officially approved dowel or MOSO® CE anchor channel. A height compensation can be made on the tension bearing by means of the included slotted washers. To do this, the mounting accessories of the relevant anchor must be used according to the table. If the anchor is to be mounted in a recess to be cast later, the profile must be coated with soft insulation. This allows the accommodation of temperature-dependent changes of length.

Cross-references for additional information

Page	Topic
19	Fixing accessories

Assembly instructions FB-EJ



▲ FB-EJ: Dowel mounting

▲ FB-EJ: Channel mounting

Mounting the parapet anchor in the precast concrete unit

The parapet anchor is installed in the precast concrete unit that the rear reinforcement rods have a concrete covering towards the inside of the precast part of at least 25 mm. The reinforcement rods must have sufficient concrete covering around it.

Please note the following during installation:
The height of the cast-in part depends on the mounting level of the parapet anchor on the upper edge of the slab. The lower edge of the profile should be Δh = 15 - 25 mm above this mounting level so that there is enough clearance for the adjustment. If the parapet anchor is mounted in a recess, as shown in the sketches, the mounting measurement depends on the lower edge of this recess plus the measurement Δh.

Mounting the parapet anchor on the slab

The parapet anchor is fastened to the top of slab with an officially approved dowel or MOSO® CE anchor channel. A height compensation can be made on the tension bearing by means of the included slotted washers as well as with the adjusting screw on the pressure bearing. To do this, the correct parts of the relevant anchor must be used according to the table. The pressure distribution plate is shimmed at the lower end of the screw in such a way that the screw is located in the recess of the plate. The hexagon bolt may only be rotated manually to adjust the height, during which the precast part must be lifted for load relief. In order to minimise the risk of cold welding, a lubricant must be applied (e.g. Molykote®). If the anchor is to be mounted in a recess to be cast later, the profile must be coated with soft insulation. This allows the accommodation of temperature-dependent changes of length.

Cross-references for additional information

Page	Topic
21	Fixing accessories

Pressure screws

FB-DS

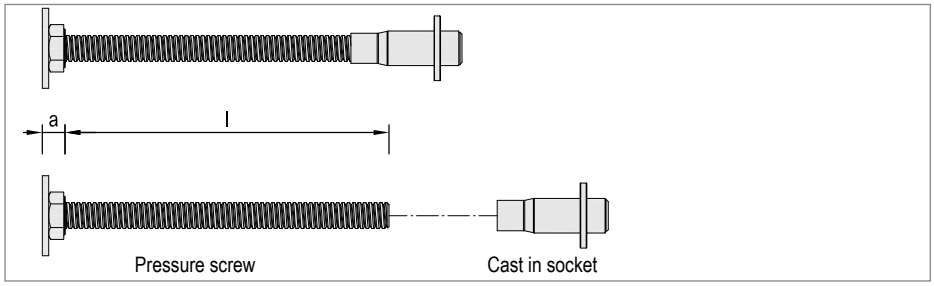
The MOSO® precast fixing FB-DS is used for the horizontal support of facade panels. The acting pressure forces are absorbed in combination with panel hangers. It is connected to the precast part by means of the officially approved cast in socket FB-M. The cast-in part must be ordered separately.

Product information FB-DS1, FB-DS2

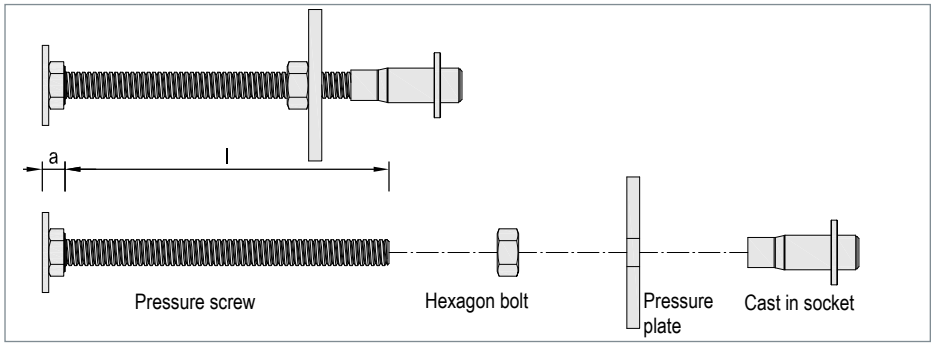
- Diameter: M12 - M30 (> by request)
- Cavity: up to 300 mm
  larger distances on request
- Material: A4-70; 1.4362
- Certification: structural analysis

Product information FB-M

- Diameter: M12 - M20 (> by request)
- Material: approved stainless steel
- Certificate: national technical approval



▲ FB-DS1



▲ FB-DS2

FB-DS1 / FB-DS2

	Cast-in part cast in socket [-]	Thread length l for the cavity b in mm 60	80	100	120	140	160	180	200	220	240	260	280	300	Adjustment [mm]	Pressure plate for Type DS2 [mm]	a [mm]	SW
M12	FB-M12K	80	100	120	140	160	180	200	220	240	260	280	300	320	± 10	80 / 80 / 8	13	19
	FB-M12L	80	100	120	140	160	180	200	220	240	260	280	300	320	± 15	80 / 80 / 8	13	19
M16	FB-M16K	80	100	120	140	160	180	200	220	240	260	280	300	320	± 15	80 / 80 / 10	16	24
	FB-M16L	90	110	130	150	170	190	210	230	250	270	290	310	330	± 20	80 / 80 / 10	16	24
M20	FB-M20K	80	100	120	140	160	180	200	220	240	260	280	300	320	± 15	100 / 100 / 12	20	30
	FB-M20L	90	110	130	150	170	190	210	230	250	270	290	310	330	± 20	100 / 100 / 12	20	30
M24	FB-M24K ①	80	100	120	140	160	180	200	220	240	260	280	300	320	± 15	100 / 100 / 15	24	36
	FB-M24L ①	90	110	130	150	170	190	210	230	250	270	290	310	330	± 20	100 / 100 / 15	24	36

① The cast-in parts FB-M24 K/ L are not subject of the approval.

Order example: FB - DS1 - M12 x 130

- Type
- Design
- Size of thread
- Thread length

Order example: FB - M12 L

- Type
- Size of thread
- Design

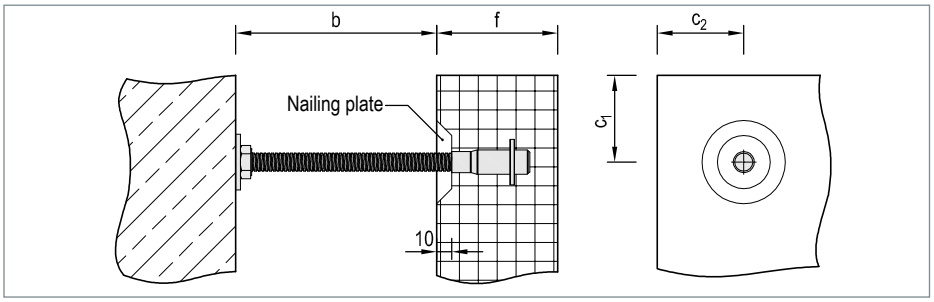
Please note

Cast in sockets (e.g. FB-M12L) to be set in concrete should be tendered separately.

Technical data / Measurement table

FB-DS1 + FB-M

FB-	Boundary conditions: Panel thickness f_{min}	Boundary conditions: Edge distance $c_{1,min}$; $c_{2,min}$	Min. concrete quality	Tensile load $F_{Z,Rd}$ [kN]	Bearing capacity (without reinforcement): Pressure load for the cavity b in mm $F_{D,Rd}$ [kN] 60	80	100	120	140	160	180	200	220	240	260	280	300
M12K	70 mm	50 mm	C25/30	3,15	3,15	→											3,15
M12K	85 mm	75 mm	C25/30	3,15	8,54	→					8,54	7,92	7,02	6,25	5,60	5,04	4,55
M12L	100 mm	75 mm	C25/30	8,54	8,54	→					8,54	7,92	7,02	6,25	5,60	5,04	4,55
M16K	80 mm	75 mm	C25/30	6,05	6,05	→											6,05
M16K	100 mm	100 mm	C25/30	6,05	12,13	→											12,13
M16L	120 mm	100 mm	C25/30	12,13	12,13	→											12,13
M20K	100 mm	75 mm	C30/37	8,80	8,80	→											8,80
M20K	120 mm	125 mm	C30/37	8,80	24,93	→											24,93
M20L	140 mm	125 mm	C30/37	24,93	24,93	→											24,93
M24K	100 mm	100 mm	C30/37	8,80	8,80	→											8,80
M24L	140 mm	150 mm	C30/37	24,93	24,93	→											24,93



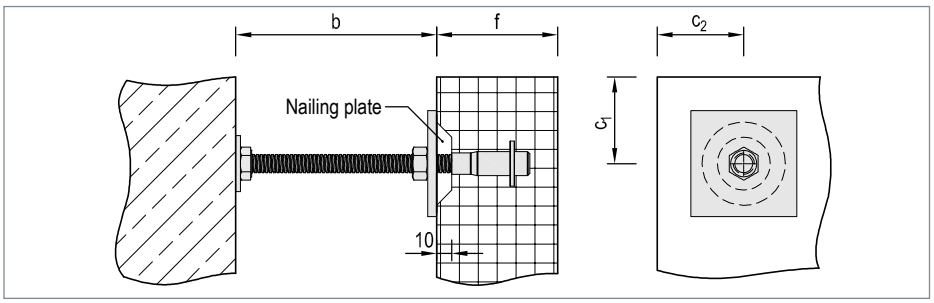
◀ FB-DS1: Installation condition

Scope of supply

- Pressure screw

FB-DS2 + FB-M

FB-	Boundary conditions: Panel thickness f_{min}	Boundary conditions: Edge distance $c_{1,min}$; $c_{2,min}$	Min. concrete quality	Tensile load $F_{Z,Rd}$ [kN]	Bearing capacity (with minimum reinforcement Q188 + pressure plate): Pressure load for the cavity b in mm $F_{D,Rd}$ [kN] 60	80	100	120	140	160	180	200	220	240	260	280	300
M12K	70 mm	285 mm	C25/30	3,15	12,84	→		12,84	11,64	10,20	8,97	7,92	7,02	6,25	5,60	5,04	4,55
M12L	100 mm	350 mm	C25/30	8,54	19,55	17,28	15,18	13,30	11,64	10,20	8,97	7,92	7,02	6,25	5,60	5,04	4,55
M16K	80 mm	250 mm	C25/30	6,05	12,64	→											12,64
M16L	120 mm	350 mm	C25/30	12,13	30,97	→		30,97	29,43	26,75	24,28	22,04	20,02	18,21	16,59	15,16	13,88
M20K	100 mm	375 mm	C30/37	8,80	22,91	→											22,91
M20L	140 mm	500 mm	C30/37	24,93	49,20	→				49,20	45,94	42,55	39,39	36,45	33,73	31,24	28,95



◀ FB-DS2: Installation condition

Scope of supply

- Pressure screw
- Pressure plate
- Hex nut DIN EN ISO 4032 (DIN 934)

Cross-references for additional information

Page	Topic
28, 30ff	In case of tensile loads, a suction protection device on the in-situ concrete must be planned. (e.g. FB-DZA ; FB-ZH)

Text for invitation to tender

...pc. MOSO® precast fixing FB-DS1[1)]-M12[2)]x130[3)] as accessory for precast concrete facade panels, delivery and proper installation.

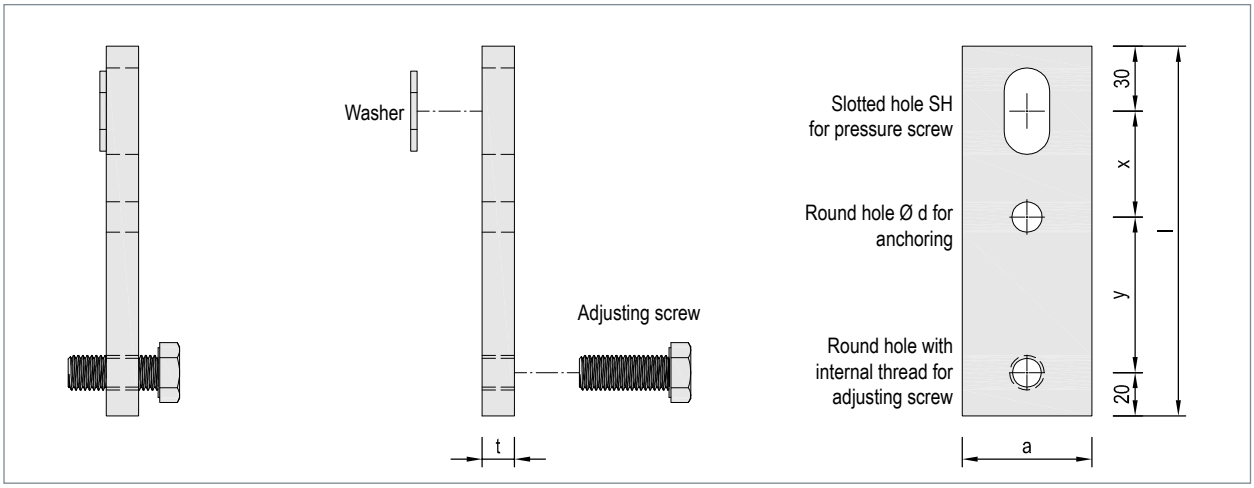
[1)] Design acc. to table
[2)] Thread size acc. to table
[3)] Thread length acc. to table

Restraint anchor: FB-DZA

The MOSO® precast fixing FB-DZA is used for the horizontal suction of facade panels. This is used in combination with pressure screw FB-DS. It is connected to the precast part by means of the officially approved cast in socket FB-M. The cast-in part and the pressure screw must be ordered separately.

Product information

- Load range: 2.0 - 6.0 kN (> by request)
- Material: approved stainless steel
- Certification: structural analysis



▲ FB-DZA

FB-DZA

	Load range (suction) [kN]	Suitable pressure screws ①	Dimensions l [mm]	a [mm]	t [mm]	x [mm]	y [mm]	Ø d [mm]	LL [mm]
Type	- 2,0	M12	157	40	10	38	69	12	13 x 40
	- 3,5	M12 / M16	148	48	12	39	59	14	17 x 40
	- 6,0	M16 / M20	171	60	15	49	72	18	21 x 40

① See table "Pressure screws" for the admissible compressive forces on page 27. Further combinations of load lvl and the size of pressure screw on request

Order example: FB - DZA - 3.5 - M16

- Type
- Design
- Load range
- Pressure screw size

Scope of supply

- Anchor plate with hex. bolt DIN EN ISO 4017 (DIN 933) pre-assembled
- Washer DIN 7349 acc. to pressure screw size

Please note

The pressure screw and the cast in socket to be set in concrete must be tendered separately.

Cross-references for additional information

Page	Topic
26 - 27	Pressure screw FB-DS
29	Assembly and mounting instructions

Text for invitation to tender

...pc. MOSO® precast fixing FB-DZA-3.5[1)]-M16[2)] including dowel for cracked concrete as accessory for precast concrete panels, delivery and proper installation.

[1)] Load range acc. to table

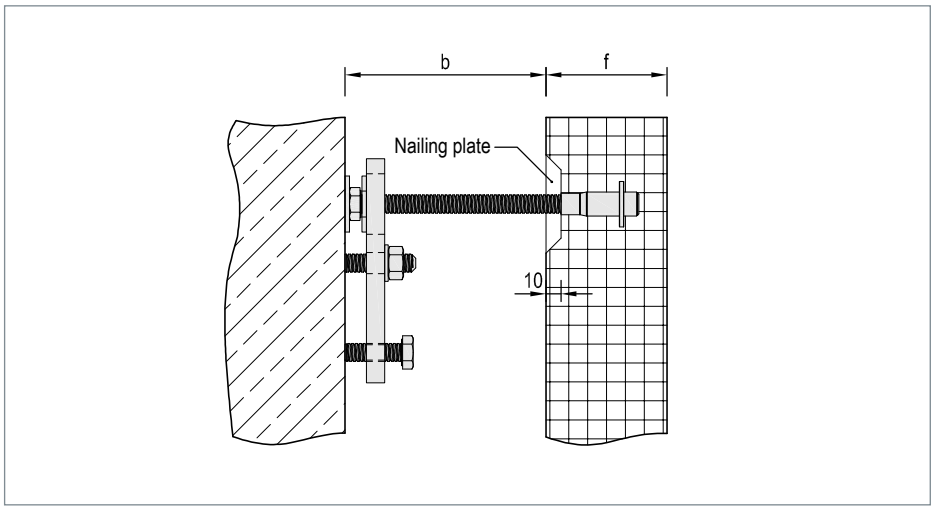
[2)] Suitable pressure screw acc. to table

Technical data / Measurement table

FB-DZA

	Load range (suction) [kN]	Design load $F_{H,Rd}$ [kN]	Recommended mount ①	Adjusting screw	Suitable pressure screws ②
Type	- 2,0	- 3,00	FAZ II 10/50	M10 x 40	M12
	- 3,5	- 5,25	FAZ II 12/60	M12 x 40	M12 / M16
	- 6,0	- 9,00	FAZ II 16/60	M16 x 50	M16 / M20

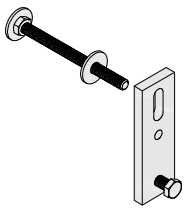
① The proof of anchoring must be provided in consideration of the respective boundary conditions.
② See table "Pressure screws" for the admissible compressive forces on page 27.



▲ FB-DZA: Mounting condition

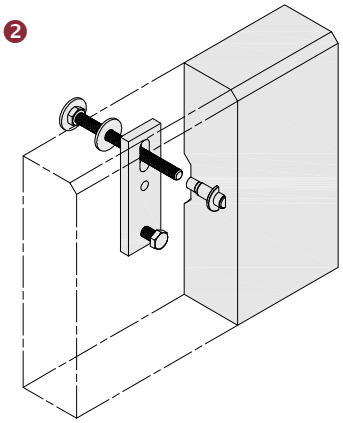
Assembly instructions FB-DZA

❶



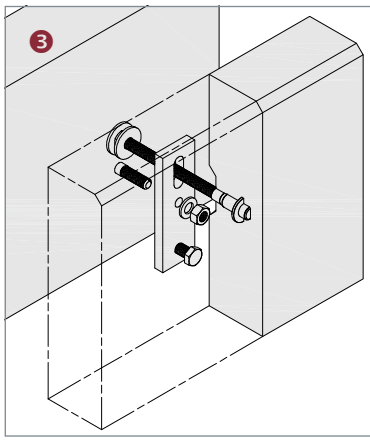
The pressure screw Type FB-DS1 or Type FB-DS2 with previously mounted washer is passed through the slotted hole of the plate.

❷



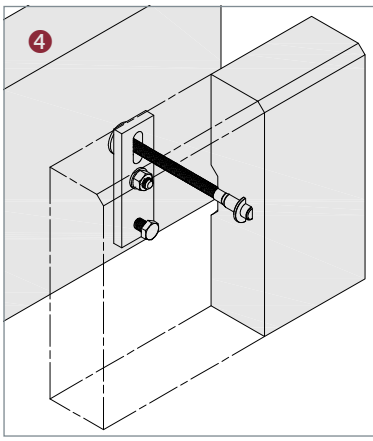
The pressure screw is screwed into the embedded cast in socket FB-M of the precast part. The distance of the precast part to the in-situ concrete can be set exactly by rotating the pressure screw.

❸



The plate is pre-mounted on the in-situ concrete using the officially approved dowel or MOSO® CE anchor channel. When setting the anchor, the offset dimension x (distance between slotted hole of pressure screw and round hole of anchor) must be noted. The plate can be mounted in any direction radially around the pressure screw.

❹



The adjusting screw is used to set the plate parallel to the wall. The dowel or MHK screw is subsequently tightened with the required tightening torque $T_{inst.}$

Serrated restraint anchor with hammer-head bolt FB-ZH

Due to its force locked connection to the installed MOSO® CE anchor channel, the serrated restraint anchor with welded-in hammer-head bolt can be pressure- and tension-loaded.

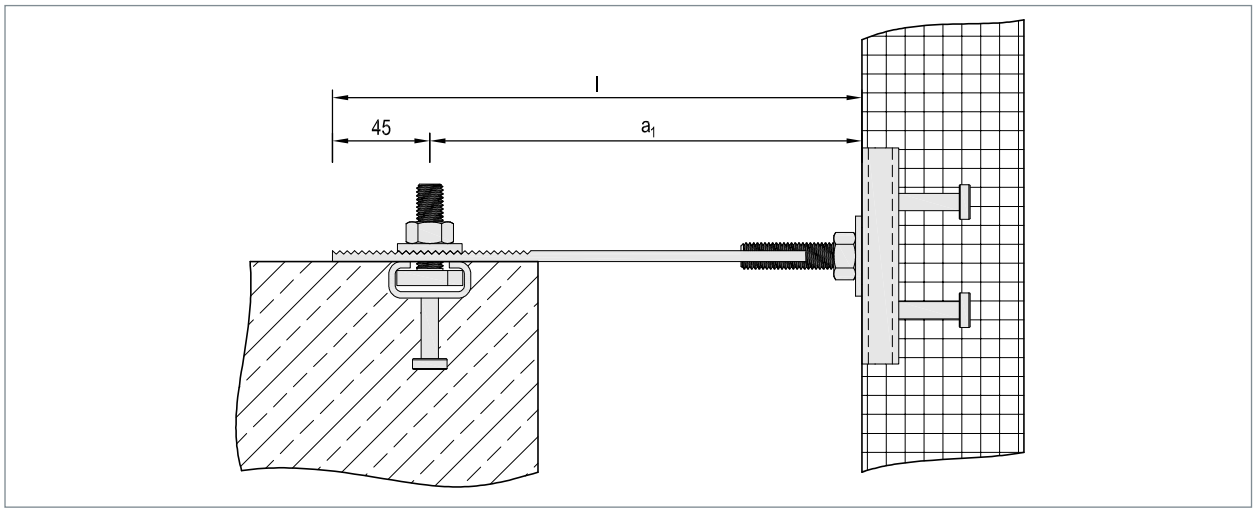
The serration on the plate guarantees an optimal force transmission and the slotted hole allows precise adjusting.

The serrated restraint anchor is fastened to the in-situ concrete with an officially approved dowel or a MOSO® CE anchor channel.

Please refer to the table for the dimensions.

Product information

- Load range: 3.5 - 7.0 kN (> by request)
- System length: up to 300 mm (> by request)
- Material: approved stainless steel
- Certification: structural analysis



▲ FB-ZH: Installation condition

Technical data / Measurement table

FB-ZH

	Load range (tensile-compres-sive) [kN]	Design load $F_{H,Rd}$ [kN]	utilised screw ②	Dimensions				Recommended mount ①	
				Spacing a_1 [mm]	Length l [mm]	Adjust-ment [mm]	Slotted hole SH [mm]	Dowel	Anchor channel
Type	± 3,5	± 5,25	MHK 28/15	125	170	±30	12 x 70	FAZ II 10/10 A4	MBA-CE 28/15 L=150 mm MHK 28/15 M10 x 30
				150	195				
				175	220				
				200	245				
				225	270				
	± 7,0	± 10,50	MHK 38/17	125	170	±25	14 x 70	FAZ II 12/10 A4	MBA-CE 38/17 L=150 mm MHK 38/17 M12 x 40
				150	195				
				175	220				
				200	245				
				225	270				

① The proof of anchoring must be provided in consideration of the respective boundary conditions.
② more hammer / hookheadscrews on request

Order example: FB - ZH - 150 - 3.5

Type
Design
Spacing
Load range

Scope of supply

- Serrated restraint anchor with welded-in hammer-head bolt, pre-assembled hex nut and washer
- Serrated washer

Please note

Parts to be set in concrete (MOSO® CE anchor channels) and installation accessories should be tendered separately.

Text for invitation to tender

...pc. MOSO® precast fixing FB-ZH-150[1)]-3.5[2)] including officially approved dowel for cracked concrete[3)], delivery and proper installation.

[1)] Distance a_1 acc. to table
[2)] Load range acc. to table
[3)] Fixing in-situ concrete acc. to table

Serrated restraint anchor U-profile

FB-ZU

Due to its force locked connection to the installed MOSO® CE anchor channel, the serrated restraint anchor with welded-in MHK bolt can be pressure- and tension-loaded. The FB-ZU is specially designed for high loads and great shell distances.

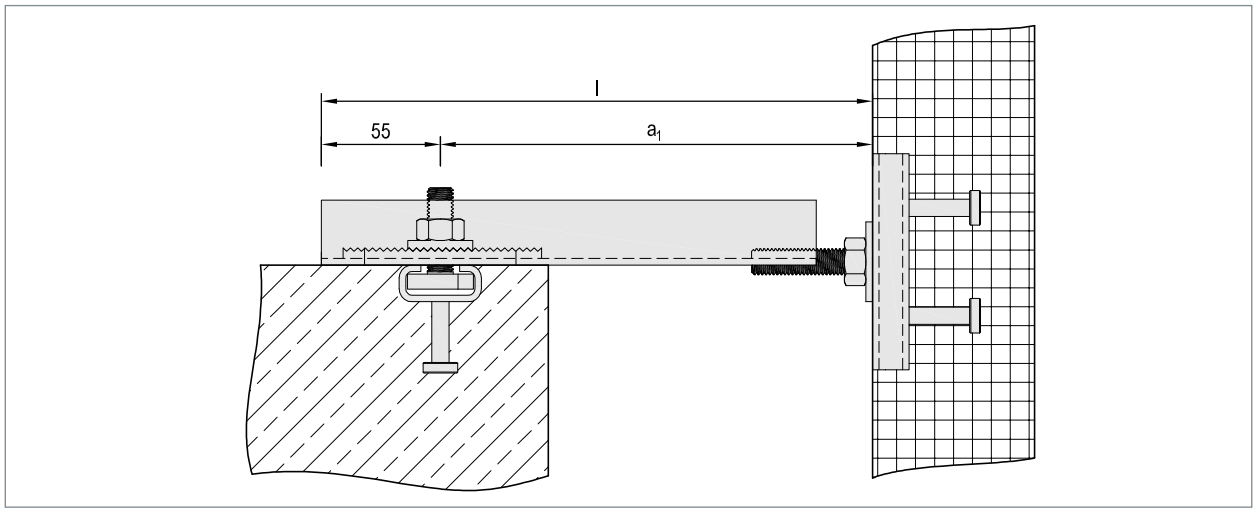
The serration on the plate guarantees an optimal force transmission and the slotted hole allows precise adjusting.

The serrated restraint anchor is fastened to the in-situ concrete with an officially approved dowel or a MOSO® CE anchor channel.

Please refer to the table for the dimensions.

Product information

- Load range: 7.0 - 12.0 kN (> by request)
- System length: up to 400 mm (> by request)
- Material: approved stainless steel
- Certification: structural analysis



▲ FB-ZU: Installation condition

Technical data / Measurement table

FB-ZU

	Load range (tensile-compres-sive) [kN]	Design load $F_{H,Rd}$ [kN]	utilised screw ②	Dimensions				Recommended mount ①	
				Spacing a_1 [mm]	Length l [mm]	Adjust-ment [mm]	Slotted hole SH [mm]	Dowel	Anchor channel
Type	± 7,0	± 10,50	MHK 38/17	225	280	±25	14 x 70	FAZ II 12/30 A4	MBA-CE 38/17 L=150 mm MHK 38/17 M12 x 40
				250	305				
				275	330				
				300	355				
				325	380				
	± 12,0	± 18,00	MHK 50/30	225	280	±25	18 x 70	FAZ II 16/25 A4	MBA-CE 50/31 L=150 mm MHK 50/30 M16 x 50
				250	305				
				275	330				
				300	355				
				325	380				

① The proof of anchoring must be provided in consideration of the respective boundary conditions.
② more hammer / hookheadscrews on request

Order example: FB - ZU - 250 - 7.0

Type
Design
Spacing
Load range

Scope of supply

- Serrated restraint anchor with welded-in MHK bolt, pre-assembled hex nut and washer
- Serrated washer

Please note

Parts to be set in concrete (MOSO® CE anchor channels) and installation accessories should be tendered separately.

Text for invitation to tender

...pc. MOSO® precast fixing FB-ZU-250[1)]-7.0[2)] including officially approved dowel for cracked concrete[3)], delivery and proper installation.

[1)] Distance a_1 acc. to table
[2)] Load range acc. to table
[3)] Fixing in-situ concrete acc. to table

Serrated restraint anchor with bracket

FB-ZW

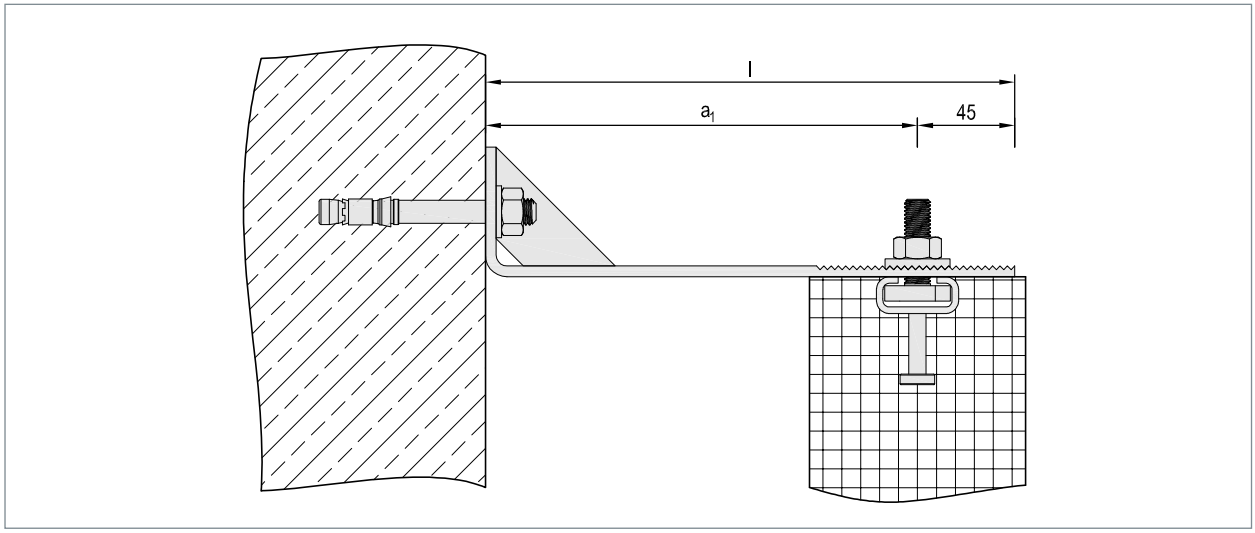
The serrated restraint anchor with bracket can be fastened to the in-situ concrete with an officially approved dowel or a MOSO® CE anchor channel. Tensile and compressive loads can be absorbed on the lower and upper side of the precast part.

The serration on the plate guarantees an optimal force transmission and the slotted hole allows precise adjusting!

Please refer to the table for the dimensions.

Product information

- Load range: 3.5 - 7.0 kN (> by request)
- System length: up to 300 mm (> by request)
- Material: approved stainless steel
- Certification: structural analysis



▲ FB-ZW: Installation condition

Technical data / Measurement table

FB-ZW

	Load range (tensile-compres-sive) [kN]	Design load $F_{H,Rd}$ [kN]	Dimensions				Recommended mount ①	
			Spacing a_1 [mm]	Length l [mm]	Adjust-ment [mm]	Slotted hole SH [mm]	Dowel	Anchor channel
Type	± 3,5	± 5,25	100	145	±30	12 x 70	FAZ II 10/10 A4	MBA-CE 28/15 L=150 mm MHK 28/15 M10 x 30
			125	170				
			150	195				
			175	220				
			200	245				
	± 7,0	± 10,50	100	145	±25	14 x 70	FAZ II 12/10 A4	MBA-CE 38/17 L=150 mm MHK 38/17 M12 x 40
			125	170				
			150	195				
			175	220				
			200	245				

① The proof of anchoring must be provided in consideration of the respective boundary conditions.

Order example: FB - ZW - 150 - 3.5

Type
Design
Spacing
Load range

Scope of supply

- Serrated restraint anchor
- Serrated washer

Please note

Parts to be set in concrete (MOSO® CE anchor channels) and installation accessories should be tendered separately.

Text for invitation to tender

...pc. MOSO® precast fixing FB-ZW-150[1)]-3.5[2)] including officially approved dowel for cracked concrete[3)], delivery and proper installation.

[1)] Distance a_1 acc. to table
[2)] Load range acc. to table
[3)] Fixing in-situ concrete acc. to table

Serrated restraint anchor with bracket without reinforcement

FB-ZWO

The serrated restraint anchor with bracket without reinforcement is a structural anti-tilt device for small loads.

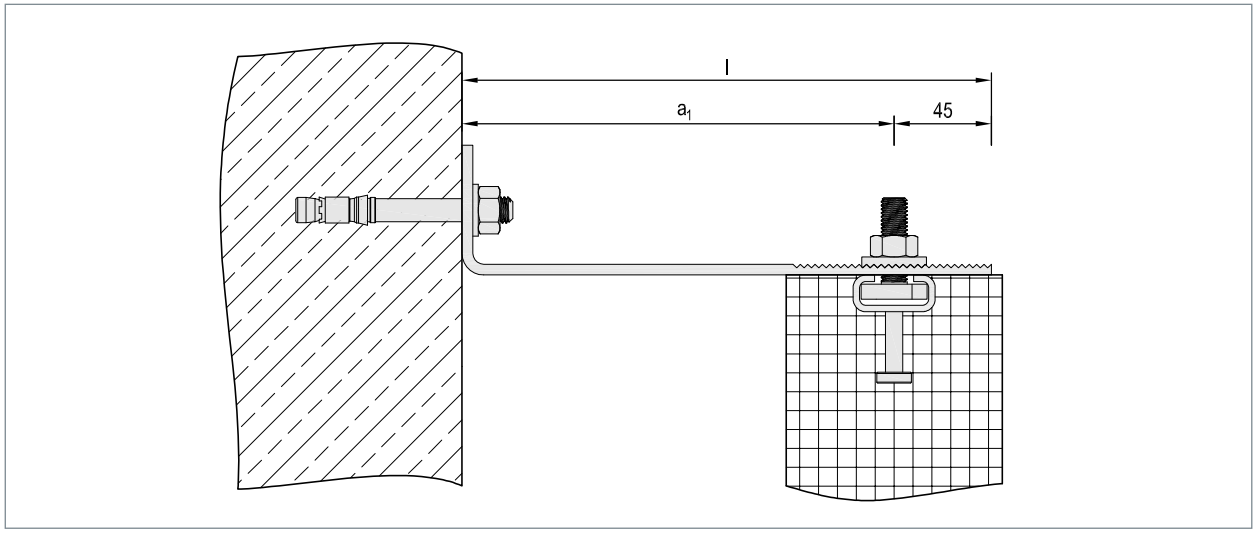
The serration on the plate guarantees an optimal force transmission and the slotted hole allows precise adjusting!

The serrated restraint anchor is fastened to the in-situ concrete with an officially approved dowel or a MOSO® CE anchor channel.

Please refer to the table for the dimensions.

Product information

- Load range: 1.0 kN (> by request)
- System length: up to 260 mm (> by request)
- Material: approved stainless steel
- Certification: structural analysis



▲ FB-ZWO: Installation condition

Technical data / Measurement table

FB-ZWO

	Load range (tensile-compres-sive) [kN]	Dimensio-ning load $F_{H,Rd}$ [kN]	Dimensions				Recommended mount ①	
			Spacing a_1 [mm]	Length l [mm]	Adjust-ment [mm]	Slotted hole SH [mm]	Dowel	Anchor channel
Type	± 1,0	± 1,50	100	145	±30	12 x 70	FAZ II 10/10 A4	MBA-CE 28/15 L=150 mm
			120	165				
			140	185				
			160	205				
			180	225				
			200	245				MHK 28/15 M10 x 30
			220	265				
			240	285				
			260	305				

① The proof of anchoring must be provided in consideration of the respective boundary conditions.

Order example: FB - ZWO - 150 - 1.0

- Type
- Design
- Spacing
- Load range

Scope of supply

- Serrated restraint anchor
- Serrated washer

Please note

Parts to be set in concrete (MOSO® CE anchor channels) and installation accessories should be tendered separately.

Text for invitation to tender

...pc. MOSO® precast fixing FB-ZWO-150[1)]-1,0[2)] including officially approved dowel for cracked concrete[3)], delivery and proper installation.

[1)] Distance a_1 acc. to table
[2)] Load range acc. to table
[3)] Fixing in-situ concrete acc. to table

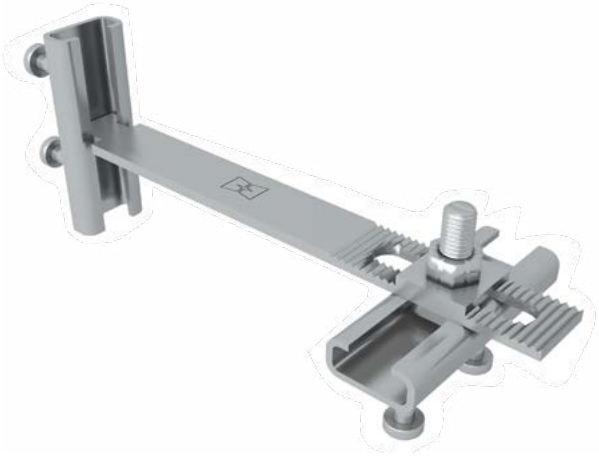
Serrated restraint anchor with hammer head FB-ZK

The serrated restraint anchor with hammer head is the installation-friendly solution for absorbing low tensile loads from precast parts.

The serration on the plate guarantees an optimal force transmission and the slotted hole allows precise adjusting!

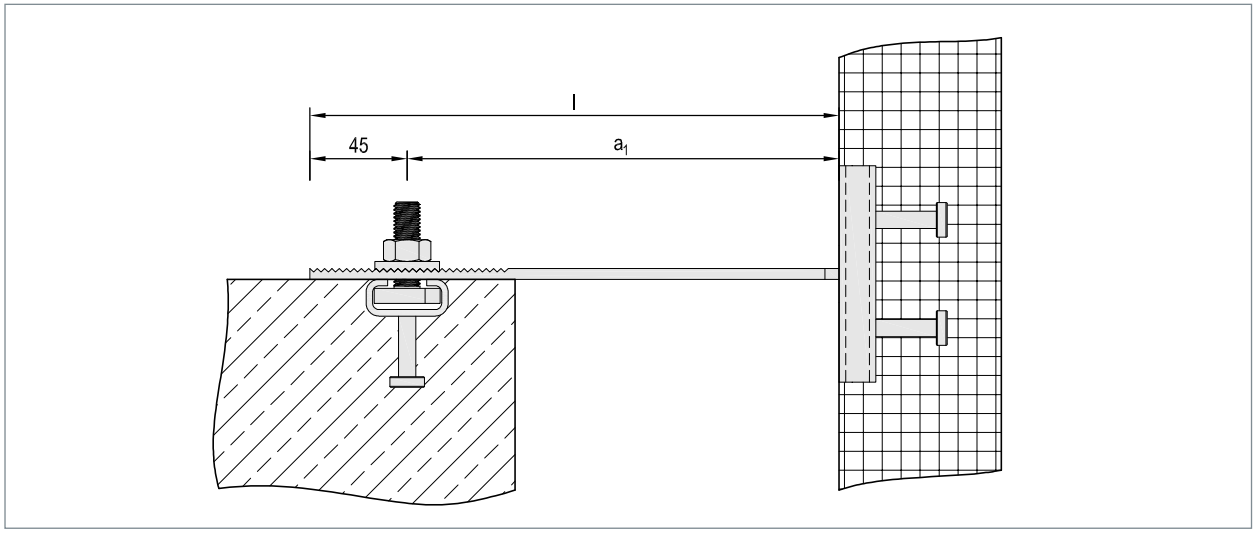
The serrated restraint anchor is fastened to the in-situ concrete with an officially approved dowel or a MOSO® CE anchor channel.

Please refer to the table for the dimensions.



Product information

- Load range: 3.5 kN
- System length: up to 325 mm (> by request)
- Material: approved stainless steel
- Certification: structural analysis



▲ FB-ZK: Installation condition

Technical data / Measurement table

FB-ZK

	Load range (tensile) [kN]	Design load $F_{H,Rd}$ [kN]	Dimensions: Distance a_1 [mm]	Dimensions: Length l [mm]	Dimensions: Adjustment [mm]	Dimensions: Slotted hole SH [mm]	Recommended mount ①: Dowel	Recommended mount ①: Anchor channel
Type	- 3,50	- 5,25	100	145	± 30	12 x 70	FAZ II 10/10 A4	MBA-CE 28/15 L=150 mm
			125	170				
			150	195				
			175	220				
			200	245				
			225	270				
			250	295				MHK 28/15 M10 x 30
			275	320				
			300	345				
			325	370				

① The proof of anchoring must be provided in consideration of the respective boundary conditions.

Order example: FB - ZK - 150 - 3.5

- Type
- Design
- Spacing
- Load range

Scope of supply

- Serrated restraint anchor
- Serrated washer

Please note

Parts to be set in concrete (MOSO® CE anchor channels) and installation accessories should be tendered separately.

Text for invitation to tender

...pc. MOSO® precast fixing FB-ZK-150[1)]-3.5[2)] including officially approved dowel for cracked concrete[3)], delivery and proper installation.

[1)] Distance a_1 acc. to table
[2)] Load range acc. to table
[3)] Fixing in-situ concrete acc. to table

Serrated restraint anchor with round hole

FB-ZL

The serrated restraint anchor with round hole is the standard solution for absorbing tensile and compressive loads on the upper edge of the precast part.

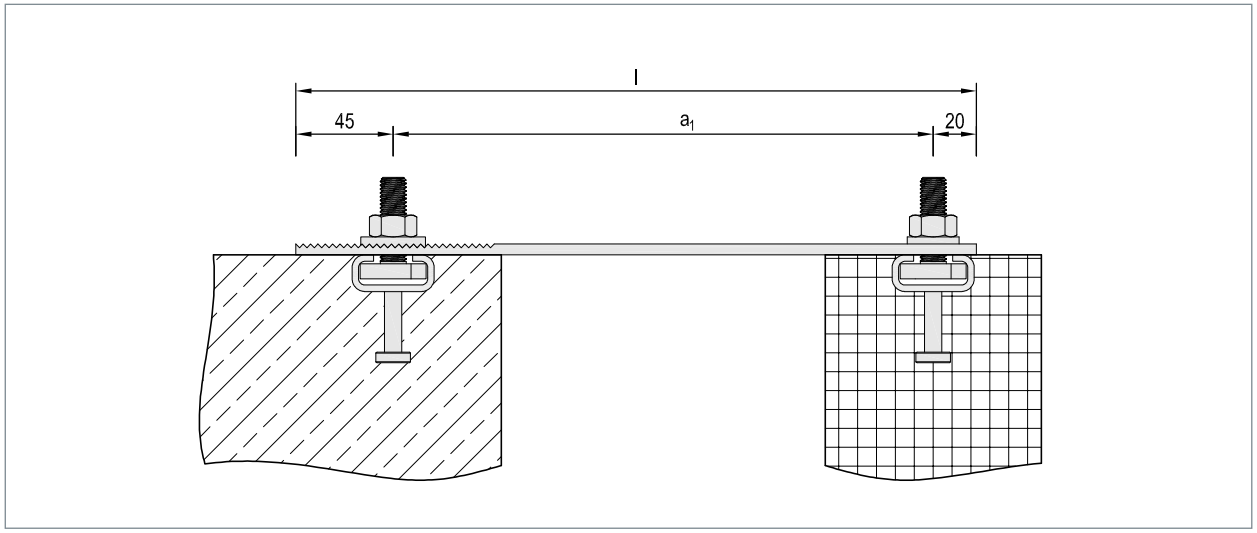
The serration on the plate guarantees an optimal force transmission and the slotted hole allows precise adjusting!

The serrated restraint anchor is fastened to the in-situ concrete with an officially approved dowel or a MOSO® CE anchor channel.

Please refer to the table for the dimensions.

Product information

- Load range: 3.5 - 7.0 kN
- System length: up to 350 mm (> by request)
- Material: approved stainless steel
- Certification: structural analysis



▲ FB-ZL: Installation condition

Technical data / Measurement table

FB-ZL

	Load range (tensile-compres-sive) [kN]	Design load $F_{H,Rd}$ [kN]	Dimensions: Spacing a_1 [mm]	Length l [mm]	Adjust-ment [mm]	Slotted hole SH [mm]	Round hole d [mm]	Recommended mount ① Dowel	Recommended mount ① Anchor channel
Type	± 3,5	± 5,25	150	215	±30	12 x 70	12	FAZ II 10/10 A4	MBA-CE 28/15
			175	240					
			200	265					MHK 28/15 M10 x 30
			225	290					
			250	315					
	± 7,0	± 10,50	275	340	±25	14 x 70	14	FAZ II 12/10 A4	MBA-CE 38/17
			300	365					MHK 38/17 M12 x 40
			325	390					
			350	415					

① The proof of anchoring must be provided in consideration of the respective boundary conditions.

Order example: FB - ZL - 150 - 3.5

- Type
- Design
- Spacing
- Load range

Scope of supply

- Serrated restraint anchor
- Serrated washer

Please note

Parts to be set in concrete (MOSO® CE anchor channels) and installation accessories should be tendered separately.

Text for invitation to tender

...pc. MOSO® precast fixing FB-ZL-150[1]-3.5[2] including officially approved dowel for cracked concrete[3], delivery and proper installation.

[1] Distance a_1 acc. to table
[2] Load range acc. to table
[3] Fixing in-situ concrete acc. to table

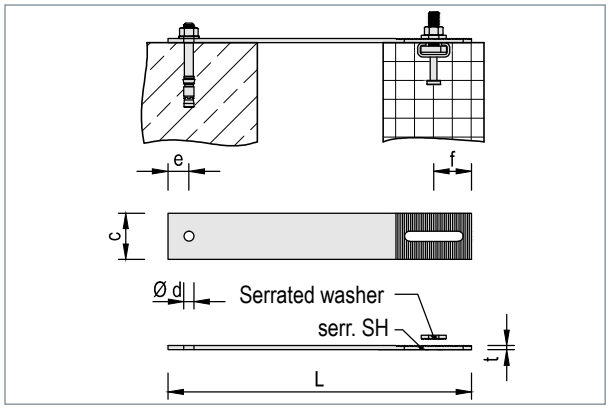
Universal butt strap

FB-UZL

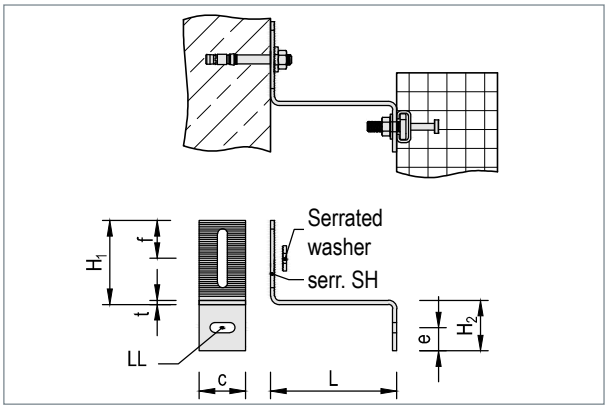
The slotted universal retaining bracket serves as individual bracing of load. The size and bending mould can be adapted to nearly every cast-in situation. The toothing of the strap ensures an optimal load transmission and enables an exact adjustability by the slotted hole.

Product information

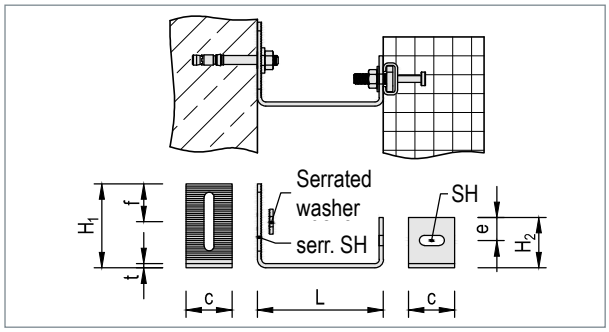
- Load range: 3,5 - 12,0 kN
- Material: approved stainless steel
  elastic limit $f_{y,k}$ = 450 N/mm²
  tensile strength $f_{u,k}$ = 600 N/mm²
  elastic modulus: 200.000 N/mm²



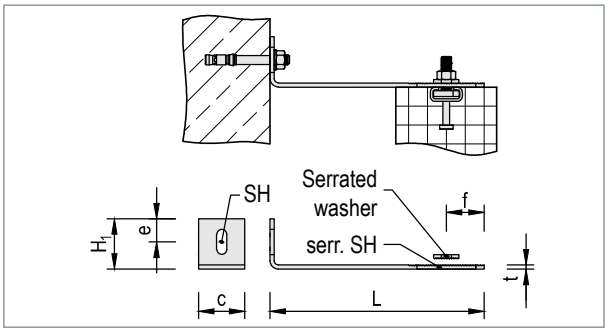
▲ Model 1



▲ Model 3



▲ Model 2



▲ Model 4

Technical data / Measurement table

FB-UZL

	Measurements ①				Serrated slotted hole	Adjustment	Strength of toothing
	L [mm]	c [mm]	t [mm]	f [mm]	[mm]	[mm]	$F_{H,d}$ [kN]
Type	≥ 150	30	5	45	12 x 70	± 30	± 5,25
		45	6		14 x 70	± 28	± 10,50
		55	6		18 x 70	± 26	± 18,00
		80	8		18 x 70	± 26	± 18,00

Further measurements on request.
① The strength of the strap depends on design and measurement. Statics have to be calculated on own responsibility.

Order example: FB - UZL - 2 - L / c / t / f / H1 / e / LL / H2

Type
Design
Model
Measurements

Scope of supply

- Universal butt strap
- Serrated washer

Please note

Parts to be set in concrete (MOSO® CE anchor channels) and installation accessories should be tendered separately.

Text for invitation to tender

...pc. MOSO® precast fixing FB-UZL[1)]-2[2)]-...[3)] delivery and proper installation.

[1)] Type acc. to table
[2)] Model
[3)] Measurement acc. to table

Dowel connection

FB-VD

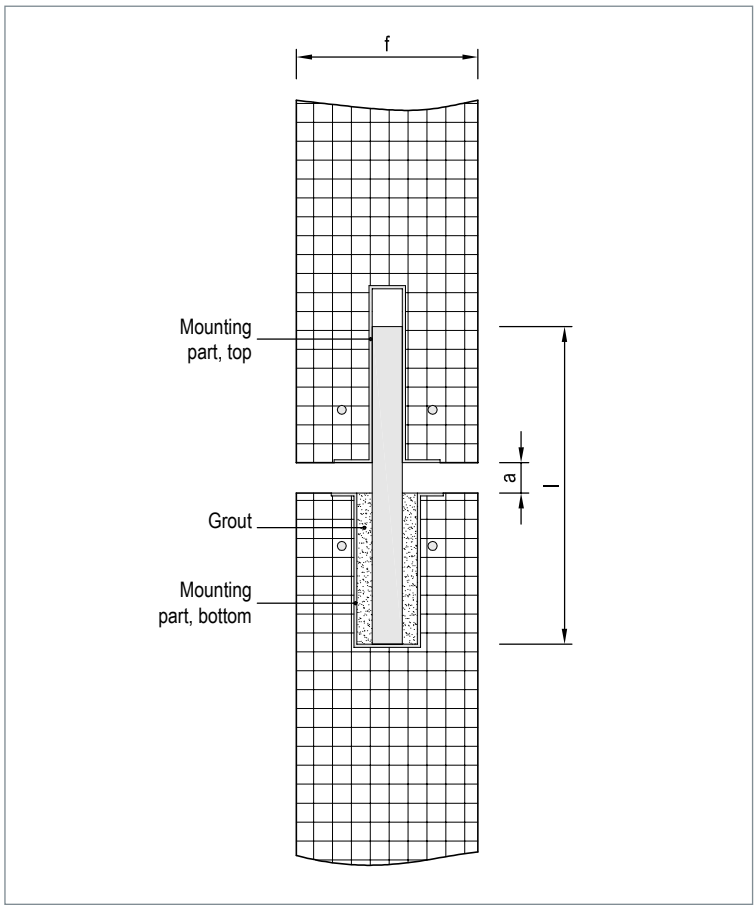
Dowel connections allow the transmission of shear forces between two precast parts.

A round sleeve is embedded into the bottom of the upper panel and a mortar sleeve is embedded into the top of the lower panel.

Please refer to the table for the dimensions.

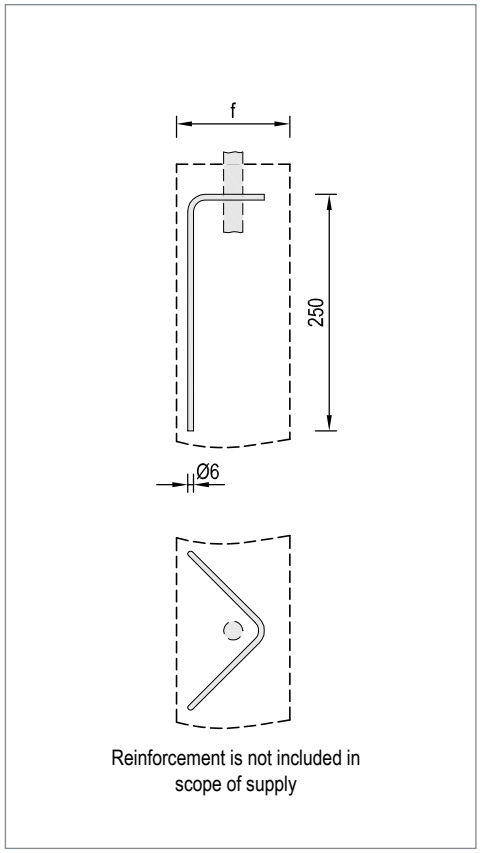
Product information

- Load range: 1.0 - 5.0 kN
- Material: approved stainless steel
- Certification: structural analysis



▲ FB-VD: Installation condition

Additional reinforcement



Reinforcement is not included in scope of supply

▲ Illustration

Technical data / Measurement table

FB-VD

	Load range [kN]	Design load $F_{H,Rd}$ [kN]	Dimensions: Diameter Ø d [mm]	Length of circular sleeve l ① [mm]	Panel thickness f_{min} [mm]	Joint thickness a_{max} [mm]	Accessories: Fitting sleeve top round	Fitting sleeve top oval	Mortar sleeve bottom round	Mortar sleeve bottom oval
Type	± 1,0	± 1,50	12	180	100	20	Ø 12,5 x 85	-	Ø 40 x 100	60/32 x 120
	± 2,5	± 3,75	16	200	100	20	Ø 16 x 100	44/18 x 100	Ø 40 x 100	60/32 x 120
	± 5,0	± 7,50	20	220	120	20	Ø 20 x 140	46/21 x 140	Ø 40 x 100	60/32 x 120

① l = 100 + a + 5 * Ø d According to booklet 346 DAfStb (when using a round mortar sleeve)
l = 120 + a + 5 * Ø d According to booklet 346 DAfStb (when using an oval mortar sleeve)

Order example: FB - VD - 16 x 200

Type
Design
Diameter
Length

Scope of supply

- Round bolts A4

Please note

Parts to be set in concrete (plastic sleeve) should be tendered separately.

Text for invitation to tender

...pc. MOSO® precast fixing FB-VD-16x200[1)], delivery and proper installation.

[1)] Measurements acc. to table

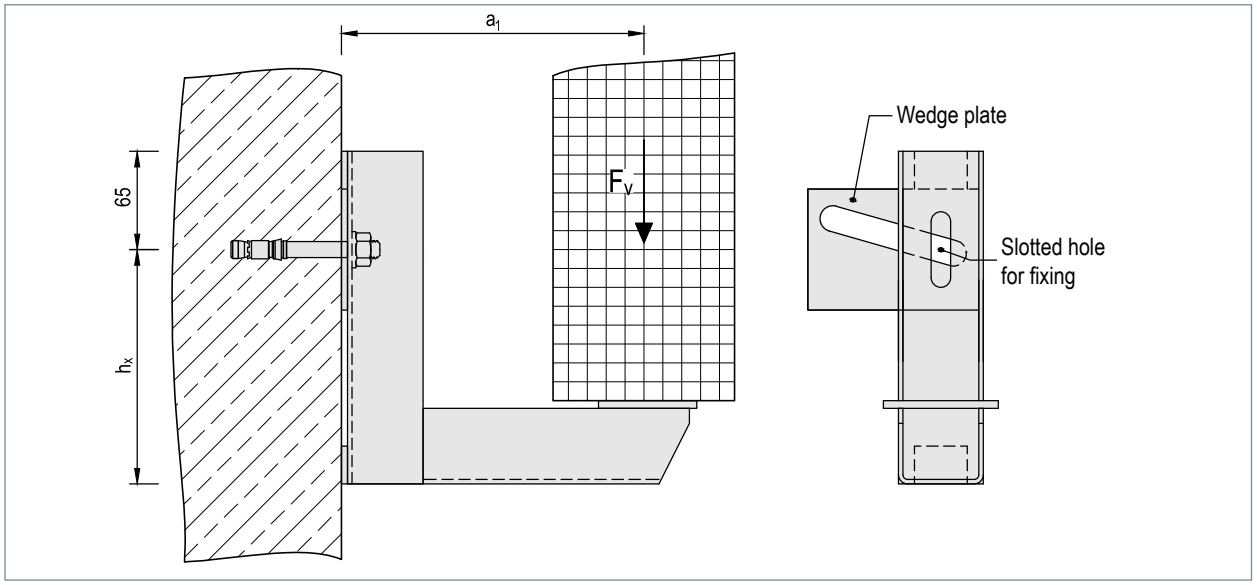
Gallow anchor

FB-G

The MOSO® precast fixing FB-G is an anchor for vertical loads. This can be manufactured in different types, depending on the situation. The gallow anchor can be adapted to the requirements of the shell and the precast unit.

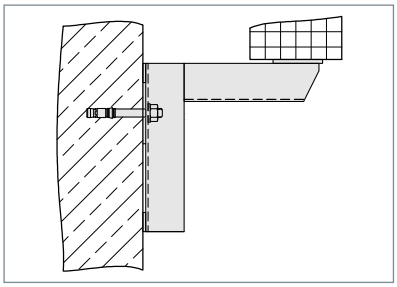
Product information

- Load range: 3.5 - 10.5 kN (> on request)
- Material: approved stainless steel
- Certification: structural analysis

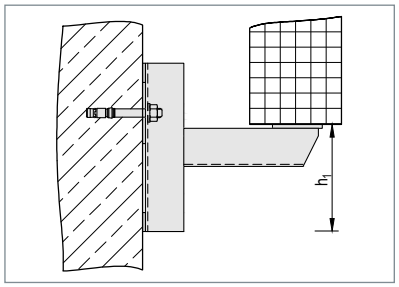


▲ System

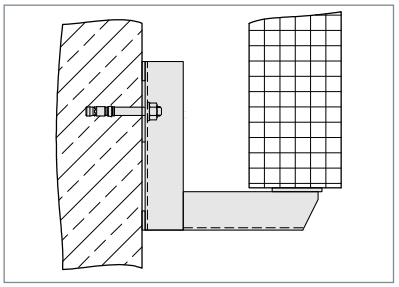
Alternatives of construction – Gallow anchor



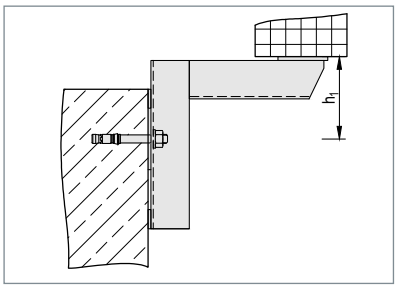
▲ FB-GO



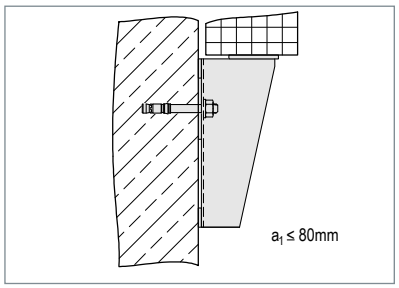
▲ FB-GM



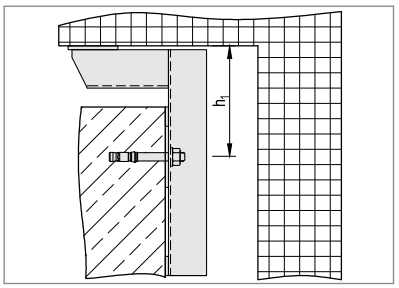
▲ FB-GU



▲ FB-GOV



▲ FB-GE



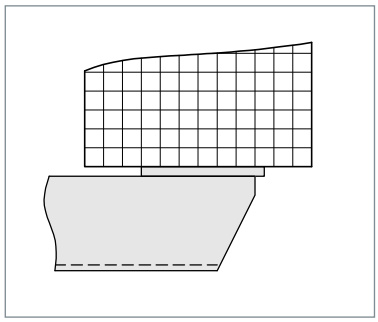
▲ FB-GA

Technical data / Measurement table

FB-G

	Load range kN	Design load $F_{V,Rd}$ kN	Dimensions: Spacing a_1 ① [mm]	Dimensions: Bracket height h_x ① [mm]	Dimensions: Slotted hole SH [mm]	Dimensions: Adjustment a_1 ③ [mm]	Dimensions: Adjustment h_x [mm]	recommended mount: Dowel ②	recommended mount: Edge distance [mm]	recommended mount: Panel thickness [mm]
Type	3,5	4,73	100	150	13 x 50	± 25	± 19	FAZ II 12 x 30 A4	≥ 100	≥ 120
			150	150						
			200	200						
			250	200						
			300	200						
	7,0	9,45	100	200	13 x 50	± 25	± 19	RG M12 x 160 A4 + cartridge RSB 12	≥ 125	≥ 140
			150	200						
			200	250						
			250	300						
			300	300						
	10,5	14,18	100	250	17 x 50	± 25	± 17	FAZ II 16 x 25 A4	≥ 150	≥ 150
			150	250						
			200	300						
			250	300						
			300	350						

① Further measurement on application
② For the calculation of the dowels, structural circumstances must be taken into consideration.
③ With type 2 adjustment ± 20 mm

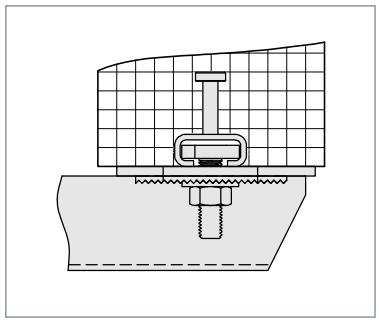


▲ Type 1

Standard configuration:
The precast reinforced-concrete is placed non-positively on the bearing plate of the gallow anchor.

Horizontal loads cannot be taken.

Set serrated restraint anchor FB-ZW if necessary.



▲ Type 2

Serrated construction:
The precast reinforced concrete is placed non-positively on the bearing plate of the gallow anchor.

Through the welded serrated plate with slotted hole, horizontal loads up to ± 3,5 kN are taken.

please note

For both anchor types please indicate cavity b and panel thickness f in mm!

Scope of supply

- Gallow anchor
- Wedge plate

Please note

Parts to be set in concrete (MOSO® CE anchor channels) and installation accessories should be tendered separately.

Order example: FB - GU1 - 250 - 7,0

Type
Design
Spacing
Load range

Text for invitation to tender

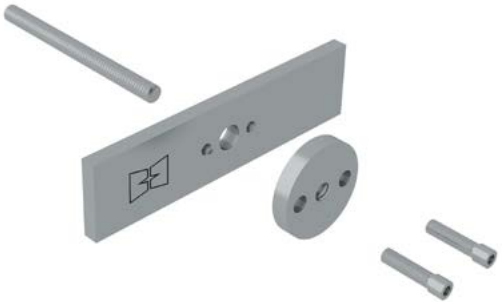
...pc. MOSO® precast fixing FB-GU1[1)]-250[2)]-7,0[3)] delivery and proper installation.
[1)] Type acc. to table
[2)] Spacing acc. to table
[3)] Load range acc. to table

Other products

Here you can find additional products from our product range. Please contact our Service Team for any questions about technical details, special-purpose solutions, standard part from stainless steel, as well as fixing accessories.

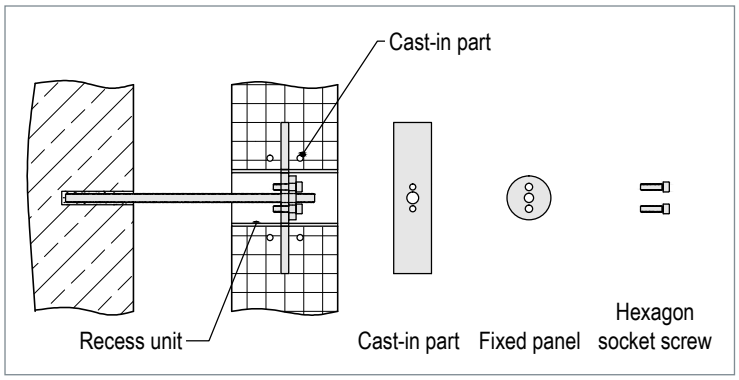
Wind anchor FB-WA

The wind anchor FB-WA is used for the horizontal pressure and suction protection of facade panels. The connection to the shell is done during the mounting of the precast unit on the embedded cast-in part, the round fixed panel and on the two hexagon socket screws.



Product information

- Load range: 3,5 - 7,0 kN
- Diameter: M12 and M16
- Material: approved stainless steel
- Certification: structural analysis



▲ FB-WA: cast-in part

The wind anchor can be applied flexible and can be used for suspended top of slab panels.

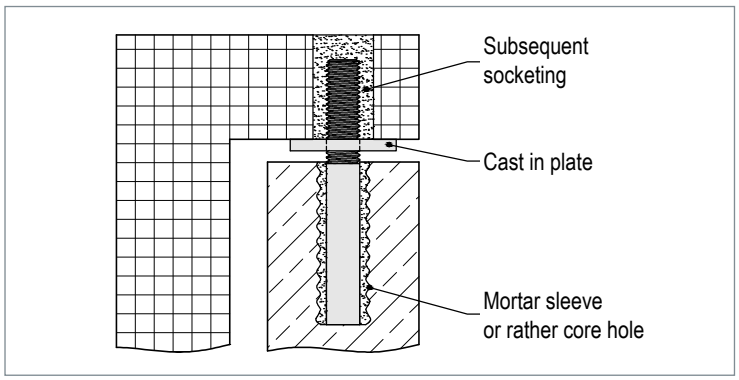
The threaded bar is anchored in the bore hole by an approved injection mortar. The distance from the precast part to the shell can be regulated continuously by the thread with the setting tool. The recess, which is necessary for mounting, is locked subsequently with a plastic plug or a concrete sealing cone.

Stud bolt anchor FB-SBA

The stud bolt anchor FB-SBA allows the fastening of angle plates in the range of reinforced concrete parapet. The anchor consists of a threaded rod with partial thread and a bearing plate with an internal thread. With the pressure screws which are instructed additionally at the bottom of the precast part, the stud anchor represents a complete fastening system.

Product information

- Diameter: M24 to M44
- Material: approved stainless steel
- Certification: structural analysis



▲ FB-SBA: cast-in part

The stud anchor takes vertical- and horizontal loads. It is characterized by a simple mounting and a very good adjustability. For the absorption of thermal expansion a stud anchor is encased elastically and superimposed on an elastomer support.

MOSO® CE anchor channel

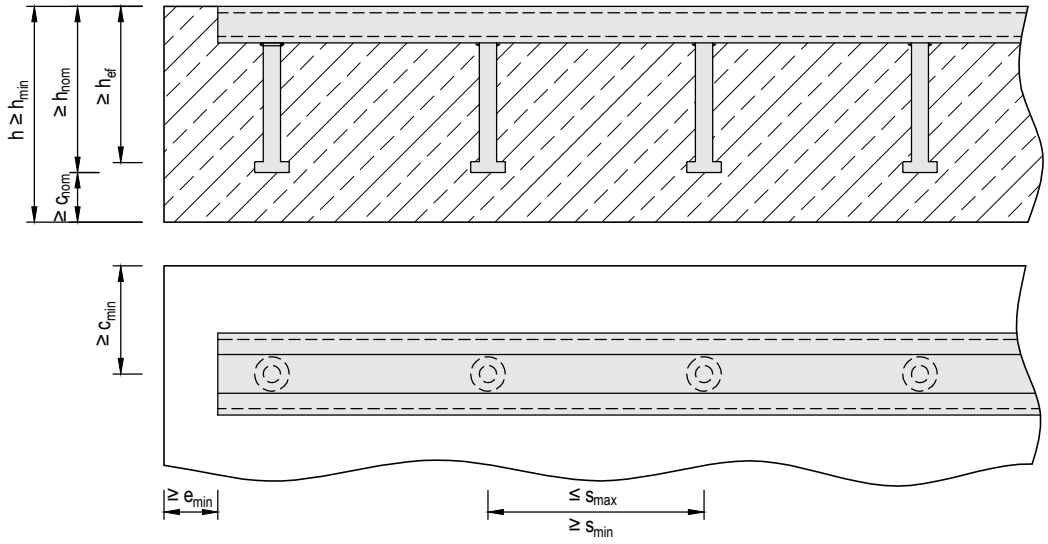
MBA-CE

Officially approved in Europe, anchor channel MBA-CE is used to mount installation parts in in-situ concrete or as a cast-in part in the pre-cast part. The MBA-CE anchor channel offers a horizontal or a vertical adjustment option depending on the mounting situation. MOSO® hammer-head/hook-head bolts MHK are used as fasteners.

Please refer to the table for the dimensions.

Product information

- Profile sizes: 28/15, 38/17, 40/25, 50/31 and 52/34
  Additional profile sizes on request
- Material: approved stainless steel
- Certificate: European Technical Assessment ETA-13/0224



▲ MBA-CE: Installation condition

Order example: **MBA - CE - 50/31 - 150**

Profile type
Profile size
Profile length

Technical data / Measurement table

MBA-CE

Anchor channel		28/15	38/17	40/25	50/31	52/34
min. h_{ef}	[mm]	45	72	80	99	151
min. h_{nom}	[mm]	50	77	85	106	159
c_{min}	[mm]	40	50	50	75	100
e_{min}	[mm]	15	25	25	50	65
s_{min}/s_{max}	[mm]	50 / 200	50 / 200	50 / 250	50 / 250	80 / 250
h_{min} ①	[mm]	80	107	115	136	189

① c_{nom} = 30 mm

Please note

The hammer-head/hook-head bolt should be tendered separately.

Text for invitation to tender

...pc. MOSO® precast fixing MBA-CE-50/31[1]-150[2], delivery and proper installation.

[1] Profile size acc. to table
[2] Profile length acc. to table

Profile size	Length [mm] ①											MHK	Bolt size ①			
	100	150	200	250	300	350	400	550	1050	3025	6050		M10	M12	M16	M20
28/15	x	x	x	x	x	x	x	x	x	x	x	28/15	x			
38/17	x	x	x	x	x	x	x	x	x	x	x	38/17	x	x	x	
40/25		x	x	x	x	x	x	x		x	x	40/25		x	x	
50/31		x	x	x	x	x	x	x	x	x	x	50/30		x	x	x
52/34		x	x	x	x	x		x	x	x	x					

① Additional dimensions on request.

Software

MOSOCONstructor

MOSOCONstructor is a flexible calculation software for engineers. We developed the software based on the official technical approval for panel hangers, the structural analysis for parapet anchors and the European Technical Assessment for anchor channels.

Software for:

Panel hanger	FB-H	Z-21.8-2012
Parapet anchor	FB-E	structural analysis
Anchor channels	MBA-CE	ETA-13/0224

Advantages

- intuitive user interface
- dimensioning without any time lag!
- clear presentation with 3D animation
- project-related saving and loading
- all results at a glance
- arrangement of clinker veneers
- extensive wind load calculation
- detailed listing of bearing loads
- input of local maximum thickness and cut-out
- forces resulting from other panels can be considered (FB-H)
- variable angle adjustment of the anchor (FB-H)
- applying and taking into account the expense of open and closed railings (FB-E)
- variable embedment depth (FB-E)

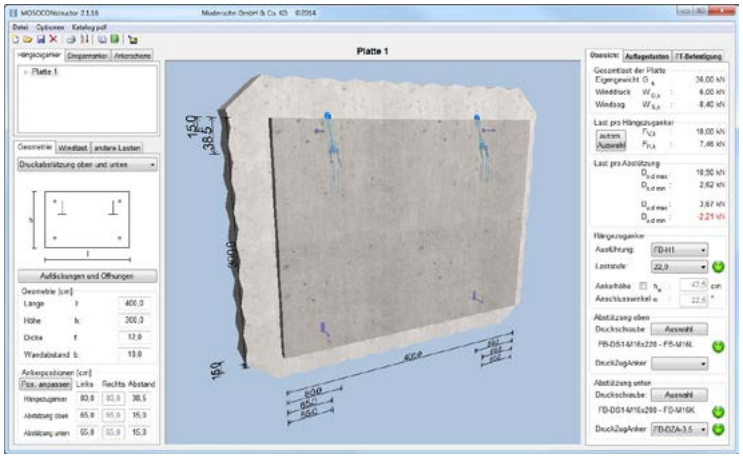
Documents for print

Clear overview for all project partners:

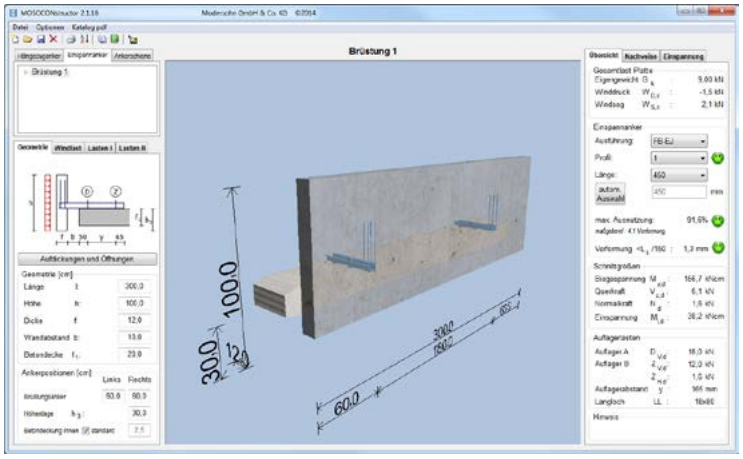
- structural analysis for the auditor and as summary for planners and structural engineers
- separate assembly plans for the precast plant
- complete bill of quantities for purchasing

MOSOCONstructor as project planner

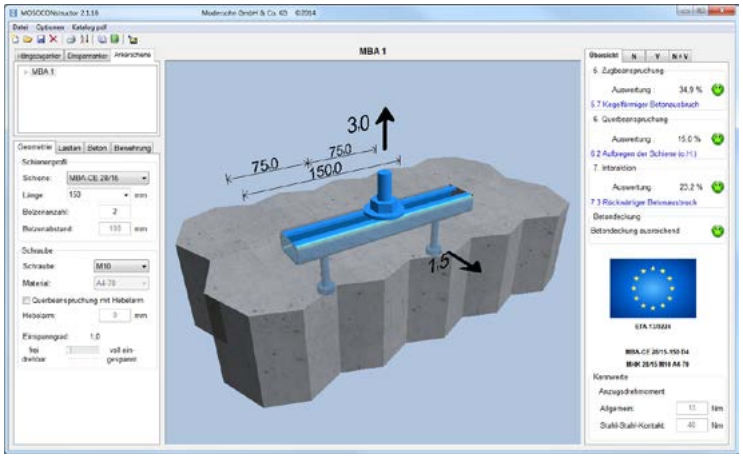
- enter all concrete elements with the software
- additional necessary installation and assembly parts can be measured panel related
- the panels are clearly presented in the project window and can be sorted alphabetically – even retroactively
- all included products can be provided in a separate input mask with detailed descriptions
- the bill of quantities contains all relevant details, required for ordering



▲ Surface FB-H



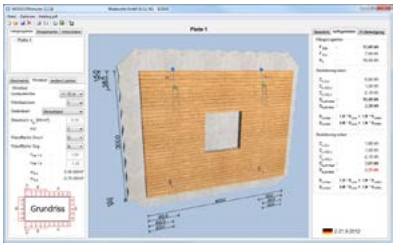
▲ Surface FB-E



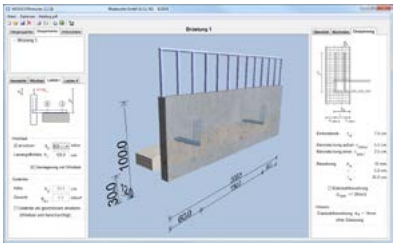
▲ Surface MBA-CE

Installation:
After receiving the software, simply execute the file "MOSOCON_V_x_x_setup.exe". If you have any questions about the programme or about installing the programme, feel free to call us at +49 5225 87 99-0 or send an e-mail to mosocon@modersohn.de. We look forward to receiving your call or your e-mail!

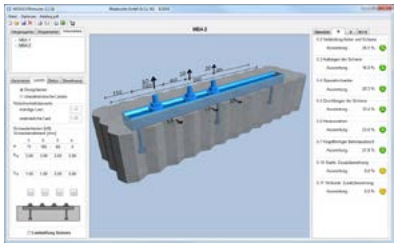
System requirements:
Windows XP, Windows 7 or Windows 8, 32/64-bit



▲ Panel hanger



▲ Parapet anchor



▲ Anchor channel

Download the software for free at:
www.modersohn.eu/en/service/software/

MODERSOHN®
Stainless Steel

Experience & expertise

The company:

1970:
Company founded by Wilhelm Modersohn senior. We started with the MU anchor for attaching pre-fabricated facade slabs to concrete

1974:
Rental of office and warehouse space

1979:
Rental of an empty factory building

1984:
Own production building on an industrial estate

End of the 1990s:
Expansion of production facilities, production of stainless steel special and series components for other sectors of industry

2000:
Wilhelm Modersohn junior takes over management To date, the two company managers have registered more than 100 innovations in the field of fastening technology and other sectors of industry with the Munich Patent Office. Patent protection has also been granted for numerous applications

2008/2009:
New administrative building for the Sales Service Centre and Work Scheduling. Production expansion: 2,500 sqm shipping hall

2010-2013:
Expansion of glass bead blasting systems with 3 blasting rooms; extension of the production, warehouse and staff rooms; number of welder positions increased to 20

2014:
Dipl.-Ing. Jürgen Matzelle is appointed second managing director. Alongside his work as a structural engineer, he is also a welding engineer.

2015:
Expansion of the administrative building on Industriestraße

2016:
Move to our extended office building

2017-2018:
Purchase of a building in the neighborhood, for the storage of small parts. Expansion of our pre-material stock. Use of a 10 kW fibre laser.

2019:
New construction of a hall for surface treatment.

2020:
Commissioning of the welding robot. Further investment in machinery and plant

SYSTEM
Façade fastenings

Masonry fastenings
- **MOSO® masonry facade fastenings**
  - Single-bracket anchors
  - Angle bracket anchors
  - Angled supports
  - Cavity wall ties (wire anchors, special scaffold anchors)
- **MOSO® masonry reinforcement - perforated strip**
- **MOSO® attachments for prefabricated parts for masonry facades**
- **MOSO® scaffold anchors for masonry facades**

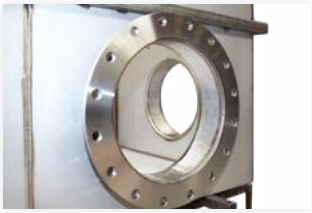
Attachments for precast parts
- **MOSO® supporting anchors for concrete facades**
  - Panel hangers
  - Clamping anchors
  - Special solutions for precast panel facades
- **MOSO® concrete facade retaining anchors**
  - Serrated restraint anchor
  - Compression/tension anchors
  - Pressure struts
- **MOSO® anchor channels**
  - MBA-CE channels with headed studs
  - ES anchor channels for prefabricated parts

CUSTOM
Custom-made solutions

- **Cutting to size in stainless steel**
  - Laser cutting
  - Water-jet cutting
  - Cutting with shears
  - Sawing
  - Slit strip die-cutting in series
- **Stainless steel shaping for profiles, linings, ducts, assembly parts etc.**
  - Flange profiles
  - Bent profiles
  - Embossed and pressed components
- **Welded structures for troughs, containers, housings, frames etc.**
- **Turned and milled components**
- **Surface finishing in stainless steel**
- **Heavy duty attachments, cladding for special structure work:**
  - Monuments
  - Restoration of buildings
  - Tunnels
  - Bridges
  - Time constructions
  - Swimming pools
  - Glass facades

TRADE
Attachment accessories

- **Stainless steel fastenings, high strength screw fastenings**
  - Threaded rods max length 3000 mm
  - Screws
  - Nuts
  - Washers
  - Rod connectors
  - Tighteners
- **Anchor bolts**
- **Anchor channels**
- **Elastomer bearings and friction bearings**
- **Bearing insulation**
- **Threaded sleeves for transport and attachment purposes**
- **Assembling aid accessories for precast panels**
- **Stainless steel tube and cable attachments**



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M-CUSTOM: +49 5225 87 99-682

M-TRADE: +49 5225 87 99-682

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SYSTEM
Façade fastenings concrete