markilux Technical Information

The installation of folding-arm awnings (in line with EN 13561)

markilux folding-arm awnings intended for exterior use meet the requirements of European Standard EN 13561 for awnings and in so doing the current technical regulations with respect to their construction and fixture brackets.
markilux awnings are CE certified according to this European standard and meet the requirements of wind resistance class 2 (not necessarily in the case of sizes that exceed our standard specification).
Wind resistance class 2 corresponds to Beaufort 5 or a wind speed of up to 10.4 metres per second (m/s).
The wind resistance class describes the wind speed up to which an awning may be used. If used at wind speeds greater than those permitted under the wind resistance class, in rain or in snow dangerous situations may arise, so in these conditions the awning should not be extended.

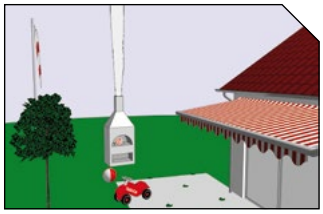
CE

markilux
Schmitz-Werke GmbH + Co. KG
Hansestrasse 87
48282 Emsdetten, Germany

DIN EN 13561
Awnings designed for exterior use

Wind resistance class 2

Definition of wind resistance classes

wind resistance class 0	**wind resistance class 1**	**wind resistance class 2**	**wind resistance class 3**
			
wind resistance class 0 corresponds either to a non-required or non-measured performance or to a product that does not fulfill the requirements of class 1.	The awning may remain extended up to a maximum of Beaufort force 4. Definition according to Beaufort: **moderate breeze** The wind moves twigs and smaller branches, lifts dust and loose paper	The awning may remain extended up to a maximum of Beaufort force 5. Definition acc. to Beaufort: **fresh breeze** Small trees begin to sway, white crests form on lakes	The awning may remain extended up to a maximum of Beaufort force 6. Definition acc. to Beaufort: **strong breeze** Large boughs move, umbrellas are difficult to keep under control, telephone wires „whistle" in the wind
The awning may not be used if there is any wind.	wind speed **20-27 km/h = 12-16 mph = 5.5-7.4 m/s**	wind speed **28-37 km/h = 17-23 mph = 7.5-10.4 m/s**	wind speed **38-48 km/h = 24-30 mph = 10.5-13.4 m/s**

Compliance with wind resistance class 2 is only met if the awning has been fitted appropriately.
Installation may only be carried out by qualified, professional dealers with appropriate fitting experience. The installation instructions supplied with the awning and especially the section referring to safety regulations must be read – without fail – and observed before installation of the awning.
The delivery does not include fixing materials such as bolts and rawlplugs. Because different countries and regions have the most widely varying of substrates, which, because of their sheer volume cannot be detailed here, it would make sense for you to get advice from your local installation specialist so that a suitable choice of fixing materials can be made.
Our customer support both oral and written is intended to provide you with information about the best possible use of our products and services. This, however, does not release you from your obligation to convince yourself – through your own conscientious analysis – of the suitability of our products and services for the application you intend to use them for.
In particular this goes for the checking of the general composition and especially the load bearing capability of the substrate to which the blind or awning is to be fitted.
Important: the permitted fixture load must always be greater than that shown in the table! Important – By taking suitable measures to seal around the fixing holes you should ensure that even in the long term the façade of the building cannot suffer from the ingress of damp (rain water). On the coast and in industrial areas stainless steel fixing materials must be used.
Please also take note of the „Technical Advice Guidelines with Regard to the Sale and Installation of Folding-arm Awnings" published by the IRTS (BKTex) Association.
Alterations such as additions or modifications, which diverge from our installation instructions, are not permitted.
Bespoke constructions require our prior and explicit approval in writing!

Installation of the markilux syncra with folding-arm awnings and pergolas

The wind resistance classes conform to the wind strengths as described according to Beaufort in the table below. They outline the wind speeds at which each awning type may be used. If used at wind speeds greater than those permitted under the wind resistance class, in rain or in snow dangerous situations may arise, so in these conditions the awning should not be extended.

The syncra system is rated to a dynamic pressure of 700 N/m² (wind zones 1-3, combination of terrain categories II and III) when the attached awning(s) are fully retracted. In the case of extended awnings the system is rated to wind loads of 70 N/m² and 110 N/m² respectively (corresponding to wind resistance class 2 or 3 respectively, DIN 13561).

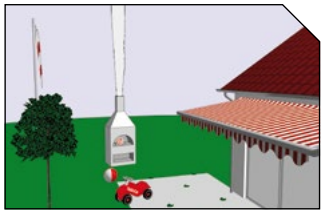
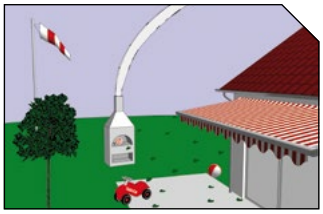
markilux folding-arm awnings may only be used up to their certified wind resistance rating. These wind resistance ratings are only applicable if the syncra is has been installed correctly. In this respect our recommendations with regard to the concrete foundations, the fixture bolts and the stabilisation boxes must be followed.

markilux
Schmitz-Werke GmbH + Co. KG
Hansestrasse 87
48282 Emsdetten, Germany

wind resistance class 2
markilux syncra with extended markilux folding-arm awnings for exterior applications

wind resistance class 3
markilux syncra with extended markilux pergola 110 / 210 for exterior applications

Definition of wind resistance classes

wind resistance class 0	wind resistance class 1	wind resistance class 2	wind resistance class 3
			
wind resistance class 0 corresponds either to a non-required or non-measured performance or to a product that does not fulfill the requirements of class 1.	The awning may remain extended up to a maximum of Beaufort force 4. Definition according to Beaufort: **moderate breeze** The wind moves twigs and smaller branches, lifts dust and loose paper	The awning may remain extended up to a maximum of Beaufort force 5. Definition acc. to Beaufort: **fresh breeze** Small trees begin to sway, white crests form on lakes	The awning may remain extended up to a maximum of Beaufort force 6. Definition acc. to Beaufort: **strong breeze** Large boughs move, umbrellas are difficult to keep under control, telephone wires „whistle" in the wind
The awning may not be used if there is any wind.	wind speed **20-27 km/h = 12-16 mph = 5.5-7.4 m/s**	wind speed **28-37 km/h = 17-23 mph = 7.5-10.4 m/s**	wind speed **38-48 km/h = 24-30 mph = 10.5-13.4 m/s**

The delivery does not include fixing materials such as bolts and rawlplugs. Because different countries and regions have the most widely varying of substrates, which, because of their sheer volume cannot be detailed here, it would make sense for you to get advice from your local installation specialist so that a suitable choice of fixing materials can be made.

When determining the fixture materials for the markilux syncra fix the following loads per fixture plate must be taken into account:

Load per fixture plate	Compressive force (N)	Sheer force (V)	Torque (M) from the sheer force
fixture plates for the outer support posts (1 to 3-field units)	**5.00 kN**	**1.14 kN**	**5.90 kN**
fixture plates for the inner support posts (1 to 3-field units)	**5.00 kN**	**1.14 kN**	**5.90 kN**

Important: By taking suitable measures to seal around the fixing holes you should ensure that the surface to which the awning / syncra has been fitted (whether face, top or bottom fix) cannot suffer from the ingress of dampness (rain water). On the coast and in industrial areas stainless steel fixing materials must be used.

Our customer support both oral and written is intended to provide you with information about the best possible use of our products and services. This, however, does not release you from your obligation to convince yourself – through your own conscientious analysis – of the suitability of our products and services for the application you intend to use them for. In particular this goes for the checking of the general composition and especially the load bearing capability of the substrate to which the blind or awning is to be fitted.

Overview of the installation options available for folding-arm awnings

Installation Instructions
Installation may only be carried out by qualified, professional dealers with appropriate fitting experience. The installation instructions supplied with the awning and especially the section referring to safety regulations must be read – without fail – before fitting the awning.

Automatic control mechanisms are to be adjusted so that they react to the appropriate wind resistance class.

Face fixture of markilux folding-arm awnings
A corresponding matrix has been made available for the following fixture types showing the pull-out forces per fixing point for each awning size (exception: markilux ES-1):

- face fixture bracket
- face fixture using spreader plate A
- face fixture using spreader plate B

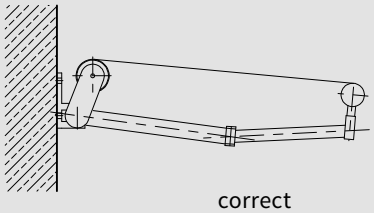
Top fixture of markilux folding-arm awnings
For top fixture an appropriate matrix has been drawn up showing the pull-out force exerted on each fixing point for each awning size.

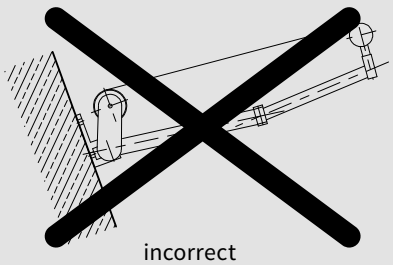
Eaves/Roof timber fixture of markilux folding-arm awnings
For eaves / roof timber fixture an appropriate matrix has been drawn up showing the sheer force exerted on each fixing point for each awning size. The following fixture types are illustrated (exception: markilux ES-1):
- eaves fixture bracket
- eaves fixture bracket with additional fixture plate

Electrical safety instructions
The power supply cables for electrical connections must be laid and installed by a qualified electrician (acc. to VDE 0100). Installation must be carried out in accordance with the instructions provided by the manufacturer (e.g. for motor drives and automatic controls).
Modifications – especially with regard to an electrical component or the power supply cables – require our explicit approval in writing.
Make sure that the power supply cables, that have already been laid, are disconnected from the power supply during installation.
Alterations such as additions or modifications, which diverge from our installation instructions, are not permitted. Bespoke constructions require our prior and explicit approval in writing!

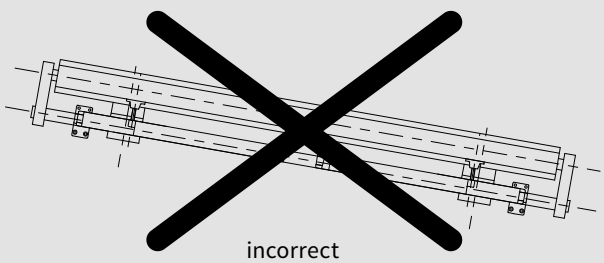
Planning permission
N.B! This system may be subject to planning permission depending on the laws and regulations as specified by local authorities.

N.B! Please note!
Smooth operation of a folding-arm awning will depend on its having been installed horizontally and the brackets having been fitted plumb and flush with one another.


correct


incorrect


correct


incorrect

Fixture to a solid substrate

Recommended maximum load for cracked concrete

The permitted central pull-out force per rawlplug in the case of single or paired rawlplugs in C20/25 (previously B25) concrete without edge limitation, i.e. edge separation c > 1.5 × the effective anchor depth; the partial safety margin of effectiveness of 1.4 was observed. All other requirements of the relevant technical permit have to be adhered to.

	fischer FAZ II	fischer FAZ II	fischer FAZ	fischer FAZ	Hilti HST/HST-R	Hilti HST/HST-R	Würth FAZ/S	Würth FAZ/S	Würth FAZ/A4	Würth FAZ/A4
	M 10	M 12	M 10 A4	M 12 A4	M 10	M 12	M 10	M 12	M 10	M 12
required distance from edge $a_{2,c}$ [8] in mm	90	105	90	105	90	105	90	100	90	100
min. centre to centre separation in the case of paired rawlplugs A_B [8] in mm	40	45	55	65	55	60	45	60	50	60
min. required substrate t_{req} [8] in mm	120	140	120	140	120	140	120	130	120	130
permitted central pull-out force for expanding bolts [5] in N	4280	6090	4280	5710	4280	5710	4280	5710	4280	5710

Recommended maximum loads for centric pull-out forces and substrate dimensions

for the above-mentioned injection anchors in brickwork[1] M 10, M 12 and M 16 with a minimum anchor depth of 130 mm, including a max. rendering layer thickness of 20 mm

Single rawlplug:	building brick	solid sand lime brick	vertically perforated clay brick	perforated sand lime brick	cavity block made of lightweight concrete	aerated cement (aircrete) concrete
	≥ M 12	≥ KS 12	≥ Hlz 12 [7]	≥ KSL 12 [7]	Hbl 2 | Hbl 4 [7]	≥ PB2
max. load [4] [6] in kN	2.0	2.0	1.2	1.0	0.6 / 1.0	1.3 / 0.6 [3]
component thickness t_{req} ≥ [8] in cm	24	24	24	24	24	17.5
distance to edge $a_{2,c}$ ≥ [8]	25	25	20	20	20	20
centre to centre separation A_B ≥ [4] [8]	15	15	15	15	20	25

Smallest possible centre to centre dimension with a correspondingly reduced load:

	building brick	solid sand lime brick	vertically perforated clay brick	perforated sand lime brick	cavity block made of lightweight concrete	aerated cement (aircrete) concrete
	≥ M 12	≥ KS 12	≥ Hlz 12 [7]	≥ KSL 12 [7]	Hbl 2 | Hbl 4 [7]	≥ PB2
min. centre to centre separation A_B [4] [8] within the paired set of rawlplugs	5	5	5	5	10	10
minimum centre to centre separation between the inner rawlplugs of adjacent brackets in cm	25	25	25	25	25	25
corresponding reduced load / single rawlplug [4] [6] in kN	1.25	1.25	0.9	0.75	0.4 / 0.6	0.8 [2] / 0.6 [3]

1) = the substrate in which is to be anchored must consist of brickwork – in line with DIN 1053 – made of the following materials with the minimum strength category: Solid brick ≥ Mz DIN 105, solid sand lime brick ≥ KS 12 DIN 106, engineering brick ≥ HLz 12 DIN 105, engineering sand lime brick ≥ KSL 12 DIN 106, aerated concrete ≥ Hbl2 DIN 18151, gas concrete / autoclaved aerated concrete ≥ strength category 2 DIN 4165.

2) = is valid for conical drill holes

3) = is valid for cylindrical drill holes

4) = the permit allows loads for values between the centre to centre measurement to be interpolated.

5) = corresponds to „pull-out force FB (N)" in matrices and refers to the differing fixture methods in the corresponding awning types

6) = may only be used, when the masonry in which the rawlplug is to be fixed, is strong enough. If a large number of rawlplugs are placed in one brick, the total load has to be limited to 2.5 kN / brick (1.7 kN in hollow brick). This is to avoid bricks being pulled out of the brickwork. Sufficient superimposed load may be assumed, if a storey, a reinforced-steel floor or something similar is situated above the awning fixture position. in the case of other fixture procedures (e.g. fixtures to Attika edges or parapets) the maximum permitted load per brick should be observed according to the permitted load / matrix: „The maximum load that may be transferred through a single rawlplug or rawlplug group into a single brick".

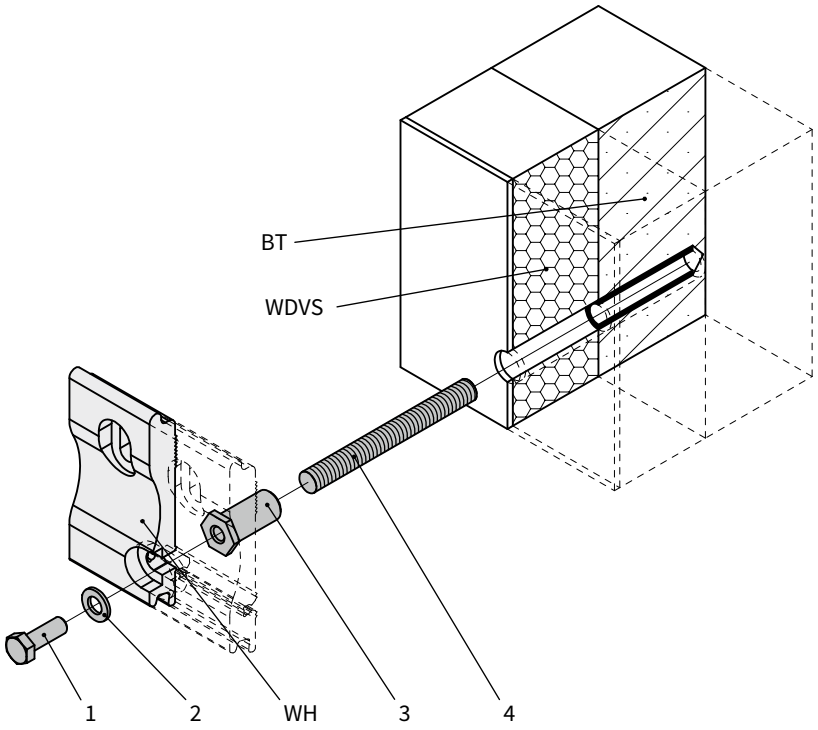
7) = turned drill hole

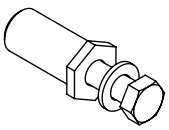
8) = for clarification please consult the sample graphic regarding: „Fixture to a façade with external insulation cladding"

Example of fixture using the “reducing bolt assembly”

An example of how the “reducing bolt assembly” can be used (please consult the section on “Fixtures, fittings and accessories”) for bracket fixture to a façade with external insulation cladding as well as an explanation of some of the terms used in the above-mentioned matrices is shown in the drawing below.

Overview



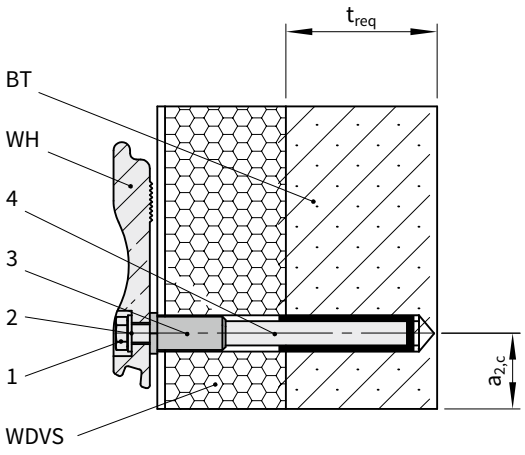


reducing bolt assembly
M 16 → M 10 / SW 27
50 mm in length

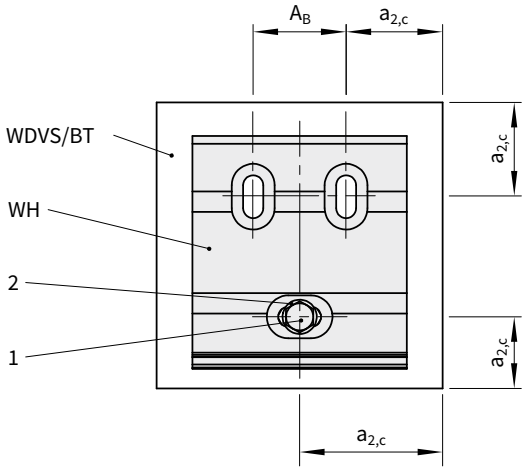
(for further reducing bolt assemblies please consult “Fixtures, fittings and accessories”)

754921

Cross section



View from the front



$a_{2,c}$ = minimum distance from the edge (in relation to the fixture substrate BT, and is valid also for solid building substrates)

t_{req} = required minimum substrate thickness (e.g. wall thickness of the load-bearing wall)

A_B = minimum centre to centre separation between the pair of rawlplugs

WH = face fixture bracket / fixture bracket / spreader plate

BT = component / fixture substrate

WDVS = external insulation cladding

1 = hexagon bolt M 10 / 12 (not supplied)

2 = washer (not supplied)

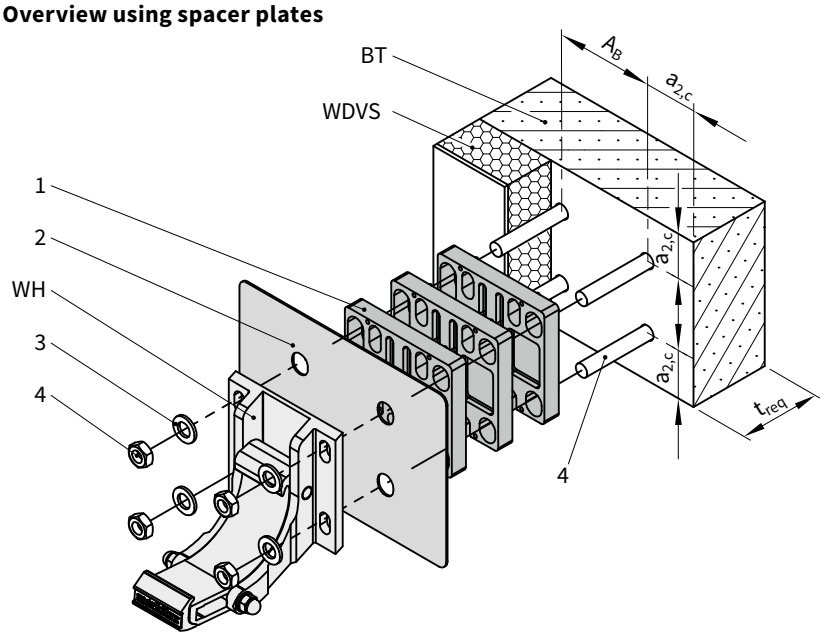
3 = reducing bolt assembly, e.g. M 16 M 10 / SW 27 (part no. 754921)

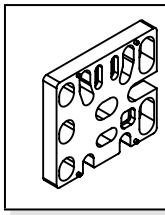
4 = studding (not provided)

Installation examples of spacer plates and stand-off brackets

An example of how spacer plates and stand-off brackets can be used (please consult the section on “Fixture, fittings and accessories”) for the fixture of brackets to a façade with external insulation cladding.

Overview using spacer plates

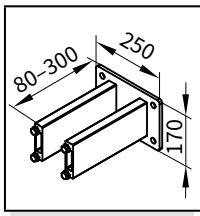




spacer plate
face/top fixture
N.B! max. stacking height = 200 mm
(for further spacer plates please consult the section „Fixtures, fittings and accessories”)

716331

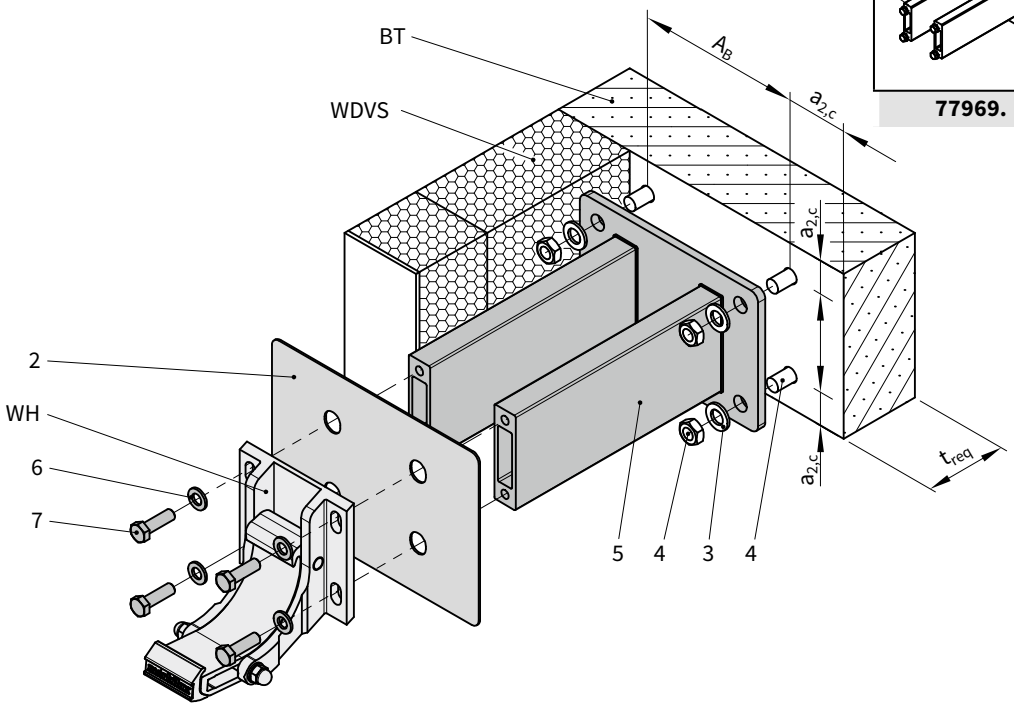
Overview using stand-off brackets



stand-off bracket
for face fixture bracket

(for further stand-off brackets please consult the section “Fixtures, fittings and accessories”)

77969.



$a_{2,c}$ = minimum distance from the edge (in relation to the fixture substrate BT, and is valid also for solid building substrates)

t_{req} = required minimum substrate thickness (e.g. wall thickness of the load-bearing wall)

A_B = minimum centre to centre separation between the pair of rawlplugs

WH = face fixture bracket / fixture bracket

BT = component / fixture substrate

WDVS = external insulation cladding

1 = spacer plate, e.g. part no. 716331

2 = cover plate for installation with spacer plates or stand-off brackets in the case of external insulation cladding, e.g. part no. 71841.

3 = washer (not supplied)

4 = fixing materials (not supplied)

5 = stand-off bracket, e.g. part no. 77969.

6 = washer

7 = hexagonal head bolt

Using epoxy resin anchors as a fixing material

fischer injection system FIS V

consisting of:

- fischer studding **M 10**, **M 12** or **M 16** (in the required length)
- injection epoxy resin FIS V, FIS VS, FIS VW
- plastic sieves (only in the case of hollow bricks)
- FIS H 16 × 130 K / FIS H 20 × 130 K

Drill hole Ø / depth, quantity of epoxy resin:

M 10	without mesh sleeve	12 mm / 135 mm, 10 ml = 5 scale divisions
	with mesh sleeve	16 mm / 135 mm, 30 ml = 15 scale divisions
M 12	without mesh sleeve	14 mm / 135 mm, 12 ml = 6 scale divisions
	with mesh sleeve	20 mm / 135 mm, 50 ml = 25 scale divisions
M 16	without mesh sleeve	18 mm / 135 mm, 16 ml = 8 scale divisions
	with mesh sleeve	20 mm / 135 mm, 50 ml = 25 scale divisions

For aerated concrete: penetration depth 95 mm without plaster bridging, use conical drill PBB cone drill PBB and centering sleeve PBZ

(as similarly expressed in permit Z-21.3-1824)

Upat injection system UPM 44

consisting of:

- fischer studding **M 10**, **M 12** or **M 16** (in the required length)
- injection epoxy resin UPM 44
- plastic mesh sleeves (only in the case of hollow bricks)
- FIS H 16 × 130 K / FIS H 20 × 130 K

Drill hole Ø / depth, quantity of epoxy resin:

M 10	without mesh sleeve	12 mm / 135 mm, 10 ml = 5 scale divisions
	with mesh sleeve	16 mm / 135 mm, 30 ml = 15 scale divisions
M 12	without mesh sleeve	14 mm / 135 mm, 12 ml = 6 scale divisions
	with mesh sleeve	20 mm / 135 mm, 50 ml = 25 scale divisions
M 16	without mesh sleeve	18 mm / 135 mm, 16 ml = 8 scale divisions

For aerated concrete: penetration depth 95 mm without plaster bridging, use conical drill PBB cone drill PBB and centring sleeve PBZ

(as similarly expressed in permit Z-21.3-1823).

Hilti injection system HIT-HY 50

consisting of:

- studding HAS **M 10** or **M 12** (in the required length)
- injection epoxy resin HIT-HY 50
- mesh sleeve HIT-S 16 × 150 K (only in the case of hollow bricks)

Drill hole Ø / depth, quantity of epoxy resin:

M 10	without mesh sleeve	16 mm / 155 mm, 60 ml = 2 squeezes
	with mesh sleeve	16 mm / 155 mm, 60 ml = 8 squeezes
M 12	without mesh sleeve	14 mm / 155 mm, 13 ml = 2 squeezes
	with mesh sleeve	16 mm / 155 mm, 60 ml = 8 squeezes

(as similarly expressed in permit Z-21.3-399 and Z-21.3-1736)

Hilti injection system HIT-HY 70

consisting of:

- studding HAS / HIT – AC / HIT – V **M 10** or **M 12** (in the required length)
- injection epoxy resin HIT-HY 70
- 2 × mesh sieve HIT-SC (only in the case of hollow bricks)

Drill hole Ø / depth, quantity of epoxy resin:

M 10	without mesh sleeve	16 mm / 155 mm, 60 ml = 2 squeezes
	with mesh sleeve	16 mm / 195 mm, 80 ml = 10 strokes
M 12	without mesh sleeve	14 mm / 155 mm, 13 ml = 2 squeezes
	with mesh sleeve	16 mm / 195 mm, 80 ml = 10 strokes

(following approval Z-21.3-1830)

Würth injection system WIT

consisting of:

- studding WIT-VI-A/S or WIT-VI-A/A4 **M 10**, **M 12** and **M 16** or WIT-AS or WIT-AS A4 **M 10** and **M 12** (in the required length)
- injection epoxy resin WIT-VM 200
- lengths of metal mesh sieve, part no. 0903 44 168 (M 10) and 0903 44 208 (M 10 and M 12) (only in the case of hollow bricks)

Drill hole Ø / depth, quantity of epoxy resin:

M 10	without mesh sleeve	12/155 mm, approx. 6 mm	cartridge scaling
	with mesh sleeve	16/155 mm, approx. 22 mm	cartridge scaling
M 12	without mesh sleeve	14 /155 mm, approx. 8 mm	cartridge scaling
	with mesh sleeve	20/155 mm, approx. 22 mm	cartridge scaling
M 16	without mesh sleeve	18/155 mm, approx. 12 mm	cartridge scaling

For aerated concrete: penetration depth 93 mm without plaster bridging, hole depth 100 mm, cylindrical hole Ø 18 mm, use mesh sleeve WIT-SH 18/95 (as similarly expressed in permit Z-21.3-1771).

Fixture to wood

Fixture into wood (face or top fixture)

Examples of approved fixing materials:

The fitting of awnings to or on wood: face and soffit fixture					in accordance with DIN 1052:2004-08					2007-11-09
axial tensile load pine C 24 strength class of bolts and studding: ≥ 4 . 6					class with respect to load assimilation over time application class angle between the applied force and the grain direction in the			short 2 90°		
	nominal gauge	recom-mended min. wood thickness	minimum penetration depth	thread length	pre-drill	minimum centre to centre separation		minimum distance to edge			Pull-out force FB[1] (= permitted axial tension load*) $N_{perm.}$ (N)
	Ø (mm)	t_{req} (mm)	t_2 (mm)	b (mm)	d_{pd} (mm)	a_1 (A_B) (mm)	a_2 (mm)	$a_{1,t}$ (mm)	$a_{1,c}$ (mm)	$a_{2,c}$ (mm)	
for example Würth ECOFAST ASSY II (galvanised) ASSY SK (galvanised) ASSY Kombi II (galvanised)	10	80	80	> 60	—	120	50	150	100	50	2710
for example Würth ECOFAST ASSY II (galvanized) ASSY Kombi II (galvanized)	12	96	96	> 80	—	144	60	180	120	60	4340
for example Würth ECOFAST ASSY (A2)	8	64	64	> 50	—	96	40	120	80	40	1810
hexagon head wood screw acc. to DIN 571 (galvanized, A2, A4)	10	80	80	≥ 54	smooth shank 10 threaded section 7.0	50	30	120	70	30	2140
hexagon head wood screw acc. to DIN 571 (galvanized, A2, A4)	12	96	96	≥ 66	smooth shank 12 threaded section 8.4	60	36	144	84	36	3130

1) = A partial safety margin of effectiveness of V_F = 1.5 has been observed. $N_{zul} = R_{ad}$ /1.5

When making the calculation the vertical load (max. 626 N) is attributed in full to the second, at that moment load-free (of the torque) bolt.

Fixture to wood (roof timber / eaves fixture)

Examples of approved fixing materials:

The fitting of awnings to or on wood: roof timbers					in accordance with DIN 1052:2004-08						2007-07-31
single-sided rafter-holder pine C 24 strength class of bolts and studding: ≥ 4 . 6					class with respect to load assimilation over time application class angle between the applied force and the grain direction in the wood				short 2 0°		
	nominal gauge	recom-mended min. wood thickness	minimum penetration depth	thread length	pre-drill	plate size	minimum centre to centre separation		minimum distance to edge		pull-out force FS[1] (= permitted shear force)
	Ø (mm)	t_{req} (mm)	t_2 (mm)	b (mm)	d_{pd} (mm)	$d_a \times d_l \times t$ (mm)	A_B (mm)	a_2[2] (mm)	$a_{1,t}$ (mm)	$a_{2,c}$ (mm)	$V_{perm.}$ (N)
for example Würth screws in line with Z-9 . 1 – 514 [3]	10	100	100	> 60	—	—	120	50	150	50	3160
	12	120	120	> 80	—	—	144	60	180	60	4530
for example Würth screws in line with Z-9 . 1 – 514 threaded over the whole length [3]	10	100	100	> 90	—	—	120	50	150	50	3570
	12	120	120	>100	—	—	144	60	180	60	4860
hexagonal head wood screw conforming to DIN 571	12	120	120	> 72	smooth shank 12 threaded section 8.4	—	144	60	180	60	3780
bolts	10	55	—	—	≤ 11	34 × 11 × 3	50	40	80	30	3490
studding	10	48	—	—	≤ 11	34 × 11 × 3	50	40	80	30	3130
toothed washer C 2 with 12 mm Ø bolt	50	70	—	—	≤ 13	44 × 13.5 × 4	75	60	84	30	7810
toothed washer C 2 with 12 mm Ø bolt	62	70	—	—	≤ 13	44 × 13.5 × 4	93	75	93	38	8930
toothed washer C 11 with 12 mm Ø bolt	50	70	—	—	≤ 13	44 × 13.5 × 4	100	60	100	30	8960

1) = A partial safety margin of effectiveness of V_F = 1.5 has been observed.

2) = not necessary when double-fitting as per sketch

3) = Ø 10 mm: Würth ECOFAST ASSY II, ASSY SK, ASSY Kombi II

Ø 12 mm: Würth ECOFAST ASSY II, ASSY Kombi II (everything galvanised)

Other conditions with regard to the fixture to or on wood

Basically the following criteria have to be fulfilled:

The fixing systems to be used have been detailed in DIN 1052:2004-08.

The characteristics for strength, rigidity and apparent density for wood have to be considered. The following table shows the different classifications. As wood in the strength category C 24 is normally used, the data for fixture to and on wood with a strength classification of C 24 has been given in the previously shown matrices.

The strength, stiffness and raw density values for wood

class of strength acc. to DIN 1052	C16	C24	C30	C35	C40
type in accordance with DIN 4074-1 or quality rating acc. to DIN 4074-2	S7 C16M III	S10 C24M II	S13 C30M I	C35M	C40M

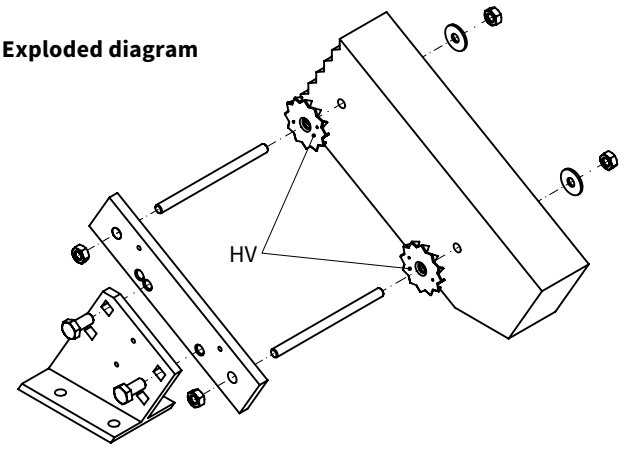
Additionally, the following has to be kept in mind:

- condition and type of wood
- adequate protection of the fixing materials against corrosion
- fixture should not be attempted to end-grain wood
- the term often referred to in wood standards as “unilateral plate” corresponds in awning jargon to an eaves fixture bracket on one side (of the wood)
- with regard to the angle between force and grain direction, the most unfavourable situation has been assumed

An example of the use of toothed washers in the case of eaves / roof timber fixture

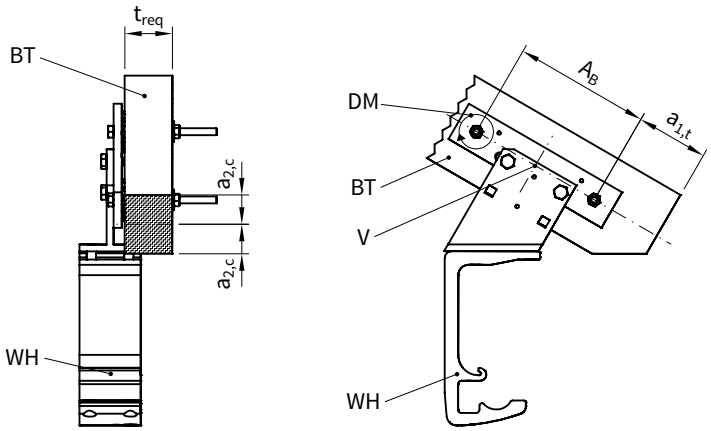
An example of an installation using toothed washers as well as an explanation of the terms used in the foregoing matrices can be found in the diagram below.

Exploded diagram



A_B = centre to centre measurement for fixing bolts
$a_{1,t}$ = minimum distance to the edge
$a_{2,c}$ = minimum distance to the edge
t_{rwq} = minimum wood or substrate thickness
T_M = distance from the rear of the bracket to the centre of the roller tube
V = the centre point of AB must lie within TM (= distance from the rear of the bracket to the centre of the roller tube)
HV = toothed washer C2
WH = face fixture bracket
BT = component / fixture substrate
DM = torque

View from the front

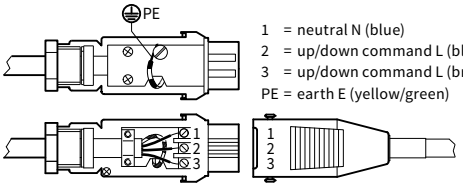


Motor drives for folding arm awnings

motor drives, hard-wired

no. of folding arms	operation side	order no.	motor data (50 Hz | 230 V)	Nm / rpm	ES-1	6000	5010	3300 (pur)	990	1710	1710 stretch	1500	1600	1600 stretch	1650	930 swing	1300 Basic	1700	1700 stretch
2	R/L	710561	P = 240 W | I = 1.10 A	35/17					•			•	•	•	•				
	R/L	725011	P = 240 W | I = 1.10 A	35/17		•	•												
	R/L	752691	P = 230 W | I = 1.18 A	40/17				•		•	•								
	R/L	755451	P = 300 W | I = 1.30 A	40/14														•	•
	R/L	770451	P = 255 W | I = 1.20 A	44/14	•														
	R/L	776111	P = 260 W | I = 1.10 A	30/14													•		
	R/L	752691	P = 230 W | I = 1.18 A	40/17												•			
3/4	R/L	764101	P = 280 W | I = 1.25 A	60/12														••[1]	
	R/L	710581	P = 320 W | I = 1.40 A	55/17		••[1]	••[1]	••[1]		••[1]		••[1]	••[1]		••[1]				
	R/L	721161	P = 260 W | I = 1.45 A	60/12													••[1]		
6	R/L	710591	P = 400 W | I = 1.80 A	85/17		••	••	••		••			••		••				
	R/L	751101	P = 320 W | I = 1.50 A	80/12														••	

4 × 1.5 mm²



1 = neutral N (blue)
2 = up/down command L (black)
3 = up/down command L (brown)
PE = earth E (yellow/green)

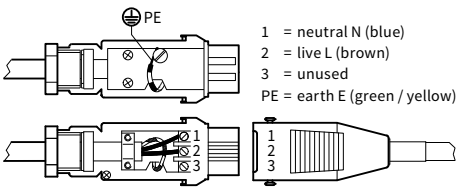
wiring diagram for Hirschmann connector, hard-wired motor

• = single unit
•• = coupled unit
[1] = single unit in the case of 3 arms; coupled unit in the case of 4 arms
R/L = right and left

Motor drives, radio-controlled, 433 MHz technology

no. of folding arms	operation side	order no.	motor data (50 Hz | 230 V)	Nm / rpm	ES-1	6000	5010	3300 (pur)	990	1710	1710 stretch	1500	1600	1600 stretch	1650	1300 Basic	1700	1700 stretch
2	R/L	725021	P = 240 W | I = 1.00 A	35/17		•	•			•	•							
	R/L	763341-1	P = 240 W | I = 1.10 A	35/17	•			•	•			•	•	•	•			
	R/L	763371-1	P = 240 W | I = 1.10 A	30/17												•		
	R/L	798851	P = 240 W | I = 1.10 A	35/17													•	•
3/4	R/L	763351-1	P = 290 W | I = 1.25 A	55/17		••[1]	••[1]	••[1]		••[1]		••[1]	••[1]		••[1]			
	R/L	763381-1	P = 290 W | I = 1.25 A	55/17												••[1]	••[1]	
6	R/L	763391	P = 400 W | I = 1.50 A	85/17													••	
	R/L	763411-1	P = 400 W | I = 1.80 A	85/17		••	••	••		••			••		••			

3 × 1.5 mm²



1 = neutral N (blue)
2 = live L (brown)
3 = unused
PE = earth E (green / yellow)

wiring diagram for Hirschmann connector, radio-controlled motor

• = single unit
•• = coupled unit
[1] = single unit in the case of 3 arms; coupled unit in the case of 4 arms
R/L = right and left

Motor drives, shadeplus

motors	operation side	order no.	motor data (50 Hz | 230 V)	Nm / rpm	6000	1600
hard-wired	R/L	774221	P = 80 W | I = 0.40 A	3/30	•	•
radio-controlled	R/L	721991*	P = 80 W | I = 0.35 A	3/30	•	•

Wiring diagram for the plug connector in the case of a shadeplus conforming to the hard-wired or radio-controlled motor drives shown in the above matrix.

• = single unit
* = 433 MHz technology
R/L = right and left

Motor drives, io technology

no. of folding arms	operation side	order no.	motor data (50 Hz | 230 V)	Nm / rpm	ES-1	6000	5010	3300 (pur)	990	1710	1710 stretch	1500	1600	1600 stretch	1650	1700	1700 stretch	1300 Basic
2	R/L	763281	P = 240 W | I = 1.10 A	35/17	•	•	•	•	•	•	•	•	•	•	•	•	•	•
3/4	R/L	763271	P = 290 W | I = 1.50 A	55/17		••[1]	••[1]	••[1]	••[1]	••[1]		••[1]	••[1]	••[1]	••[1]	••[1]	••[1]	
6	R/L	763261	P = 400 W | I = 2.10 A	85/17		••	••	••		••			••		••	••		

Three frequencies (868, 869 and 870 MHz) are used to transmit commands, of which the best is automatically selected.

wiring diagram for Hirschmann connector to radio-controlled motor see illustration

• = single unit
•• = coupled unit
[1] = single unit in the case of 3 arms; coupled unit in the case of 4 arms
R/L = right and left

Awning cover tolerances

Tolerances in the cover width and length

from	to	tolerances
0	2000	+ 5 / – 5
2010	4000	+ 8 / – 8
4010	6000	+ 12 / – 12
6010	7000	+ 15 / – 15

dimensions in mm

markilux Quick-fit spline

makes it possible to change an awning cover quickly on site

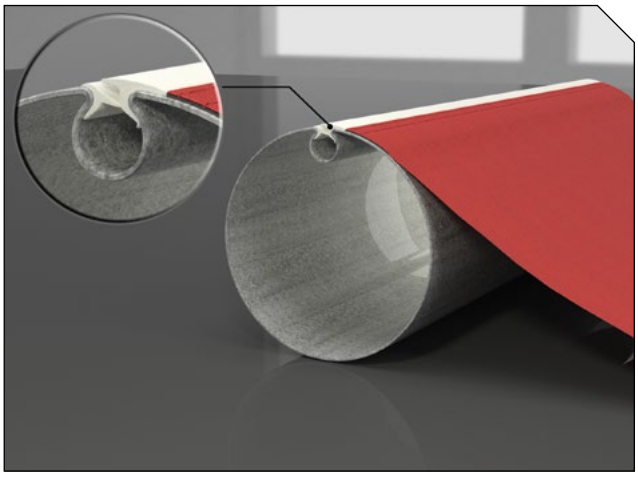
The markilux quick-fit spline makes it possible to change the cover of all the current folding-arm awning models easily and quickly on site.

In the case of older models and those of our competitors, the roller tube dimensions should be compared with those in Fig. 2 before attempting to exchange a cover using the quick-fit spline.

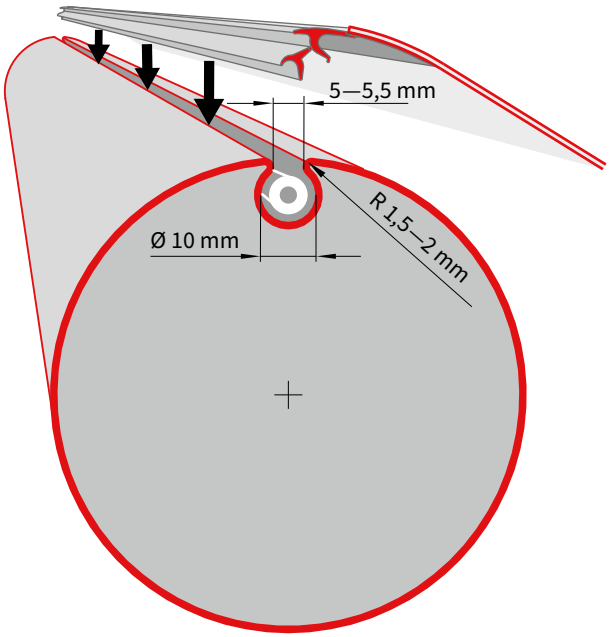
After the old cover has been removed, the markilux quick-fit spline is pressed into the keyway (Ø 10 mm) in the roller along with the cover. It is not necessary to pull the old spline out to the side.

Please consult the section “Housing tolerances and awning cover dimensions” to find out the sizes of a replacement cover.

In the case of new covers please note that the length of the cover should be such, that the roller tube is covered even when the awning is fully extended i.e. 1 1/2 times the circumference of the roller tube is added to the length of the cover.



Roller tube with markilux quick-fit spline and cover



Roller tube dimensions suitable for the markilux quick-fit spline

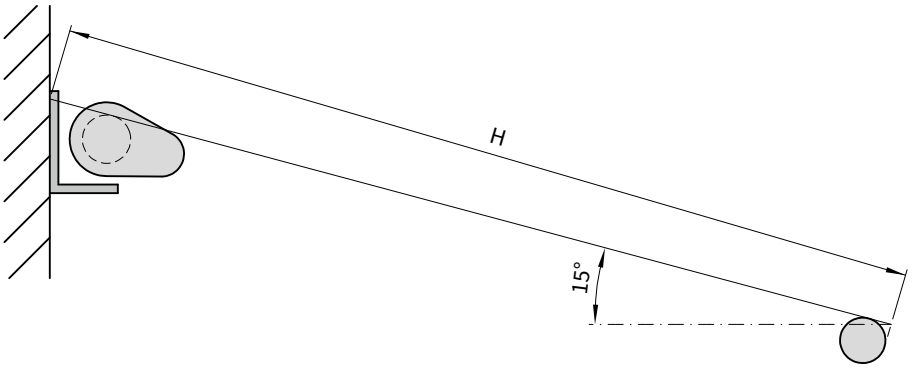
Round keyway Ø 10 mm for markilux quick-fit spline
radius at the corners of the keyway approx. 1.5 mm to 2 mm
keyway opening min. 5.0 mm to max. 5.5 mm

Definition of the projection of folding-arm awnings

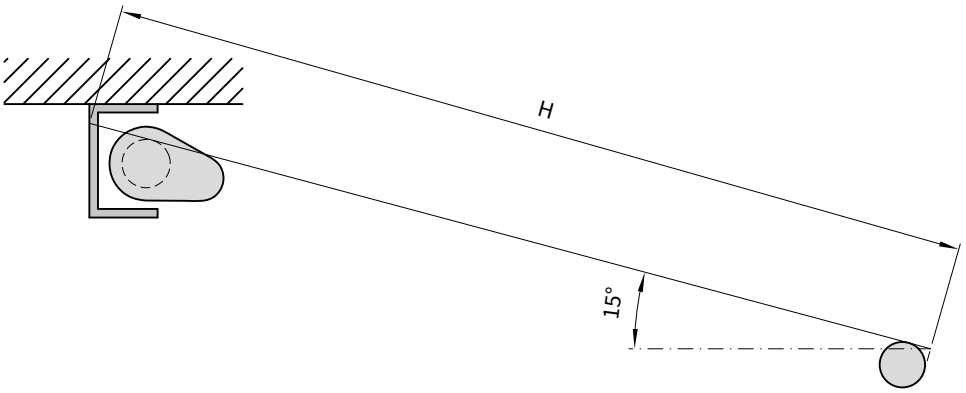
Definition

The nominal projection is measured with the awning extended at a pitch of approx. 15° from the back of the fixture brackets over the cover to the leading edge of the front profile. The tolerance in projection is + 40 mm / − 40 mm.

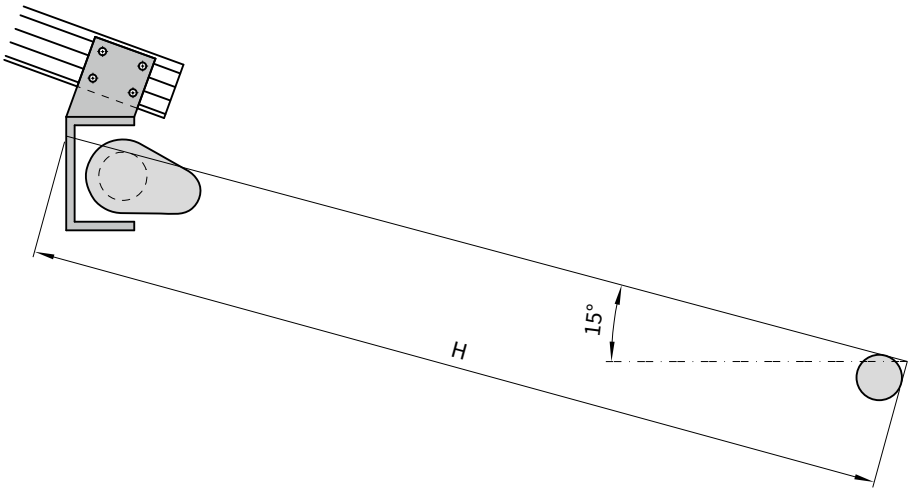
Face fixture



Top fixture



Eaves fixture



H = projection

Maximum drop markilux shadeplus / drop valance

Awning model →		6000		5010	1500	1600		1300 Basic	pergola 110 / 210
Fabric range no. ↓		gearbox	motor	gearbox	gearbox	gearbox	motor	gearbox	gearbox
sunvas snc plains 1)*	310 .. / 311 ..	2100	2100	2100	2100	2100	1000	2100	2300
sunvas snc 2) 3)	310 .. / 311 .. 313 .. — 315 ..	1900	1400	1900	1500	1500	550	1900	2300
sunsilk snc 2)	324 .. / 328 .. / 369 ..	2100	1700	2100	1800	1800	650	2100	2300
sunsilk snc 3) vuscreen Alu vuscreen FR	324 .. / 328 .. / 369 .. 317 .. 318 ..	2100	1300	2100	1500	1500	600	2100	2300
transolair	338 ..	2100	2100	2100	2100	2100	1000	2100	2300

1) = horizontal seam
2) = bonded
3) = seams and pattern run vertically
* = depending on the type of fabric there may be a horizontal seam

dimensions in mm

Minimum width of coupled units

junction roller, 4 folding arms

1300 Basic		1500		1600		1700		1710		3300		5010		6000	
proj.	width	proj.	width	proj.	width	proj.	width	proj.	width	proj.	width	proj.	width	proj.	width
150	406	150	425	150	413	150	406	150	406	150	490	150	495	150	518
200	506	200	525	200	513	200	506	200	506	200	590	200	595	200	618
250	606	250	625	250	613	250	606	250	606	250	690	250	695	250	718
300	706	300	725	300	713	300	706	300	706	300	790	300	795	300	818
350	806	350	825	350	813	350	806	350	806	350	890	350	895	350	918
400	906	400	—	400	913	400	906	400	906	400	—	400	1012	400	1032

junction roller, 6 folding arms

1300 Basic		1500		1600		1700		1710		3300		5010		6000	
proj.	width	proj.	width	proj.	width	proj.	width	proj.	width	proj.	width	proj.	width	proj.	width
150	582	150	—	150	952	150	952	150	928	150	990	150	982	150	1002
200	732	200	—	200	1052	200	1052	200	1028	200	1090	200	1082	200	1102
250	882	250	—	250	1152	250	1152	250	1128	250	1190	250	1182	250	1202
300	1032	300	—	300	1252	300	1252	300	1228	300	1290	300	1282	300	1302
350	1182	350	—	350	1352	350	1352	350	1328	350	1390	350	1382	350	1390
400	1332	400	—	400	—	400	—	400	—	400	—	400	—	400	—

one-piece cover, 4 folding arms (cover not custom made)

1300 Basic		1500		1600		1700		1710		3300		5010		6000	
proj.	width	proj.	width	proj.	width	proj.	width	proj.	width	proj.	width	proj.	width	proj.	width
150	370	150	—	150	—	150	360	150	—	150	404	150	401	150	452
200	470	200	—	200	—	200	460	200	—	200	504	200	501	200	737
250	570	250	—	250	—	250	560	250	—	250	604	250	601	250	787
300	670	300	—	300	—	300	660	300	—	300	704	300	701	300	837
350	770	350	—	350	—	350	760	350	—	350	804	350	801	350	887
400	870	400	—	400	—	400	—	400	—	400	—	400	—	400	—

dimensions in cm