

Installation manual

Solar panels - flat roof installation

Installation manual Solar panels - flat roof installation

English

1	Safet 1.1	y	
	1.2	Warning signs and explanation of symbols	4
	1.3	Avoiding danger	
	1.4	Intended use	
	1.5	Instructions for operating safety	
			-
2	Produ	ct description	7
	2.1	Structure and constituent parts of the Solar system (unpressurised system)	7
	2.2	Brief description	8
	2.3	System components for all systems	8
	2.4	System components for the unpressurised system	10
	2.5	System components for the pressurized system	12
	2.6	Flat roof packages	15
	2.6.1	For flat solar panel EKSV26P	15
	2.6.2	For one EKSH26P flat solar panel	16
		·	
3	Instal	lation 1	7
	3.1	Transport and storage	17
	3.1.1	Scope of delivery	17
	3.1.2	Transport	17
	3.1.3	Storage	17
	3.2	System concepts	18
	3.3	Laying connection pipes	18
	3.3.1	Non-pressurised System	19
	3.3.2	Pressurised system	19
	3.4	Installing flat solar panels	20
	3.4.1	Main dimensions of the Solar system solar panel with Solar panels - flat roof installation	21
	3.4.2	Mounting flat roof frame	23
	3.4.3	1. Installing flat solar panel	30
	3.4.4	Installing another flat solar panels	31
	3.4.5	Hydraulic connection of the flat solar panel (non-pressurised system)	33
	3.4.6	Hydraulic connection of a flat solar panel (pressurized system)	36
	3.4.7	Install equipotential bonding terminal	37
	3.4.8	Installing solar panel temperature sensor	38
	3.5	Removing the flat solar panel	39
_	_		
4		· P···································	10
	4.1	Start-up	
	4.2	Decommissioning	
	4.2.1	Temporary shutdown	
	4.2.2	Final shutdown	40
5	Diamo	ing instructions for accomply	
อ	Fiann 5 1	ing instructions for assembly4 Wind loads	
	5.1.1	Information about wind loads	
	5.1.2	Effects of wind on the structures	
	5.1.2		
	5.1.3 5.1.4	Selection of fixing type	
	5.1.4 5.2	Required anchorage weights and concrete slab thicknesses for approved wind load zones	
	V	Snow loads	
	5.2.1	Information concerning snow loads	
	5.2.2 5.3	Instructions concerning snow load zones	
		· ·	
	5.4	Sensor position solar panel	+/
6	Techn	iical data4	LΩ
J	6.1	Basic data	
	6.2	Weights.	
	5.2	g	. 3
7	List o	f keywords	j0

1 Safety

1.1 Refer to the manual

This manual is intended for authorised and trained technicians who have experience in the proper installation and commissioning of solar systems on account of their technical training and knowledge.

All procedures required for installation, commissioning, operation and adjustment of the system are described in this instruction manual and associated instruction manuals. The manuals are part of the scope of delivery of the respective components.

Please read this manual carefully and thoroughly before proceeding with the installation or modification of the heating system.

Relevant documents

For configuration with the air-water heat pump EKHBH*/EKHBX* (pressurised system [+p]):

- Control and pump unit for solar systems (pressurised system) EKSR3PA/EKSRDS1A.
- Solar add-on for air-water heat pump system KKSOLHWAV1.
- Process water for air-water heat pump EKHWE*/EKHWS*.

For configuration with the air-water heat pump EKHBRD* (unpressurised system [p=0]):

- Control and pump unit for solar systems (unpressurised system) EKSRPS3.
- Hot water storage tank for air-water heat pumps EKHWP300/500A.

When connecting to an external heat generator or storage tank which is not included in the scope of delivery, the individual associated operating and installation instructions apply.

1.2 Warning signs and explanation of symbols

Meaning of the warnings

Warnings in this manual are classified according into their severity and probability of occurrence.



DANGER!

Draws attention to imminent danger.

Disregarding this warning can lead to serious injury or death.



WARNING!

Indicates a potentially dangerous situation.

Disregarding this warning can result in serious injury or death.



CAUTION!

Indicates a situation which may cause possible damage.

Disregarding this warning may cause damage to property and the environment.



This symbol identifies user tips and particularly useful information, but not warnings or hazards.

Special warning signs

Some types of danger are represented by special symbols:



Electrical current



Danger of burning or scalding

Validity

This instruction applies specially to Solar panels - flat roof installation of the solar panel. For other types of installation (on-roof, in-roof mounting) the instructions for the individual type of installation are applicable. The operating and installation instructions of the respective control and pump unit are to be observed when installing piping and commissioning.

P=0 Only applicable for the unpressurised system (Drain Back)



THE Only applicable for the pressurised system

Handling instructions

- Handling instructions are shown as a list. Actions of which the sequential order must be maintained are numbered.
 - → Results of actions are identified with an arrow.

1.3 **Avoiding danger**

The DAIKIN Solar system are manufactured using state-of-the-art technology and recognised technical rules. However, improper use may result in serious physical injuries or death, as well as property damage. To prevent danger, the DAIKIN Solar system should be only installed and operated:

- as stipulated and in perfect condition,
- with an awareness of safety and the hazards involved.

This assumes knowledge and use of the contents of this manual, of the relevant accident prevention regulations as well as the recognised safety-related and occupational health rules.

Intended use 1.4

The DAIKIN Solar system must be used exclusively for hot water generation and for solar heating support of hot water heating systems. The DAIKIN Solar system may only be installed, connected and operated according to the information in this manual.

Any other use outside the intended use is considered as improper. The operator alone shall bear responsibility for any resulting damage.

Use as intended also involves compliance with maintenance and inspection conditions. Replacement parts must at least satisfy the technical requirements defined by the manufacturer. This is the case, for example, with original spare parts.

1 Safety

1.5 Instructions for operating safety

Working on the roof

- Installation work on the roof may only be carried out by authorised and trained persons (heating technicians, roofers, etc.) in compliance with the relevant Accident Prevention Regulations and with the use of suitable personal protection equipment.
- Material and tools must be secured against falling down.
- . Barriers must be erected to prevent persons from entering the area below the roof where the work is being carried out.

Before working on the heating system

- All work on the heating system (such as installation, connection and commissioning) may only be carried out by authorised and trained heating technicians.
- Switch off the main switch and secure it against unintended switching on when carrying out any work on the heating system.

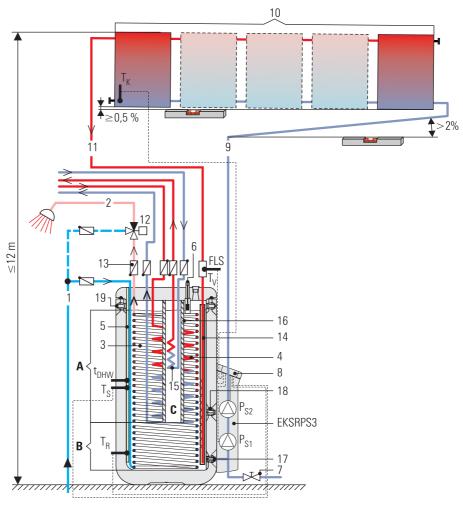
Electrical installation

- Electrical installations must only be conducted by electrical engineers and in compliance with valid electrical guidelines as well as the specifications of the energy supply company.
- Before connecting to the mains supply, check that the voltage specified on the type label of the heating system (230 V, 50 Hz) is the same as the available supply voltage.
- Before beginning work on live parts, disconnect them from the power supply (switch off main switch, remove fuse) and secure against unintentional restart.
- Equipment covers and service panels must be replaced as soon as the work is completed.

Instruct the operator

- Before you hand over the heating system, explain to the user/owner how to operate and check the heating system.
- Hand over the technical documentation (this document and all supporting documents) to the user and advise him that these
 documents must be made available at all times and be stored in the immediate vicinity of the unit.
- Document the handover by filling out the installation and instruction forms together with the owner and sign them.

2.1 Structure and constituent parts of the Solar system (unpressurised system)



- 1 Cold water connection pipe
- 2 Drinking water (hot) distributor
- 3 Stainless steel corrugated heat exchanger for domestic water (hot)
- 4 Corrugated stainless steel pipe for heat exchanger to heat generator (storage tank charging)
- 5 Immersion socket for reservoir, return flow temperature sensor
- 6 Fill level display
- 7 Filling and draining cock
- 8 Solar system R3 Controller
- 9 Solar system Return flow pipe (at the bottom of the flat solar panel / VA 18 Solar)
- 10 Solar system Solar panel
- 11 Solar inflow pipe (at the top of the flat solar panel / VA 15 Solar)
- 12 Thermostatic mixer valve (consumer-side scalding protection)
- 13 Anti-siphon valve
- 14 Solar system Infeed layering pipe
- 15 Corrugated stainless steel heat exchanger for heating support
- 16 Thermal insulation of stainless steel heat exchanger for heating support
- 17 Connection Solar system Return flow
- 18 Equipotential bonding terminal cable connection (with valve attachment) for storage cylinder extension
- 19 Safety overflow connection

- A Area with water for domestic use
- B Solar area
- C Heating support area

t_{DHW} Heat generators Storage temperature sensor

- T_R Solar system Return flow temperature sensor
- T_S Solar system Storage tank temperature sensor
- **T_K** Solar system Solar panel temperature sensor
- T_V Solar system Inflow temperature sensor

EKSRPS3

Regulating and pump unit

- FLS Solar system FlowSensor (flow measurement) or Solar system FlowGuard (flow setting)
- **P_{S1}** Solar system Operational pump
- P_{S2} Solar system Booster pump

Fig. 2-1 Standard arrangement of a Solar system (shown on a Drain-back system | p=0 |

2.2 Brief description

The DAIKIN Solar system is a thermal solar system for hot water generation and heating support.

The system consists of several, mainly pre-assembled, modules. Plug-in technology and a high degree of pre-assembly ensure fast and simple system installation.



The unpressurised system (drain back) must only be operated with the regulation and pump unit EKSRPS3, the air-to-water heat pump EKHBRD*, the hot water storage tanks EKHWP* and the relevant components (chapter 2.3 and 2.4).

The pressurised system must only be operated with the pump unit EKSR3PA, the pressure station EKSRDS1A, the plate heat exchanger EKSRPWT1, with the heat pump EKHBH* or EKHBX*, the solar connection kit EKSOL, the hot water storage tanks EKHWE/EKHWS and the relevant components (chapter 2.3 and 2.5).

Unless specified otherwise, the components are not included in the scope of delivery and need to be ordered separately.

Electronic control

The fully-electronic Solar system R3 controller ensures optimum solar heat exploitation (hot water heating, heating support) and compliance with all operational safety aspects. All parameters needed for trouble-free operation have been preset at the factory.

2.3 System components for all systems p=0

High performance flat solar panels

- H x W x T: 2000 x 1300 x 85 mm, weight: approx. 42 kg
 EKSH26P
- H x W x T: 1300 x 2000 x 85 mm, weight: approx. 42 kg

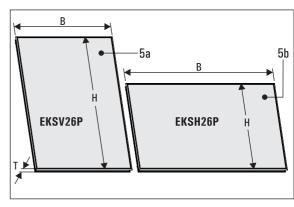


Fig. 2-2 Flat solar panel

Solar panel mounting rails FIX-MP FIX-MP130

- for one EKSV26P flat solar panel
 FIX-MP200
- for one EKSH26P flat solar panel

Consists of:

6a 2x Mounting rail

6b 2x Collector securing clip

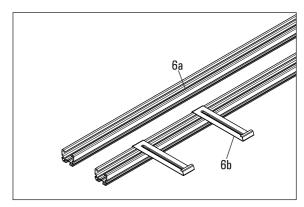


Fig. 2-3 FIX-MP

Solar panel connection Solar system

FIX-VBP

Consists of:

- 7a 2x Double clamping blocks for solar panel fixing
- 7b 2x Assembly profiler connector
- 7c 2x Expansion joints for solar panel connection with mounting support

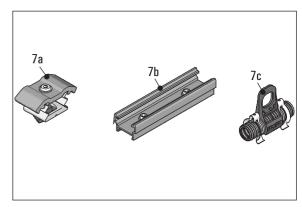
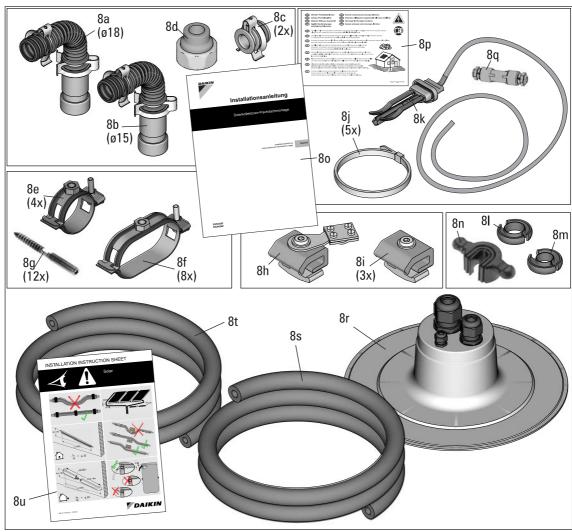


Fig. 2-4 FIX-VBP

2.4 System components for the unpressurised system [p=0]

Collector connection kit and roof transit for both side connection EKSRCFP



Consists of:

- 8a Connection fitting
- 8b Connection fitting
- 8c End plug
- 8d Transition fitting
- 8e Casing clamp
- 8f Casing clamp
- 8g Stud bolt casing clamp
- 8h Single clip equipotential bonding terminal
- 8i Single clip
- 8j Cable tie
- 8k Solar panel temperature sensor

Fig. 2-5 EKSRCFP

- RI Application for detaching tool (Ø 18 mm)
- 8m Application for detaching tool (Ø 15 mm)
- 8n Handle for detaching tool
- 80 Installation instruction
- 8p Sheet

DAIKIN

- 8q Cable connection console
- 8r Flat roof transit CON F
- 8s HT-Armaflex ø18x13
- 8t HT-Armaflex ø22x13 UV resistant
- 8u Supplementary sheet

Roof transit CON FE

CON FE

Consists of:

- 8r Flat roof transit CON F
- 8v Sealing unit for screwed cable fitting M40
- 8v Sealing unit for screwed cable fitting M16
- 8v Sealing unit for screwed cable fitting M32

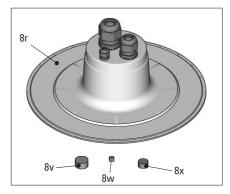


Fig. 2-6 CON FE

Connection pipes CON 15 and CON 20

CON 15, L = 15 m

and

CON 20, L=20 m

Connection pipes between solar panel area and EKSRPS3 (thermally insulated feed and return line (AI-PEX-compound pipe) with integrated sensor cable)).

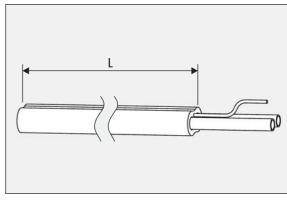


Fig. 2-7 CON 15 / CON 20

Extension kits for connection pipe CON X

CON X 25, L=2.5 m

CON X 50, L=5 m

CON X 100, L = 10 m

Heat insulated feed and return line with integrated sensor cable, pipe clamps and connecting fittings.

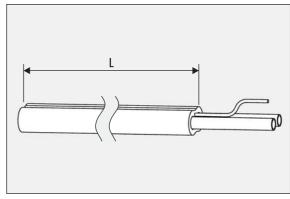


Fig. 2-8 CON X (optional)

Extension kit for feed line CON XV CON XV 80, $L=8\ m$

UV-resistant thermally insulated feed line with integrated sensor cable, pipe clamps, cable connection fitting and connecting fitting.

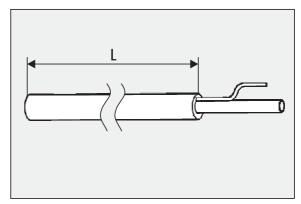


Fig. 2-9 CON XV (optional)

Support trough kit for connecting pipes CON 15 and CON 20

TS, L = 1.20 m

Support troughs for laying the connecting lines CON 15 and CON 20 with a continuous gradient (preventing pooling).

Consists of:

- 5x Support trough

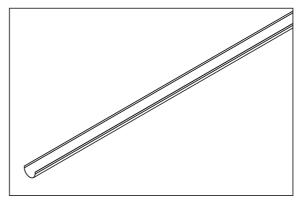


Fig. 2-10 TS (optional)

2.5 System components for the pressurized system [-+--

Solar panel connection set EKSRCP

Consists of:

- Assembly material for flat solar panel and connection pipe (4x individual clamping blocks, 1x equipotential bonding terminal, pipe clamps)
- UV-resistant heat insulation for external area (2 m)
- 1x Solar panel temperature sensor
- 2x End plugs
- 2x Solar panel connection elbow with compression ring fittings to connect a connecting pipe (Cu Ø 22 mm)

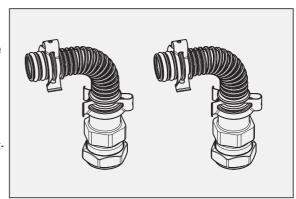


Fig. 2-11 EKSRCP

Connection pipes CON 15P16 and CON 15P20

CON 15P16, L = 15 m

Heat insulated stainless steel corrugated pipe line for solar pressurised systems with incorporated sensor pipe (nominal size DN 16)

For systems with up to 3 flat solar panels and a pipe length up to $25\ m.$

CON 15P20, L=15 m

Heat insulated stainless steel corrugated pipe line for solar pressurised systems with incorporated sensor pipe (nominal size DN 20).

For systems with up to 5 flat solar panels and a pipe length of up to 25 m.

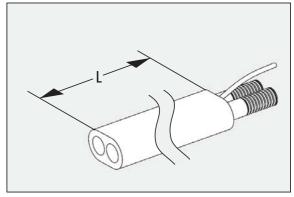


Fig. 2-12 CON 15P16 / CON 15P20

Pressure solar connection kit CON CP16 and CON CP20

CON CP16

For incorporating the pressure solar pipe (nominal size DN 16) into the solar panel connection kit EKSRCP and to the pressure station.

CON CP20

For incorporating the pressure solar pipe (nominal size DN 20) into the solar panel connection kit EKSRCP and to the pressure station.

Consists of:

Swivel nut with accessory

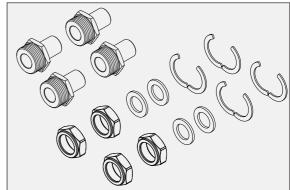


Fig. 2-13 CON CP16 / CON CP20 (optional)

Pressurised line connectors CON XP16 and CON XP20

CON XP16

For the connection of two pressurised solar system pipes (Nominal size DN 16).

CON XP20

For the connection of two pressurised solar system pipes (Nominal size DN 20).

Consists of:

- Swivel nut with accessory

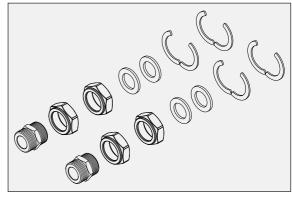


Fig. 2-14 CON XP16 / CON XP20 (optional)

2 Product description

Solar system fluid GFL

20 Litres of ready-mix with frost protection up to -28 $^{\circ}\text{C}.$

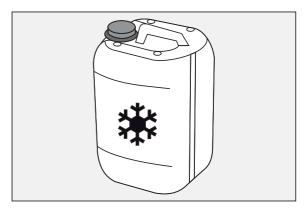
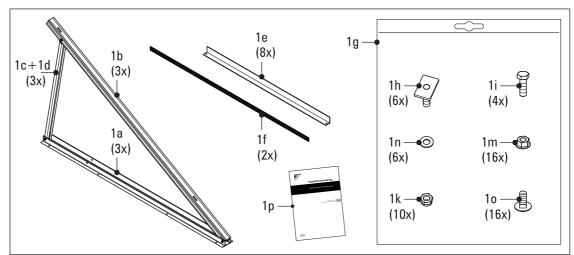


Fig. 2-15 GFL

2.6 Flat roof packages

For flat solar panel EKSV26P

Basic package FBV26P, for two EKSV26P flat solar panels:



Consists of:

Pre-assembled basic elements

Base rail EKSV26P 1a

1b Support rail EKSV26P

Telescopic rail external EKSV26P

1*d* Telescopic rail internal EKSV26P

and;

Cross-brace EKSV26P 1e

Diagonal support EKSV26P Fig. 2-16 Flat roof frame FBV26P 1g Bag of accessories EKSV26P

1h Clamping block M8

1i Hex bolt M8

1n Washer

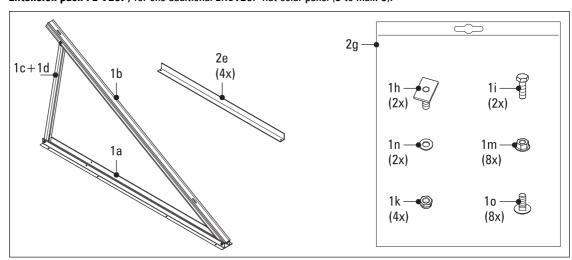
1 m Hex nut M8 with locking serration

Hex nut M8 1*k*

Cheese-head bolt M8 10

Technical document 1p

Extension pack FE V26P, for one additional EKSV26P flat solar panel (3 to max. 5):



Consists of:

Pre-assembled basic element

Base rail EKSV26P 1a

1b Support rail EKSV26P

Telescopic rail external EKSV26P 1c

1d Telescopic rail internal EKSV26P

and:

Cross-brace EKSV26P extension 2е

Fig. 2-17 Flat roof frame extension pack FE V26P

Bag of accessories EKSV26P 2g

Clamping block M8 1h

1i Hex bolt M8

Washer 1n

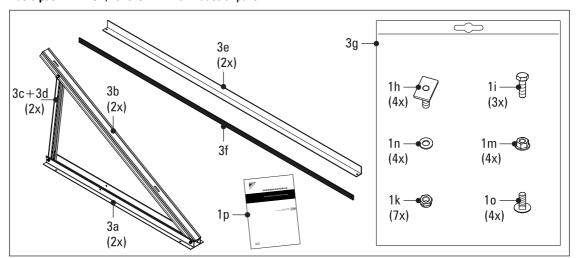
Hex nut M8 with locking serration 1m

Hex nut M8 1*k*

Cheese-head bolt M8

2.6.2 For one EKSH26P flat solar panel

Basic pack FBH26P, for one EKSH26P flat solar panel



Consists of:

Pre-assembled basic elements

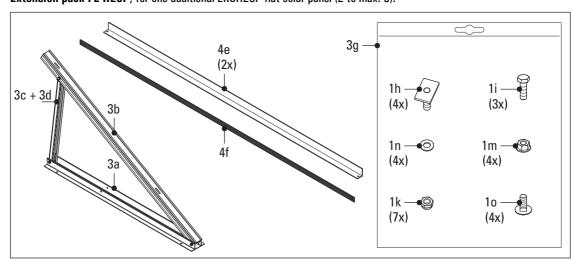
- 3a Base rail EKSH26P
- 3b Support rail EKSH26P
- 3c Telescopic rail external EKSH26P
- 3d Telescopic rail internal EKSH26P

and;

- 3e Cross-brace EKSH26P
- 3f Diagonal support EKSH26P
- Fig. 2-18 Flat roof frame FBH26P

- 3g Bag of accessories EKSH26P
- 1h Clamping block M8
- 1i Hex bolt M8
- 1n Washer
- 1m Hex nut M8 with locking serration
- 1k Hex nut M8
- 10 Cheese-head bolt M8
- 1p Technical document

Extension pack FE H26P, for one additional EKSH26P flat solar panel (2 to max. 5):



Consists of:

Pre-assembled basic element

- 3a Base rail EKSH26P
- 3b Support rail EKSH26P
- 3c Telescopic rail external EKSH26P
- 3d Telescopic rail internal EKSH26P

and;

- 4e Cross-brace EKSH26P extension
- 4f Diagonal support EKSH26P extension
- Fig. 2-19 Flat roof frame extension pack FE H26P

- 3g Bag of accessories EKSH26P
- 1h Clamping block M8
- 1i Hex bolt M8
- 1n Washer
- 1m Hex nut M8 with locking serration
- 1k Hex nut M8
- 10 Cheese-head bolt M8

3.1 Transport and storage

3.1.1 Scope of delivery

- The unpressurised DAIKIN Solar system p=0 consists of: High-performance flat solar panels, regulating and pump unit EKSRPS3, roof transitions, connecting lines and installation materials.
- The DAIKIN Solar system pressure system [+ r] consists of: High-performance flat solar panels, regulating and pump unit EKSR3PA/EKSRDS1A, pressure station, plate heat exchanger, connecting lines and installation materials.
- The document folder with the installation and maintenance instructions, operating instructions, installation and instruction form is included with the respective control system and pump unit.
- The installation instructions for the Solar panels flat roof installation of the solar panels are included in the roof breakthrough kit and the flat roof frame.



DAIKIN hot water storage tank such as the EKHWP* or the EKHWE*/EKHWS*, and the additional components can be ordered as options and are supplied separately.

3.1.2 Transport



CAUTION!

The DAIKIN flat solar panels are impervious to slight mechanical loading. However, impact, shock and walking on them should be avoided.

- The DAIKIN flat solar panels should be transported and stored carefully in their original packing only and this packing should not be removed until shortly before installation.
- The DAIKIN flat solar panels should be stored and transported flat on even and dry supports.
 - Transport with forklift trucks or cranes is only allowed if on pallets.
 - Up to 10 flat solar panels can be stacked and transported on top of each other.

The DAIKIN flat solar panels are delivered on a pallet, wrapped in film All industrial trucks, such as lifting trucks and forklift trucks, are suitable for transporting it. Other DAIKIN Solar system components are delivered packaged separately.

3.1.3 Storage

When storing the components of the DAIKIN Solar system you must take account of the following:

- All components should be stored in dry and frost-protected rooms only.
- Dismantled hydraulic components must be completely drained before being stored.
- Components must not be stored until they have cooled down.
- Current-carrying components must be permanently isolated from the power supply before storage (switch off fuses and main switches, remove cables) and must be secured against inadvertent restarting.
- The components must be stored in such a way that persons are not endangered by them.

The regulations in the respective documentation for other heating components apply for transport and storage of these products.

3.2 System concepts



For the Solar panels - flat roof installation of the flat solar panels, the roof surface must have an inclination of less than 5°. With roof inclinations of 15° to 80°, the flat solar panels can be mounted on the roof or integrated in the roof skin. Further information is provided by the installation instructions of the DAIKIN Solar system onroof installation pack and the DAIKIN Solar system in-roof installation pack.

DAIKIN Solar system are generally assembled in accordance with the installation concept shown below. This also includes the possibility of connection on the opposite side of the flat solar panels in each case.

- The connection on opposite sides is recommended by DAIKIN (possible from 1 flat solar panel upwards).
- Alternate side connection is acceptable for both DAIKIN Solar system ([-p] + [p=0]).

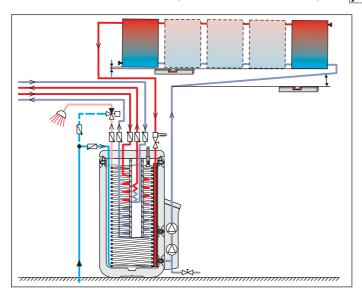


Fig. 3-1 Alternately connected Solar system solar panel with hot water storage tank EKHWP* (shown in the drain-back system P=0).

3.3 Laying connection pipes

Installation instructions concerning differences between non-pressurised and pressurised system

Non-pressurised system (Drain Back) p=0	Pressurised system [>+p]
With solar panels connected at opposite ends, the whole solar panel array must be set up with at least 0.5 % gradient to the lower panel connection (return flow).	No particular minimum gradient of the solar panel array is required. A gradient from the lower (return flow) connection should however be avoided.
of at least 2% and without any counter gradient.	The connection pipe between the solar panel array and the hot water storage tank must be made of pressure-resistant metal piping (CON XP16 / CON XP20 or Cu Ø 22 mm). The use plastic piping is not allowed.

Tab. 3-1 Installation instructions



CAUTION!

Siphon action may never be allowed to occur anywhere in the pipe run between storage tank and the flat solar panel. This could lead to functional faults and even material damage.

In the case of longer horizontal pipe runs with only a minimum gradient, it is possible for water pockets to develop due to thermal expansion of the plastic pipes between the mounting points with siphon action:

- Always make sure that pipe runs have a continuous gradient of at least 2%.
- Fix the pipes in the optional support troughs TS (see page 12) or run them along a rigid auxiliary structure (e.g. profile rail, pipe etc.).
- DAIKIN recommends always using the support trough kits (TS) for extended horizontal pipe sections.
- Lay prefabricated connection pipes (feed and return flow) with integrated sensor cable (see chapter 2.4 "System components
 for the unpressurised system") between the planned installation site of the solar panel area in the inner roof and the installation location of the hot water storage tank with control system and EKSRPS3 pump unit.
 - Make sure there is adequate length for connection to the hot water storage tank and the flat solar panels.
 - Make sure that there is a constant gradient in the connecting pipes (min. 2%).
 - The maximum permissible overall pipe length must not be exceeded (see tab. 3-2).

Number of solar panels	Max. possible total length of pipe
2	45 m
3	30 m
4	17 m
5	15 m



If larger distances need to be covered, calculations need to be made for the dimensioning of the connecting pipes.

Contact DAIKIN Service.

Tab. 3-2 Maximum lengths of the DAIKIN connection pipes

Additional notes about connecting pipes

If on-site conditions make it impossible or very difficult to install the connecting pipes in the manner described above, slight deviations from the specified installation are permitted. Hereby, the inflow pipe may not be larger than 18×1 mm.

- 1. If vertical copper pipes are already installed in the house, they can be used if a continuous connection pipe gradient can be guaranteed and the maximum pipe diameter must not be exceeded.
- If a uniform gradient from the second roof penetration to all pipe sections cannot be guaranteed when the solar panels are connected at opposite ends, then for roof penetration purposes, the inflow pipe can be connected to the top of e.g. through a ventilating tile, if:
 - the highest point if the inflow pipe is not more than 12 m above the storage tank mounting floor level,
 - the internal diameter of the inflow pipe is not more than 16 mm.
 - a continuous rise of the inflow pipe to the highest point, as well as a continuous gradient to the storage cylinder is
 ensured.
- 3. For pipe runs in which only a limited gradient can be achieved, copper pipe should be used on site. This avoids the need for a rigid supporting structure, and prevents the formation of water pockets due to expansion of the plastic pipes.

The connection pipe between the solar panel array and the hot water storage tank must be made of pressure-resistant metal piping (CON XP16 / CON XP20 or Cu \emptyset 22 mm). The use plastic piping is not allowed.

3.4 Installing flat solar panels



DANGER!

There is an increased accident risk during work on a roof. When working on the roof, the general accident prevention regulations must be observed to prevent accidents. Installation work on the roof must only be carried out by authorised and trained personnel.

- Before starting the installation work, check that the roof structure has adequate carrying capacity and is undamaged (e.g. defective battens or leaks).
- Use of tools etc. only in accordance with the applicable accident prevention regulations.
- Marking of the workplace (danger of parts falling down).



WARNING!

After their packaging is removed, the flat solar panels will become hot very quickly if they are exposed to the sun's rays.

- Wear protective gloves.
- Remove protective caps (not heat-resistant) after positioning the flat solar panel.



CAUTION!

Frost or overheating can damage the system.



- Permit the system to drain.
- Make sure that the flat solar panels are installed so that their lower edge is always higher than the Solar system-inflow coupling of the storage tank.



CAUTION!

Damage to roof skin.

· Do not slide any sharp or pointed objects along the flat roof.

Notes for safe and trouble-free operation p=0

- Mount the solar panel with a gradient to the lower collector coupling (return flow).
- Always run the connection pipe between the flat solar panels and the hot water storage tank with continuous gradient to avoid a siphon effect (opposite gradient) over the whole connection run.
- The upper edge of the flat solar panels may not be more than 12 m above the storage cylinder(s) mounting floor level.

3.4.1 Main dimensions of the Solar system solar panel with Solar panels - flat roof installation

Solar panel description			EKSV26P			EKSH26P				
Number of solar panels			3	4	5	1	2	3	4	5
Measuring point Dim		Dimensions in mm								
Width of solar panel array		2664	3996	5328	6660	2032	4064	6096	8128	10160
Distance from roof breakthrough		minimum 175			minimum 175					
Height of solar panel array	H ₁		20	100		1303				
Total height of collector field	H ₂	dependi	ng on the a	angle (see	tab. 3-4)	depending on the angle (see tab. 3-4)				
Height of flat roof trestle	Н ₃	depending on the angle (see tab. 3-4)			depending on the angle (see tab. 3-4)					
Length of base rail	X ₀	1750			1150					
Distance of cross-struts	Х ₁	510			1004					
Distance from lower collector edge to lower mounting rail	Υ ₀	200			200					
Spacing of the mounting rails		1400 – 1600			800 – 1000					
Distance of mounting DIN rail —Bottom edge of bearing rail	Υ ₂		357 – 389 ¹⁾			357 – 389 ¹⁾				
Distance solar panel edge to first solar panel securing hook	A ₀	100 – 300		100 – 300						
Spacing of the roof mounting brackets of a flat solar panel	A ₁	900 – 1100		1600 – 1800						
Spacing of solar panel mounting brackets between two flat solar panels		230 – 630			230 – 630					
Pitch of base rails (basic pack)	Z	1180			1785					
Pitch of base rails (extension pack)	Z ₁	1279		1785						
Distance from solar panel edge to hydraulic connection	E ₀	approx. 73		approx. 73						
Centre-to-centre distance of the solar panel couplings	E ₁	1854		1154						
Distance from solar panel temperature sensor to: - p=0 bottom edge of solar panel - y+p top edge of solar panel	F	172		172						

Tab. 3-3 Main dimensions of the Solar system solar panel in Solar panels - flat roof installation

Setting the solar panel angle with Solar panels - flat roof installation								
Working angle	Screw connection	Total height of col	lector field (H ₂) [mm]	Height of flat roof trestle (H ₃) [mm]				
	point	EKSV26P	EKSH26P	EKSV26P	EKSH26P			
30°	W1	1240	890	1034	734			
40°	W2	1538	1082	1311	925			
50°	W3	1784	1243	1549	1089			
55°	W4	1888	1310	1650	1159			
60°	W4	1977	1367	1740	1220			

Tab. 3-4 Setting the solar panel angle with Solar panels - flat roof installation

¹⁾ Depending on the mounting position, the distance can be smaller if the flat roof duct is mounted directly under the flat roof trestle.

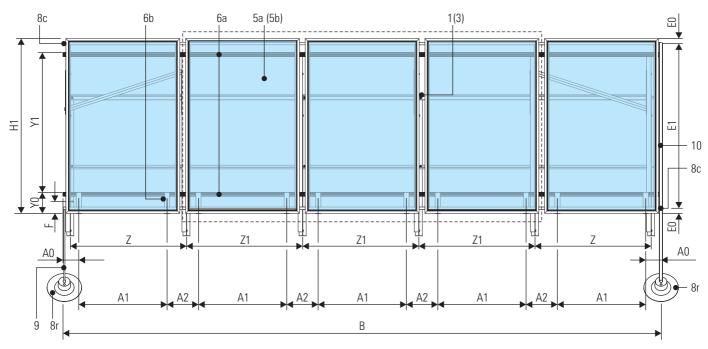


Fig. 3-2 Main dimensions of a Solar system solar panel in Solar panels - flat roof installation (shown on the flat solar panel EKSV26P in the drain-back system)

- Key see fig. 3-3.
- Dimensions see tab. 3-3.

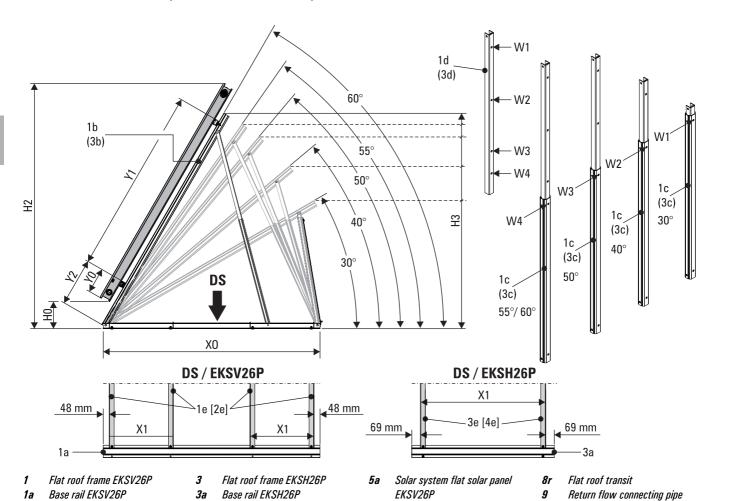


Fig. 3-3 Solar system solar panel - angle setting

Telescopic rail external EKSV26P

Telescopic rail internal EKSV26P

Cross-brace EKSV26P extension

Support rail EKSV26P

Cross-brace EKSV26P

3b

3с

3d

3е

4e

Support rail EKSH26P

Cross-brace EKSH26P

Telescopic rail external EKSH26P

Telescopic rail internal EKSH26P

Cross-brace EKSH26P extension

5b

6a

6b

8c

Solar system flat solar panel

Profile mounting rail

Solar panel plug

Collector securing clip

EKSH26P

10

W1 - W4

tab. 3-4

1b

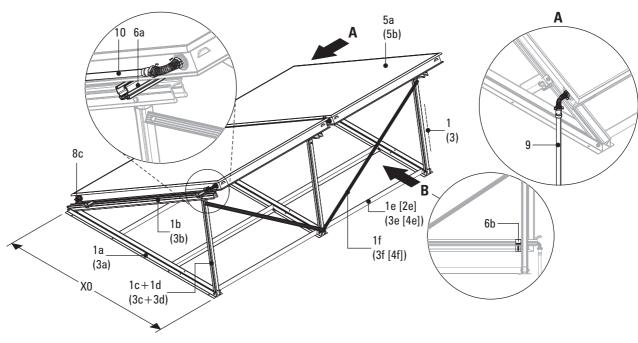
1c

1d

1e 2e Screwing points for support brackets

For other dimensions see tab. 3-3 +

Inflow connecting pipe



- 1 Flat roof frame EKSV26P
- 1a Base rail EKSV26P
- 1b Support rail EKSV26P
- 1c Telescopic rail external EKSV26P
- 1d Telescopic rail internal EKSV26P
- 1e Cross-brace EKSV26P
- 1f Diagonal support EKSV26P
- **2e** Cross-brace EKSV26P extension
- 3 Flat roof frame EKSH26P
- 3a Base rail EKSH26P
- 3b Support rail EKSH26P
- 3c Telescopic rail external EKSH26P
- 3d Telescopic rail internal EKSH26P

- 3e Cross-brace EKSH26P
- 3f Diagonal support EKSH26P
- 4e Cross-brace EKSH26P extension
- 4f Diagonal support EKSH26P extension
- **5a** Solar system flat solar panel EKSV26P
- 5b Solar system flat solar panel EKSH26P
- 6a Profile mounting rail
- 6b Collector securing clip
- 8c Solar panel plug
- 8r Flat roof transit
- 9 Return flow connecting pipe
- 10 Inflow connecting pipe

Fig. 3-4 Solar system solar panel - Solar panels - flat roof installation angle setting

3.4.2 Mounting flat roof frame



DANGER!

Non-intended use and prohibited modifications to the structure reduce safety. Any changes to the structure of components is not permitted.



DANGER!

Insufficiently dimensioned supporting structures can endanger persons, the building and the solar installation.

Check carrying capacity of the supporting structure (Note wind and snow loads, see chapter 5.1
"Wind loads" and chapter 5.2 "Snow loads").

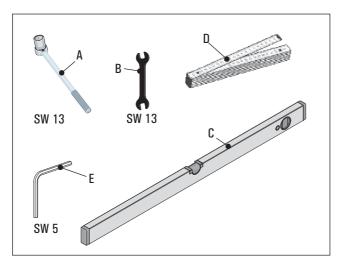


As in flat roof-mounting package, the flat roof basic mounting package and the extension flat roof mounting package are provided for the used flat solar panels (see chapter 2.3 "System components for all systems").

A defined roof area is required per flat solar panel.

- for the EKSV26P: 2.0 x 1.33 m² (HxB).
- for the EKSH26P: 1.33 x 2.0 m² (HxB).

The main dimensions of the Solar system solar panel (in accordance with fig. 3-2 and fig. 3-3) are summarized in tab. 3-3.



- Hex socket and socket wrench SW 13
- Open-ended spanner SW 13
- Spirit level
- D Metre rule

Ε

Hex socket- (Allen Key-) socket wrench SW 5

Required tools Fia. 3-5



Use commercially available concrete blocks e.g. lawn edging for weighing down (for EKSV26P frame: 500 mm long, for EKSH26P frame: 1000 mm long).



The short names are explained in the following figures for:

- the mounting parts provided by DAIKIN in the chapter 2 "Product description".
- the dimension details in tab. 3-3.
- the auxiliary equipment in fig. 3-5.

Installing basic package

Flat solar panel EKSV26P - basic pack for FBV26P for 2 flat solar panels

Flat solar panel EKSH26P — basic pack FBH26P for 1 flat solar panel

- 1. Determine the dimensions of the solar panel array and define the installation location.
 - Determine the main dimensions in accordance with fig. 3-2 and tab. 3-3.
 - Alignment of the solar panel in accordance with the planning documents of the solar installation.
 - Observe planning instructions in chapter 5 "Planning instructions for assembly" (minimum distance to edge of roof must be complied with in order to avoid increased wind and snow loading).
- 2. Installation angle of the solar panel in accordance with the planning documents of the solar installation. As illustrated in tab. 3-4, there are five possibilities in the range of 30° to 60°.

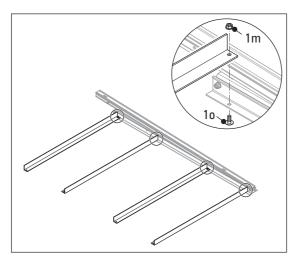


Shortening the support bracket is not necessary. For the 60° angle, you need to reposition the telescopic rail in accordance with fig. 3-3.

3. Number of required basic triangles (frame with 1 solar panel: 2 Basic triangle; Frame with 2 solar panels: 3 Basic triangles) position relative to each other in folded position.



A basic triangle consists of a basic rail, a support rail and the two telescopic rails.



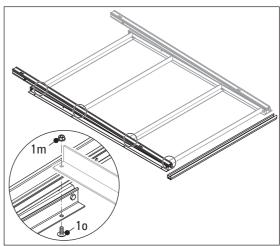


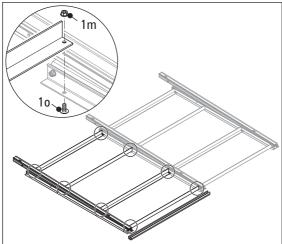
Fig. 3-6 Mounting cross-struts

Fig. 3-7 Install a second basic triangle with cross-braces

- 4. Insert the cheese head screws (pos. 1o) into the pre-drilled openings from below (magnification fig. 3-6) and place the cross-braces orthogonally to the basic triangle with the pre-drilled bolt openings to match the cheese head bolts (fig. 3-6).
- 5. Secure the hex bolts using the hex nuts with locking serrations (item 1m).
- 6. Align a second basic triangle in the desired installation position using the installation profile rail on the free side of the cross-braces (fig. 3-7).
- 7. Here again, insert the cheese head screws and secure with the hex nuts with locking serrations (magnification fig. 3-7).



Do not tighten the screws yet at this point in the installation, otherwise the cross-braces could become misaligned. This would result in the fact that the weights to be positioned later may not be able to be inserted accurately.



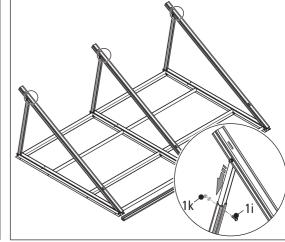


Fig. 3-8 Install a third basic triangle with cross-braces

Fig. 3-9 Erect the basic triangle to the angle required

- 8. Align the basic triangle in the desired installation position using the installation profile rail (fig. 3-8).
- 9. Here again, mount the cross-braces to the basic triangles according to the schematic diagram. Here again, insert the cheese head screws one after the other and secure with the hex nuts with locking serrations (magnification fig. 3-8).

- 10. Erect the first basic triangle (fig. 3-9), by adjusting the telescopic rails in accordance with the desired angle (tab. 3-4) and fix in position with the hex bolt.
- 11. Erect the other basic triangles in the same way and install them (fig. 3-9).



If the flat roof frame is being installed for more than two EKSV26P flat solar panels, first just install the first section of the basic frame, up to and including step 7 (as shown in fig. 3-7) for one flat solar panel. The completion pack is to be mounted between the basic frame, because otherwise the position of the flat solar panels on the frame becomes displaced and will not be symmetrical.

12. Secure the diagonal braces from the outside, starting with the hex bolts and the washers provided and the hex nuts at the top at the side and mid-way between the basic triangles.

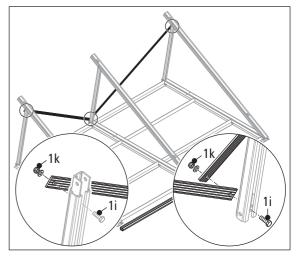


Fig. 3-10 Mounting diagonal struts



CAUTION!

Siphon action may never be allowed to occur anywhere in the pipe run between storage tank and the flat solar panel. This could lead to functional faults and even material damage.



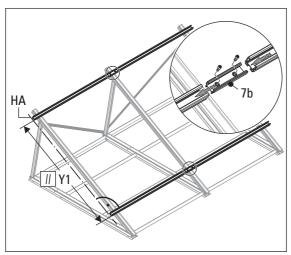
- With solar panels connected at opposite ends, the whole mounting rails with minimum 0.5% gradient to the lower solar panel connection (return flow) must be set up to avoid Siphon-effect (anti-gradient).
- Set up both mounting rails exactly flat and parallel to each other on the marking line A (HA) (see fig. 3-11). If needed, the mounting rails inserted in suitable way.



CAUTION!

In order to prevent torsional stresses and fixing difficulties when mounting the solar panels;

- Only slightly tighten the self-tapping screws on the sliding blocks during the installation.
- Align both both mounting profile rails exactly flat on the flat roof frame and parallel to each other (see fig. 3-11). If needed, the mounting rails inserted in suitable way.
- At the end of the installation, and after checking, tighten all the bolts.



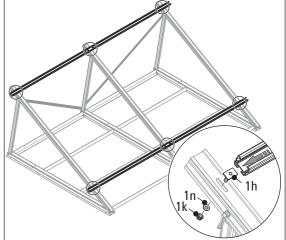


Fig. 3-11 Mounting the installation profile rails, 1st. step

Fig. 3-12 Mounting the installation profile rails, 2nd. step



To start with, only tighten the clamping fittings hand tight, in order to make it easier to align the installation profile rails.

- 13. Connect the installation profile rails using the connector (item 7b) (fig. 3-11).
- 14. Align the mounting rails precisely horizontally (only with same side connection and max. 3 flat solar panels).



To do this, slide the installation profile connector from the FIX-VBP pack into the side grooved profile half way on each installation rail and then fix using the stud screws.

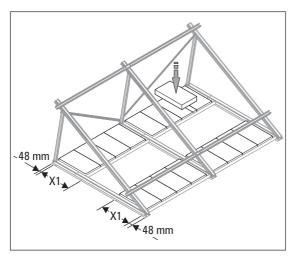
15. Install the top and bottom installation profile rails using the clamping screwed fittings (clamping blocks (item 1h), washers (item 1n) and hex nuts with locking serrations (item 1k)) with consideration of the distance (Y₂) to the bottom edge of the support rail and the distance Y₁) between the installation profile rails (see tab. 3-1 and fig. 3-12).



CAUTION!

In order to prevent instability;

After a final inspection, check all the screwed connections and tighten if necessary.



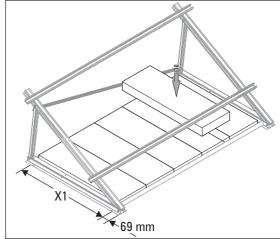


Fig. 3-13 Inserting the concrete slabs (EKSV26A)

Fig. 3-14 Inserting the concrete slabs (EKSH26A)

16. To secure the solar panel array against the effects of the wind, place the prepared weights in the flat roof frame (for EKSV26P frame: 500 mm long, for EKSH26P frame: 1,000 mm long) (fig. 3-13 and fig. 3-14).

Observe the required weights in tab. 5-2 and tab. 5-3 in chapter 5 "Planning instructions for assembly".

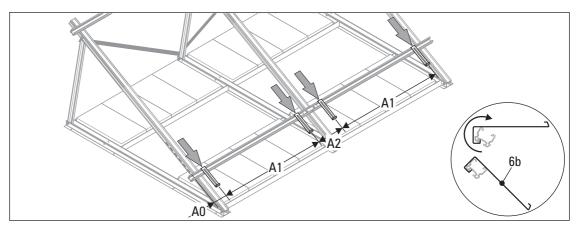


Fig. 3-15 Hang the solar panel securing hooks (6h)

17. Hang solar panel securing hooks (6b) into the upper side guiding groove of the lower mounting rails and tilt downwards. Pay attention to distances!

Mounting the extension pack



For each additional flat solar panel, the flat roof frame must be supplemented with an extension pack FE V26P (flat solar panel EKSV26P) or FE H26P (solar panel EKSH26P).



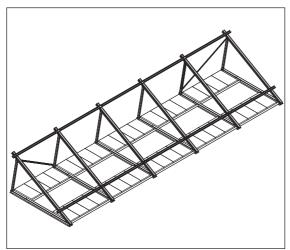
If the flat roof frame is being installed for more than two EKSV26P flat solar panels, first just install the first section of the basic frame, up to and including step 7 (as shown in fig. 3-7) for one flat solar panel. The completion pack is to be mounted between the basic frame, because otherwise the position of the flat solar panels on the frame becomes displaced and will not be symmetrical.

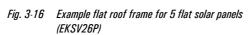
1. Position a basic triangle from the corresponding extension pack accordingly (see fig. 3-6) and install and fix in accordance with the principle already described for the basic pack.



In flat roof frames for the flat solar panel EKSH26P, all fields (fig. 3-17) need diagonal braces, in frames for the flat solar panel EKSV26P, only the external fields need diagonal braces (fig. 3-16).

- Then install and fix the remaining second section of the base frame (basic frame with cross-braces) to the end of the flat roof frame.
- 3. To secure the solar panel array against the effects of the wind, place the prepared weights in the flat roof frame (for EKSV26P frame: 500 mm long, for EKSH26P frame: 1,000 mm long) (fig. 3-13 and fig. 3-14). Note the required weights in tab. 5-2 and tab. 5-3 in chapter 5.





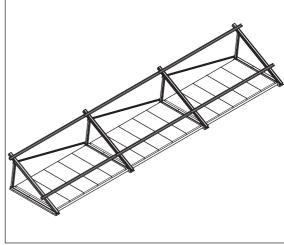


Fig. 3-17 Example flat roof frame for 3 flat solar panels (EKSH26P)

3.4.3 1. Installing flat solar panel



CAUTION!

There will be a danger of injury to persons and damage to materials if flat solar panels are installed which do not fit exactly. They may be ripped away by high wind and snow loads.

 To ensure proper use, use only genuine DAIKIN accessories and installation materials for installing DAIKIN flat solar panels.



CAUTION!

In order to prevent torsional stresses and fixing difficulties when mounting the solar panels;

- · Lightly tighten the self-locking nuts of the slide blocks,
- Align both both mounting profile rails exactly flat on the flat roof frame and parallel to each other (see fig. 3-11). If needed, the mounting rails inserted in suitable way.



CAUTION!

p=0

In the Drain-Back system, as opposed to the pressurised system, the flat solar panels need to be installed rotated through 180°, since otherwise partial snow covering of the flat solar panel and if there is a danger of frost, the solar system cannot operate efficiently and frost damage may occur.

- Install flat solar panels rotated through 180° in the Drain-Back system, as depicted on the covering film.
- Always fit the solar panel temperature sensor at the bottom in one of the two side installation openings in the Drain-Back system.
- The different mounting position for the solar panel temperature sensor is only supported above version 4.2 on the R3 controller.

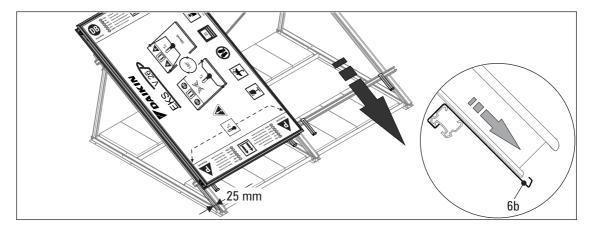


Fig. 3-18 Lift the flat solar panel over the mounting rails, and carefully suspend it in the solar panel securing hooks (6b).

Pay attention to distances!

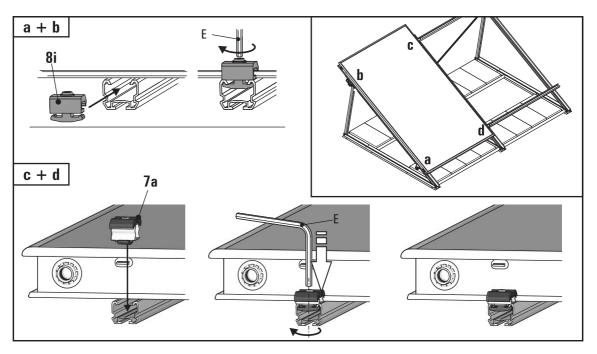


Fig. 3-19 Screw flat solar panel with individual single clamping blocks (8i) on the mounting profile rails and insert double clamping blocks (7a).

3.4.4 Installing another flat solar panels



DANGER!

If the clamping blocks are incorrectly positioned and installed (hammer bolt not clicked in place in the mounting rail), the fixing of the solar panel array on the supporting structure cannot be guaranteed under unfavourable weather conditions. This may cause personal injury.

- Visual checking of the correct installation of the clamping blocks is imperative.
- In particular, you should check the double clamping blocks (point 1.) because these are fixed at the joint
 position of two mounting rails.



CAUTION!

If the retaining clips do not clip in place audibly, the DAIKIN Solar system can develop leaks and thus restrict the operational safety.

Reasons for the retaining clamps not engaging:

- Flat solar panels not completely pushed together.
- Absorber position moved (push the absorber into the connections on the opposite side in the correct position, wearing protective gloves).



CAUTION!

If the connections on the flat solar panel (FIX-VBP) are not fitted with extreme caution, the seal ring can get damaged. This causes leaks in the system.

- Always fit the expansion joints (7c) to the flat solar panels with extreme caution.
- Bring the next flat solar panel in alignment with the connection pipes of the previous flat solar panel when pushing together.



p=0

CAUTION!

In the Drain-Back system, as opposed to the pressurised system, the flat solar panels need to be installed rotated through 180°, since otherwise partial snow covering of the flat solar panel and if there is a danger of frost, the solar system cannot operate efficiently and frost damage may occur.

- Install flat solar panels rotated through 180° in the Drain-Back system, as depicted on the covering film.
- Always fit the solar panel temperature sensor at the bottom in one of the two side installation openings in the Drain-Back system.
- The different mounting position for the solar panel temperature sensor is only supported above version 4.2 on the R3 controller.

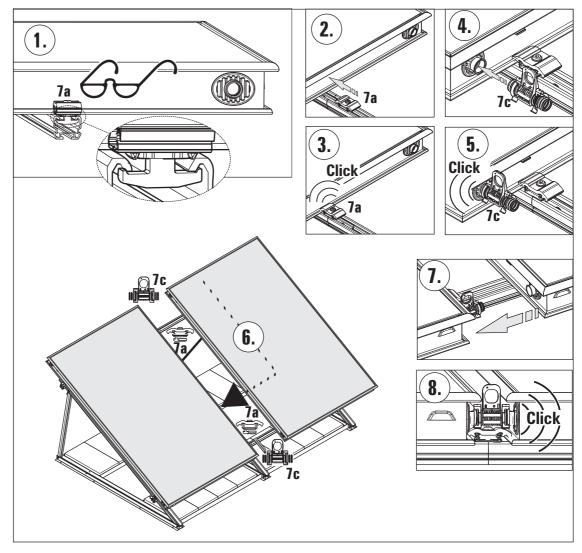


Fig. 3-20 Install double clamping blocks (7a) and expansion joints (7c). Installing flat solar panel In case of big solar panel fields, install additional solar panels in same procedure.

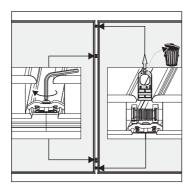


Fig. 3-21 Tighten double clamping blocks between the flat solar panels and detach assembly supports from the expansion joints.

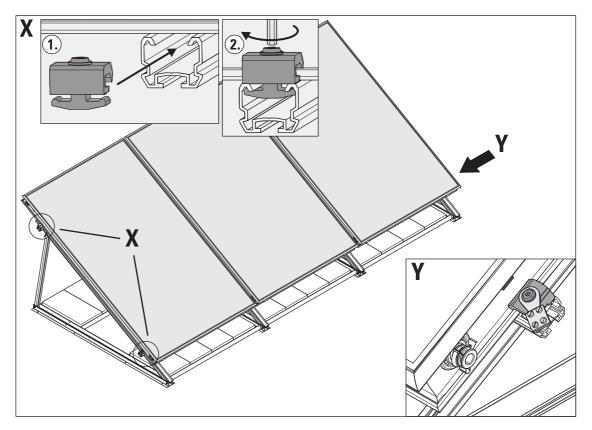


Fig. 3-22 Insert the individual clamping blocks for the last flat solar panel and tighten down. Mount the clamping block with potential balancing terminal close to the return flow connection.

3.4.5 Hydraulic connection of the flat solar panel (non-pressurised system) p=0



CAUTION!

Siphon action may never be allowed to occur anywhere in the pipe run between storage tank and the flat solar panel. This could lead to functional faults and even material damage. In the case of longer horizontal pipe runs with only a minimum gradient, it is possible for water pockets to

develop due to thermal expansion of the plastic pipes between the mounting points with siphon action:

- Always make sure that pipe runs have a continuous gradient of at least 2%.
- Fix the pipes in the **optional support troughs TS** (see page 12) or run them along a rigid auxiliary structure (e.g. profile rail, pipe etc.).
- DAIKIN recommends always using the support trough kits (TS) for extended horizontal pipe sections.

If the connecting pipe of CON 15 or CON 20 is not long enough for the distance between the hot water storage tank and solar panel array, it can be lengthened, whereby the number of solar panels must be taken into account.

Pipe extension kits CON X 25 (2.5 m), CON X 50 (5 m), and CON X 100 (10 m) are available.

Take account of the instructions concerning lengths of pipe in tab. 3-2.

Instructions on pipe installation

- Run the connecting pipe with a continuous gradient between the flat solar panels and the storage tank.
- Connect the solar panel array alternately, and align it so that the bottom return flow coupling is located at the lowest point of the solar panel array (see section 3.2).



The differences between the connection points and dimensions of the inflow connection pipe (at the top of the flat solar panel / VA 15 Solar) and the return flow connection pipe (at the bottom of the flat solar panel / VA 18 Solar) make it impossible to confuse one pipe for the other.

 However, you must ensure that the inflow and return flow pipes on the flat solar panel are labelled as heat generators.



This instruction manual only describes the pipe laying for alternate end connection with two roof breakthroughs.

In principle there is a possibility of having an alternative connection with a single roof transit.

In this case, you should always make sure that the flow line is installed along the frame at the necessary
gradient in order then to lay this also at the side of the return flow line through the roof transit.

Connect the connecting lines

- 1. Lay the connection pipes up to the roof penetration and fix in position (e.g. with clamps).
- 2. Carefully cut the thermal roof insulation below the roof penetration, so that the return flow pipe (VA 18 Solar) can be pulled out.



CAUTION!

Leaking vapour barriers can lead to building damage.

Reseal the vapour barrier from the inside at the penetration points of the connecting pipes and cable.



CAUTION!

If plastic pipes are damaged, there is a risk that they will break.

- When cutting through the thermal insulation, never damage the surface of the VA Solar system connecting pipes.
- Lay the connecting pipes along the flat solar panels up to the solar panel connection and cut off the thermal insulation on the connecting pipes at the solar panel connection.

The transit can be carried out directly at the individual flow or return connection on the flat solar panel or underneath the solar panel array.

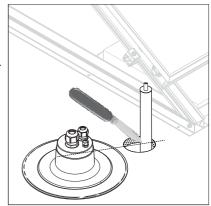
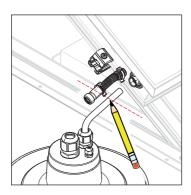


Fig. 3-23 Transit of connection pipe directly on the solar panel connection



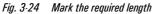




Fig. 3-25 Shortening the connections

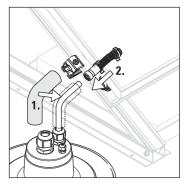


Fig. 3-26 Place the connection fitting on the connections

- 4. Mark required length of the flow (at the top on the flat solar panel / VA 15 Solar) and return flow pipe (at the bottom on the flat solar panel / VA 18 Solar) (fig. 3-24).
- 5. Cut the inflow pipe (at the top of the flat solar panel / VA 15 Solar) and the return flow pipe (at the bottom of the flat solar panel / VA 15 Solar) at the marked positions (fig. 3-25).
- 6. Push the compressed thermal insulation sleeve (HT Armaflex) over the fitting (step 1 in fig. 3-26).
- 7. Push the push fittings of the solar panel connection elbows onto feed (at the top of the solar panel / VA 15 Solar) or return flow connection pipe (at the bottom on the flat solar panel / VA 18 Solar) (step 2 in fig. 3-26).
- Insert the flat solar panel connection elbows into the flat solar panel connecting pipes, until the retaining clamps click in place (fig. 3-27).
- Insert the end plugs into the open solar panel connection pipes until the retaining clamps click in place (fig. 3-28).

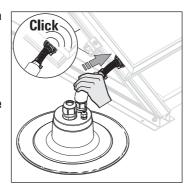


Fig. 3-27 Inserting the flat solar panel connecting elbows in the flat solar connecting pipes



Fig. 3-28 Insert the end plugs



In order to protect the VA Solar system connecting pipes from excess temperatures, the flow and return fittings are equipped with thermal separation.

3.4.6 Hydraulic connection of a flat solar panel (pressurized system) [-+]





WARNING!

Danger of burns from hot solar panel couplings and hot solar panel frame.

- Do not remove the cover of the solar panel until hydraulic connection work has been completed.
- Do not touch hot parts.
- Wear protective gloves.



CAUTION!

Danger of scalding if incorrect connection pipes are used.

- Use only connecting lines made of pressure-resistant metal pipes (CON XP16 / CON XP20 or Cu Ø 22 mm) between the Solar system solar panel and plate heat exchanger.
- The use plastic piping is not allowed.

Instructions on pipe installation

The connection fittings included in the EKSRCP connection kit have compression ring joints for copper piping Ø 22 mm. We therefore recommend, as the connecting lines between the Solar system solar panel and the hot water storage tank, using the DAIKIN CON XP16 / CON XP20.

Connect the connecting lines

- 1. Lay connection pipes between the flat solar panels and the location of the hot water storage tank.
 - Connect the Solar system solar panels on alternate sides and align so that the return flow connection is at the lowest point of the Solar system solar panel (see section 3.2). The feed pipe should preferentially be connected at the opposite end at the top of the solar panel.
 - In the process, thermally insulate the connection pipes indoors.



Install connection fittings

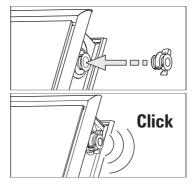


Fig. 3-30 Insert the end plugs

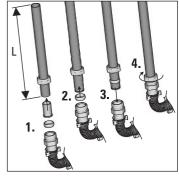


Fig. 3-31 Connect the connection lines with connection fittings

- 2. Install connection fittings (fig. 3-29).
- 3. Outdoors cover the connection pipes with UV resistant thermal insulation tubing.
- 4. Insert the end plugs into the open solar panel connection pipes until the retaining clamps click in place (fig. 3-30).



Leaking vapour barriers can lead to building damage.

- Reseal the vapour barrier from the inside at the penetration points of the connecting pipes and cable.
- 5. Connect the connection pipe with the compression ring joints of the connection fittings (fig. 3-31).

3.4.7 Install equipotential bonding terminal



WARNING!

The equipotential bonding terminal is not a substitute for a lightning rod. It is merely intended to protect the solar panel temperature sensor. Local lightning strike regulations must be observed.

1. Release the slotted screws on the equipotential bonding terminal.

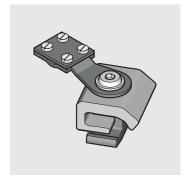


Fig. 3-32 Work step 1

- 2. Connect the equipotential bonding cable (not included in delivery).
- 3. Tighten the screws of the equipotential bonding terminal.
- 4. Lay the equipotential bonding cable to the equipotential bonding rail, fix with cable ties and connect to the equipotential bonding rail.

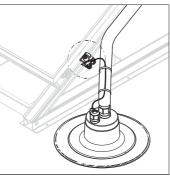


Fig. 3-33 Work step 2 - p=0

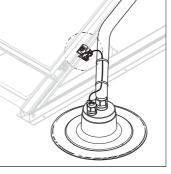
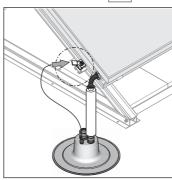


Fig. 3-34 Work step 3 - p=0



Work step 2 - ++ Fig. 3-35

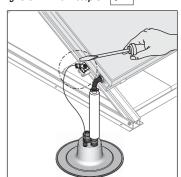


Fig. 3-36 Work step 3 - +p



If two or more collector rows are installed, they must be connected by means of an equipotential bonding. Equipotential terminals are:

- P=0 contained in the package CON RVP and
- +< in the package CON LCP.

3.4.8 Installing solar panel temperature sensor



CAUTION!

Plastic connection pipes will not conduct voltages induced by electrical storms. Under adverse circumstances, these voltages can extend through the solar panel sensor up to the control and thus damage both.

Carry out equipotential bonding ("Earthing") between foundation earth connection and solar panel array.

This should only be performed by an authorised specialist (electrician) in accordance with the local regulations.



The installation openings for the solar panel temperature sensor are located on the left and right on the side solar panel frame and are closed off with plugs in the as-delivered condition.

In the Drain-Back system, as opposed to the pressurised system, the flat solar panels are installed rotated through 180°. This produces the following mounting positions for the solar panel temperature sensor:

- p=0 at the bottom edge of solar panel \triangle
- $rac{3}{3}$ at the top edge of solar panel

The different mounting position for the solar panel temperature sensor is only supported above version 4.2 on the R3 controller.

 Fit the solar panel temperature sensor in the flat solar panel at the position where the feed pipe is connected.

The mounting openings for the solar panel temperature sensor are located to the left and right at the top of the side solar panel frame, approx. 10cm below the upper connection. The mounting openings are fitted with plugs in the as-delivered condition. Fit the solar panel temperature sensor in the flat solar panel at the position where the feed pipe is connected.

- 1. Remove the sensor plugs (fig. 3-40).
- Push solar panel temperature sensor up to the stop in the flat solar panel (fig. 3-40). The sensor must be clamped to the absorber plate.
- 3. Run the silicone-covered sensor cable to the roof penetration box (with drip-off elbow), and secure it to the inflow connection line (fig. 3-41).



CAUTION!

Moisture can damage the temperature sensor.

 When securing the cable, make sure that no rainwater can run down the cable to the sensor well (installing with drip-off elbow see fig. 3-41).

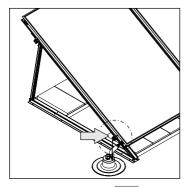


Fig. 3-37 Work step 1 - p=0



Fig. 3-38 Work step 2 - p=0

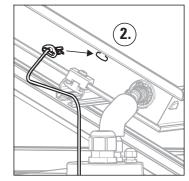


Fig. 3-39 Work step 3 - p=0

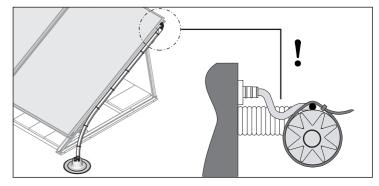


Fig. 3-40 Work step 1/2 - +p

Fig. 3-41 Work step 3 - ++-

- 4. Inside the roof, connect the silicone cable of the solar panel temperature sensor to the input cable of the solar panel temperature sensor of the regulating and pump unit (p=0) EKSRPS3 or p=0 EKSR3PA).
 - → The assembly and installation of the DAIKIN Solar system installation is complete when all steps have been completed.



Fig. 3-42 Assembled and installed solar panel installation

3.5 Removing the flat solar panel



WARNING!

Live parts can cause an electric shock on contact and cause life-threatening burns and injuries.

- Before beginning removal work, disconnect all components that are electrically linked to the solar system (heat generator, solar control, etc.) from the power supply (switch off fuse, main switch) and secure against unintentional restart.
- Comply with the relevant safety at work regulations.



WARNING!

Danger of burns from hot solar panel couplings and hot solar panel frame.

- Do not touch hot parts.
- · Wear protective gloves.

Solar panel dismantling is carried out basically in the reverse sequence to the solar panel assembly.

If the flat solar panels are to be separated, the connection elbows or expansion joints must first be released as follows:

- Press the retaining clamps out of the engagement positions and pull off (fig. 3-43 and fig. 3-44).
- 2. Pull off the connection elbows (fig. 3-44).

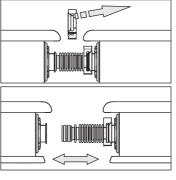


Fig. 3-43 Work step 1

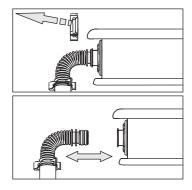


Fig. 3-44 Work step 2

4 Start-up and taking out of service

4.1 Start-up

Instructions for hydraulic system incorporation, commissioning, operation of the controller, and fault an malfunction rectification are included in the installation and maintenance instructions of the regulating and pump unit (p=0 EKSRPS3 or p=0 EKSRPS3 or

4.2 Decommissioning

4.2.1 Temporary shutdown



CAUTION!

A heating system which is shut down can freeze in the event of frost and may suffer damage.

• Drain the heating system that is shut down if there is danger of frost.

If solar heating support is not required for water heating for an extended period, the DAIKIN Solar system can switched off temporarily at the mains switch of the DAIKIN Solar system R3 control system.

If there is a danger of frost:

- DAIKIN Solar system start the solar system in operation
- suitable antifreeze measures must be applied to the connected heating system and hot water storage tank (e.g. draining).



If there is a danger of frost for only a few days, the unit's excellent heat insulation ensures that the ROTEX Sanicube does not have to be drained, provided that the storage tank temperature is monitored regularly and does not fall below DAIKIN +3 °C. This does not, however, provide any protection against frost for the connected heat distribution system!

Draining the storage tank

- Switch off the main switch and secure against restarting.
- p=0
 - Use the hose connection to connect a hose to the solar return flow with the boiler filling and draining valve.
 - Drain the tank's water content.
- [*+p_*]:
 - Follow the instructions on shutdown provided in the operating and installation instructions EKSR3PA + EKSRDS1A.

4.2.2 Final shutdown

- Decommissioning a Solar system (see section 4.2).
- Solar system disconnected from all electrical and water connections.
- Dismantle the Solar system in accordance with the instruction manual (chapter 3 "Installation") in reverse order.
- Solar system disposed off in a professional manner.

Recommendations for disposal

The DAIKIN Solar system has an environmentally friendly design. During the disposal process, the only waste created is that which can be used for material or thermal recycling.

The materials used that are suitable for recycling can be sorted into individual types.



DAIKIN has complied with the standards for environmentally-friendly disposal as a result of the environmentally-friendly design of the DAIKIN Solar system. Proper disposal in compliance with the respective national regulations of the country of use is the responsibility of the user/owner.

5.1 Wind loads

5.1.1 Information about wind loads

When installing the solar panel, the European regulations of technology must be observed.

In particular, for flat roof installation, the regulations concerning the harmonised standard EN 1991: Effects on Supporting Structures.

In Germany, DIN 1055 is the most important standard for load supporting on structures and, in the construction industry, it is the most recognised technological regulation. DIN 1055 provides precise stipulations how you must determine loads for various different buildings and locations. Requirement of wind and snow loads can thus be determined to the specific local requirements.



The specialist technician is obligated to observe and maintain the applicable standards in the installation of solar panels with supporting structures.

The DAIKIN Solar system fixing system corresponds to the requirements of DIN 1055 or EN 1991.

5.1.2 Effects of wind on the structures

The wind load on the flat roof frame depends on the individual erection site. Wind acts in a suction or pressure on the solar panels and the supporting structure. The wind load depends mainly on the wind zone, the consistency of the landscape and the height of buildings.

Wind load zone Subdivision into areas

	_	Wind speed at							
Wind zone	Area	Building height 10 m	Building height 18 m	Building height 25 m					
1	Inland	102 km/h	116 km/h	125 km/h					
2	Inland	116 km/h	129 km/h	137 km/h					
	Coast	133 km/h	144 km/h	151 km/h					
3	Inland	129 km/h	140 km/h	151 km/h					
	Coast	148 km/h	158 km/h	164 km/h					
4	Inland	140 km/h	154 km/h	164 km/h					
Í	Coast	161 km/h	170 km/h	179 km/h					

Tab. 5-1 Wind zone sub-division

The design must take account of the wind loads in accordance with the country-specific regulations and guidelines. The minimum distances to the edge of the roof must also be maintained, because in corners (A) and on edges (B) of rooves considerably higher wind loads arise. The minimum distance of 1 m must be maintained.

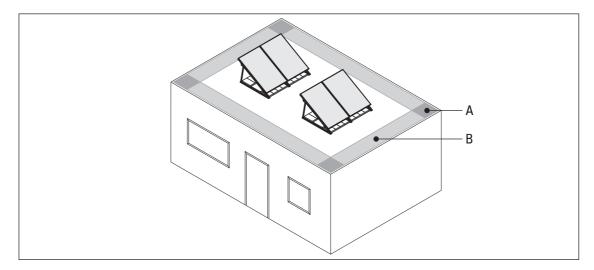


Fig. 5-1 Minimum distances to corner and edge areas

5.1.3 Selection of fixing type

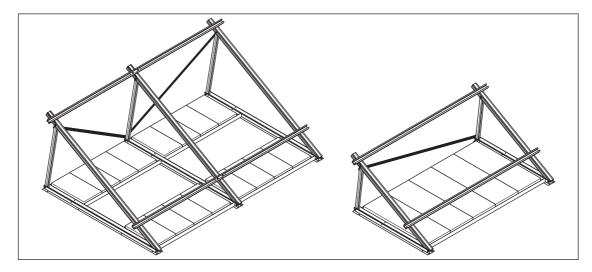
DAIKIN solar panels must be secured against wind load when installing on flat rooves. The DAIKIN flat solar panel frame can be installed free-standing (e.g. on concrete panels) or on a fixed support structure.



DAIKIN has designed for securing by concrete blocks. In free-standing installations, you need to secure the solar panel frame from sliding, tipping and lifting using additional weights.

Free-standing installation with weighing-down weights

Free-standing installation with weighing down weights prevents tipping, sliding or lifting of the structure. To do this, in accordance with tab. 5-2, insert and position the corresponding number of concrete blocks in the retainers provided.



Secure the free-standing roof structure with weighing -down weights Fig. 5-2

Mounting the frame on the support structure

Installation can also be made using a separate support structure using an adequate bolted connection system. The bolted connections to the support structure must be immediately next to the force application points on the basic rails.



The responsibility for dimensioning and execution of the bolted connections is exclusively with the installation company.

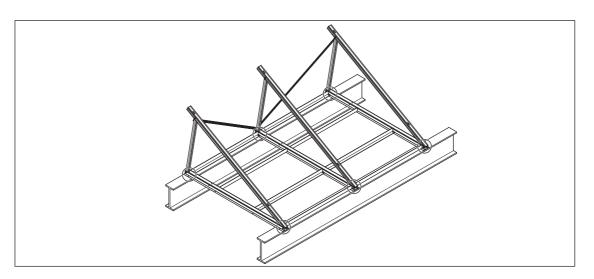


Fig. 5-3 Free-standing flat roof structure secured with weighing down weights

5.1.4 Required anchorage weights and concrete slab thicknesses for approved wind load zones (in accordance with DIN 1055-4: 2005-03)

The details given in this instruction manual concerning stability and resilience of the design with regard to wind speeds which may arise are based on the static calculations of the frame in accordance with DIN 1055. With correct installation and compliance with all relevant points in this instruction manual, the ROTEX flat roof frames are designed for wind loads up to DAIKIN 1.3 kN/m². This corresponds to a wind speed of 164 km/h.

In tab. 5-1 you can read off the wind speeds in the corresponding wind zones and building heights.

- Always test the load capacity of the roof.
- If the location differs from the specified wind protection zone and the building height is above 25 m, check the anchorage of
 the trestle, in addition, verifications are necessary in individual cases if applicable

DAIKIN

High-performance flat solar panel EKSV26P

Working angle in			Wind load zone (mainland)	ne (mainland)			Wind load zone (Coast + Baltic Islands)	ad zone Itic Islands)
			2	2		3	3	
	Weight in kg/solar panel	J/solar panel	Weight in kg/solar panel	/solar panel	Weight in kę	Weight in kg/solar panel	Weight in kg/solar panel	/solar panel
	front	back	front	back	front	back	front	back
			Height of the i	Height of the installation location via in situ site up to 10 m	tion via in-situ s	ite up to 10 m		
	65	170	80	200	100	265	130	350
	40	170	45	200	09	265	75	350
	10	170	10	200	10	265	10	350
	15	170	15	200	25	265	30	350
	06	225	110	270	145	360	190	470
		Hei	Height of the installation location via in-situ site between 10 and 18	lation location vi	ia in·situ site be	tween 10 and 18	8 m	
	80	215	100	265	120	315	150	400
	50	215	09	265	70	315	06	400
	10	215	10	265	10	315	10	400
	20	215	25	265	25	315	35	400
	120	290	145	360	175	425	220	540
		Hei	Height of the installation location via in situ site between 18 and 25 m	lation location vi	ia in·situ site be	tween 18 and 2!	5 m	
	92	250	115	300	140	365	165	435
	55	250	65	300	80	365	92	435
	10	250	10	300	10	365	10	435
	20	250	25	300	30	365	35	435
	135	340	165	405	200	490	235	280

Tab. 5-2 Details of weights depending on the wind load zone and height of installation location

High-performance flat solar panel EKSH26P

Wind load zone (Coast + Baltic Islands)	က	Weight in kg/solar panel		520	450	380	330	310	8 m	595	515	435	375	355	.5 m	640	260	470	410	385
	က	Weight in kg/solar panel	ion via in-situ site up to 10 m	395	345	290	255	235	a in-situ site between 10 and 1	470	410	345	300	280	a in-situ site between 18 and 2	545	475	300	345	325
Wind load zone (mainland)	2	Weight in kg/solar panel	Height of the installation location via in situ site up to 10 m	300	260	220	190	175	Height of the installation location via in situ site between 10 and 18 m	395	345	290	255	235	Height of the installation location via in situ site between 18 and 25 m	445	385	325	285	265
	-	Weight in kg/solar panel		250	215	180	160	150	Heig	320	280	235	205	195	Heig	370	325	270	235	225
Working angle in	degree			30	40	20	55	09		30	40	20	55	09		30	40	20	55	09

Tab. 5-3 Details of weights depending on the wind load zone and height of installation location

5.2 Snow loads

5.2.1 Information concerning snow loads

Snow represents an additional weight on the solar panels. The snow load also depends on the erection location. When planning a solar installation, you must also bear in mind the snow load that arises. The design must take account of the snow loads in accordance with the country-specific regulations and guidelines.

5.2.2 Instructions concerning snow load zones

The statistical safety of the roof construction must be guaranteed, especially with elevated snow loading.

Snow load	Snow load zone	Maximum permissible altitude for flat solar panel installation
< 0.65 kN/m²	1	1100 m
CO.OS KIVIIII	1a	1075 m
< 0.85 kN/m²	2	800 m
~ 0.05 kW/III	2a	700 m
< 1.10 kN/m²	3	600 m

Tab. 5-4 Max. permissible snow loads for flat solar panels for flat roof installation

For structural locations outside the permissible deployment limits, individual static calculations are required.

5.3 Shading

In order to prevent undesirable shading of the solar panels the installation of multiple solar panel arrays one after the other must be undertaken at a specific separation distance (z).

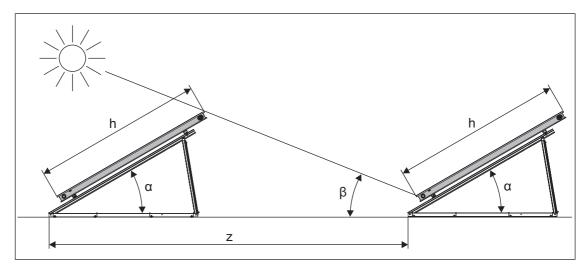


Fig. 5-4 Schematic drawing concerning shading and shading angles

Calculating the shading angle

 β = Angle of sun location (shading angle)

With $\beta = 90^{\circ} - 23.5^{\circ}$ ((constant) – latitude (latitude of the site location)), calculate the pitch of the rows of solar panels.

Enter the shading angle b, the solar panel inclination angle a and the height of the solar panel h into the following equation:

$$\frac{z}{h} = \frac{\sin(180^{\circ} - (\alpha + \beta))}{\sin \beta}$$

h = Solar panel height

a = Solar panel inclination angle

 β = Angle of sun location (shading angle),

z = Solar panel array separation

Height of solar panel h for EKSV26P = 2000 mm Height of solar panel h for EKSH26P = 1300 mm

Sensor position solar panel 5.4

After installation and positioning the solar panel you need to check whether the shading and possible snow gathering on the solar panel has an influence on the measurement made by the solar panel temperature sensor.



CAUTION!

If part of the solar panel (at the height of the return flow) is covered by snow or ice for an extended period, frost damage may arise on the DAIKIN Drain-Back solar system.



- Check the frost protection parameters on the solar regulator and adapt if necessary.
- For parameter settings see the instructions in the control and pump unit EKSRPS3.



In the Drain-Back system, as opposed to the pressurised system, the flat solar panels are installed rotated through 180°.

This produces the following mounting positions for the solar panel temperature sensor:

- p=0 at the bottom edge of solar panel 🗥
- at the top edge of solar panel

6.1 Basic data

Flat solar panel	EKSV26P	EKSH26P				
Basic data						
Dimensions L x W x H	2000 x 1300 x 85 cm	1300 x 2000 x 85 mm				
Gross surface area	2.60	D m ²				
Aperture surface area	2.33	ō m ²				
Absorber surface area	2.30	6 m ²				
Absorber	1	elded-on highly selective coated aluminium eet.				
Coating	MIRO-THERM (absorption max. 9	06%, emission approx. 5% ± 2%)				
Glazing	Single pane safety glass,	Transmission approx. 92%				
Heat insulation	Rock woo	ol (50 mm)				
Weight	42 kg					
Water content	1.71	2.1				
Max. pressure drop at 100 l/h	3.0 mbar.	0.5 mbar.				
Permissible roof gradient (flat roof mounting)	15° to 80°					
Max. standstill temperature	approx.	200°C				
Max. operating pressure	6	bar				
	is stable for a long period and is protected above 525 kWh/m² per year with 40% cloud					

Tab. 6-1 Technical Data Flat Solar Panel

6.2 Weights

Flat roof trestle	For EKSV26P	For EKSH26P
Basic weight flat roof frame FB	33.2 kg	25.4 kg
Basic weight flat roof frame FE	12.4 kg	13 kg

Tab. 6-2 Weight details flat frame variants

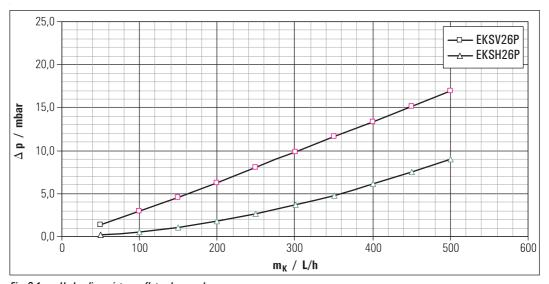


Fig. 6-1 Hydraulic resistance flat solar panels

7 List of keywords

A	
Anchoring weights	43
Angle adjustment	22
Assembly profile connector	9, 27
В	
Basic triangle	25
Brief description	8
C	
Components	
D .	
Danger of frost	40
Decommissioning	
Design	
Dimensions of solar panel array	
Double clamping block	
E	-, -
Electronic control	8
End plugs	-
Equipotential bonding	
Equipotential bonding terminal	
Expansion joint	,
Explanation of symbols	
F [']	
Flat roof basic pack	15
Flat roof extension pack	
Flat roof installation	
Flow line	
Н	,
••	
High performance flat solar panels	
High performance flat solar panels Hydraulic connection (non-pressurised system)	em) 33
Hydraulic connection (non-pressurised syste	
Hydraulic connection (non-pressurised system) Hydraulic connection (pressurised system)	36
Hydraulic connection (non-pressurised system) Hydraulic connection (pressurised system) Hydraulic resistance	
Hydraulic connection (non-pressurised system) Hydraulic connection (pressurised system) Hydraulic resistance Permissible snow load zones	
Hydraulic connection (non-pressurised system) Hydraulic connection (pressurised system) Hydraulic resistance Permissible snow load zones Product description	
Hydraulic connection (non-pressurised system) Hydraulic connection (pressurised system) Hydraulic resistance Permissible snow load zones Product description Technical data	
Hydraulic connection (non-pressurised system) Hydraulic connection (pressurised system) Hydraulic resistance Permissible snow load zones Product description Technical data Hot water storage tanks	
Hydraulic connection (non-pressurised system) Hydraulic connection (pressurised system) Hydraulic resistance Permissible snow load zones Product description Technical data Hot water storage tanks Shutdown	
Hydraulic connection (non-pressurised system) Hydraulic connection (pressurised system) Hydraulic resistance Permissible snow load zones Product description Technical data Hot water storage tanks	
Hydraulic connection (non-pressurised system) Hydraulic connection (pressurised system) Hydraulic resistance Permissible snow load zones Product description Technical data Hot water storage tanks Shutdown Hydraulic system connection	
Hydraulic connection (non-pressurised system) Hydraulic connection (pressurised system) Hydraulic resistance Permissible snow load zones Product description Technical data Hot water storage tanks Shutdown Hydraulic system connection	
Hydraulic connection (non-pressurised system) Hydraulic connection (pressurised system) Hydraulic resistance Permissible snow load zones Product description Technical data Hot water storage tanks Shutdown Hydraulic system connection Installation 1. flat solar panel	
Hydraulic connection (non-pressurised system) Hydraulic connection (pressurised system) Hydraulic resistance Permissible snow load zones Product description Technical data Hot water storage tanks Shutdown Hydraulic system connection	
Hydraulic connection (non-pressurised system) Hydraulic connection (pressurised system) Hydraulic resistance Permissible snow load zones Product description Technical data Hot water storage tanks Shutdown Hydraulic system connection I Installation 1. flat solar panel Additional flat solar panels	
Hydraulic connection (non-pressurised system) Hydraulic connection (pressurised system) Hydraulic resistance Permissible snow load zones Product description Technical data Hot water storage tanks Shutdown Hydraulic system connection 1. flat solar panel Additional flat solar panels Connection pipes	
Hydraulic connection (non-pressurised system) Hydraulic connection (pressurised system) Hydraulic resistance Permissible snow load zones Product description Technical data Hot water storage tanks Shutdown Hydraulic system connection 1. flat solar panel Additional flat solar panels Connection pipes Equipotential bonding	
Hydraulic connection (non-pressurised system) Hydraulic connection (pressurised system) Hydraulic resistance Permissible snow load zones Product description Technical data Hot water storage tanks Shutdown Hydraulic system connection 1. flat solar panel Additional flat solar panels Connection pipes Equipotential bonding Flat roof	
Hydraulic connection (non-pressurised system) Hydraulic connection (pressurised system) Hydraulic resistance Permissible snow load zones Product description Technical data Hot water storage tanks Shutdown Hydraulic system connection Installation 1. flat solar panel Additional flat solar panels Connection pipes Equipotential bonding Flat roof Solar panel temperature sensor	
Hydraulic connection (non-pressurised system) Hydraulic resistance Permissible snow load zones Product description Technical data Hot water storage tanks Shutdown Hydraulic system connection 1. flat solar panel Additional flat solar panels Connection pipes Equipotential bonding Flat roof Solar panel temperature sensor M Main dimensions in flat roof installation	
Hydraulic connection (non-pressurised system) Hydraulic connection (pressurised system) Hydraulic resistance Permissible snow load zones Product description Technical data Hot water storage tanks Shutdown Hydraulic system connection Installation 1. flat solar panel Additional flat solar panels Connection pipes Equipotential bonding Flat roof Solar panel temperature sensor	
Hydraulic connection (non-pressurised system) Hydraulic resistance Permissible snow load zones Product description Technical data Hot water storage tanks Shutdown Hydraulic system connection I flat solar panel Additional flat solar panels Connection pipes Equipotential bonding Flat roof Solar panel temperature sensor M Main dimensions in flat roof installation Mounting profile rail	
Hydraulic connection (non-pressurised system) Hydraulic resistance Permissible snow load zones Product description Technical data Hot water storage tanks Shutdown Hydraulic system connection I flat solar panel Additional flat solar panels Connection pipes Equipotential bonding Flat roof Solar panel temperature sensor M Main dimensions in flat roof installation Mounting profile rail O Operating mode	
Hydraulic connection (non-pressurised system) Hydraulic resistance Permissible snow load zones Product description Technical data Hot water storage tanks Shutdown Hydraulic system connection I flat solar panel Additional flat solar panels Connection pipes Equipotential bonding Flat roof Solar panel temperature sensor M Main dimensions in flat roof installation Mounting profile rail	
Hydraulic connection (non-pressurised system) Hydraulic resistance Permissible snow load zones Product description Technical data Hot water storage tanks Shutdown Hydraulic system connection 1. flat solar panel Additional flat solar panels Connection pipes Equipotential bonding Flat roof Solar panel temperature sensor M Main dimensions in flat roof installation Mounting profile rail O Operating mode Operating safety	

R	
Return line3	4
Roof penetration	4
Roof space	4
Roof supporting structure2	3
S	
Scope of delivery1	7
Sensor position solar panel	7
Shading4	
Shading angle	7
Shutdown4	O
Final	0
Temporary	
Single terminal block	
Snow load zones4	6
Solar panel array separation	7
Solar panel connection pack	
Solar panel mounting kits	
Both systems	8
Pressurised system	
Unpressurised system (Drain-Back)	
Solar panel securing clip	8
Solar panel temperature sensor	
Solar system fluid1	4
Start-up	0
Storage1	
Support rail	3
Support trough kit	
System components	
Non-pressurised and pressurised system	8
Non-pressurised system1	O
Pressurised system	2
System concepts	8
T .	
Technical data4	8
Telescopic rail	
Tool	
Transport	
U	,
Use as intended	5
W	J
	^
Weighing down weights4	2

Wind zone sub-division41



