

# **Installation manual**

Solar panels on-roof installation

Installation manual Solar panels on-roof installation

English

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# 1 Safety

# 1.1 Observing Instructions

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. Please read this manual carefully and thoroughly before proceeding with the installation and initial start-up or modification of the 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-to-water heat pumps EKHWP\*.

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 can lead to 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 especially to on-roof mounting of the solar panel area. For other types of installation (in-roof, flat 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)



FPT 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.

#### **Avoid danger** 1.3

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. Responsibility for any resulting damage will be borne by the user/owner alone.

Proper use also includes observing the relevant maintenance and servicing conditions. Replacement parts must at least satisfy the technical requirements defined by the manufacturer. This is the case, for example, with genuine 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 start-up) may only be carried out by authorised and trained heating technicians.
- Switch off the mains supply before starting any work on the heating system and secure it against unintentional switch-on.

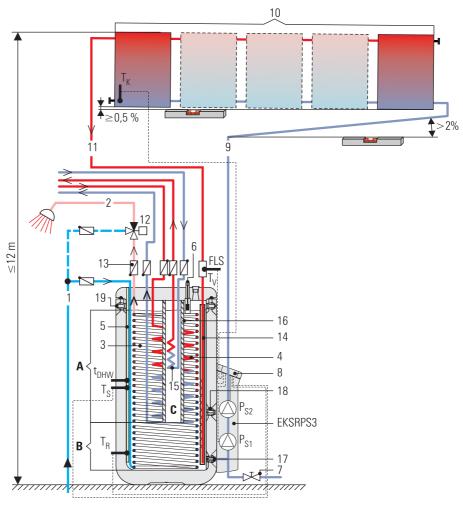
### **Electrical installation**

- 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 plate 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.

### Instructing the user/owner

- 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/owner 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
- 4 Corrugated stainless steel pipe for heat exchanger to heat generator (storage tank charging)
- 5 Well for storage cylinder temperature sensor + return flow temperature sensor
- 6 Fill level display
- 7 Filling and draining cock
- 8 Solar system R3 Controller
- 9 Solar return flow pipe (at the bottom of the collector / VA 18
- 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<sub>DHW</sub> Heat generators Storage temperature sensor

- T<sub>R</sub> Solar system Return flow temperature sensor
- T<sub>S</sub> Solar system Storage tank temperature sensor
- T<sub>K</sub> Solar system Solar panel temperature sensor
- T<sub>V</sub> Solar system Inflow temperature sensor

#### EKSRPS3

Regulating and pump unit

- FLS Solar system FlowSensor (flow measurement) or Solar system FlowGuard (flow setting)
- P<sub>S1</sub> Solar system Operational pump
- P<sub>S2</sub> 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 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 factory.

# 2.3 System components for all systems p=0 p=0

# High performance flat solar panels

- H x W x T: 2000 x 1006 x 85 mm, weight: approx. 35 kg  $\mathbf{EKSV26P}$
- 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

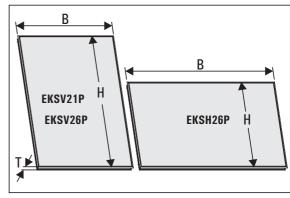


Fig. 2-2 Flat solar panel

# Solar panel mounting rails FIX-MP FIX-MP100

- for a EKSV21P flat solar panel FIX-MP130
- for a EKSV26P flat solar panel FIX-MP200
- for a EKSH26P flat solar panel

# Consists of:

- 2x mounting profile rail
- 2x solar panel securing hooks

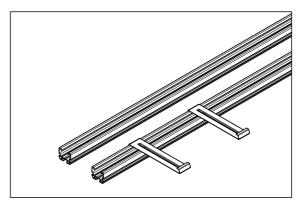


Fig. 2-3 FIX-MP

# Solar panel connectionSolar system FIX-VBP

# Consists of:

- 2x double clamping blocks for solar panel fixing
- 2x mounting profile connector
- 2x expansion joints for solar panel connection with mounting support

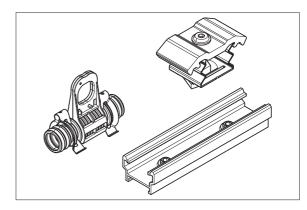


Fig. 2-4 FIX-VBP

# Kit for installing a flat solar panel on a roof FIX-AD

### Consists of:

- 4x roof ties
- 8x woodscrews (Ø 8 x 60 mm)

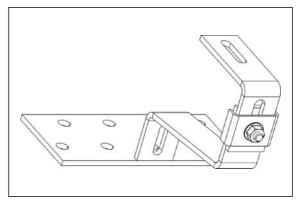


Fig. 2-5 FIX-AD

# FIX-ADP

# Consists of:

- 4x roof ties (double height adjustment)
- 8x woodscrews (Ø 8 x 60 mm)

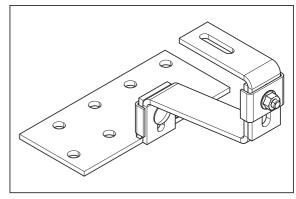


Fig. 2-6 FIX-ADP

# FIX-ADS

# Consists of:

- 4x roof ties for flat roofing (e. g. slate)

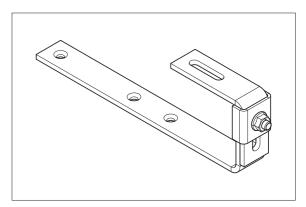


Fig. 2-7 FIX-ADS

# FIX-WD

### Consists of:

- 4x hanger bolt for corrugated roofing

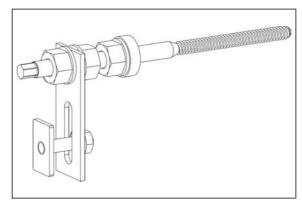


Fig. 2-8 FIX-WD

# FIX-BD

### Consists of:

- 4x holders for welted sheet metal roofing

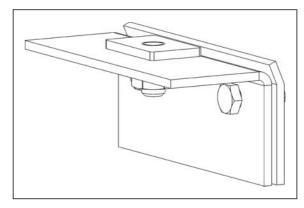


Fig. 2-9 FIX-BD

# 2.4 System components for the unpressurised system p=0

# Solar panel serial connector CON -RVP

For connecting two rows of solar panels one above the other.

#### Consists of

- 4x individual clamping block
- 2x equipotential bonding terminal
- 2x end cap
- 2x solar panel connection elbow
- 1 m thermally insulated AI-PEX compound pipe

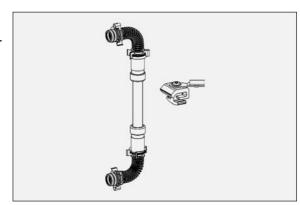


Fig. 2-10 CON -RVP

Roof transition package on-roof, EKSRCAP (anthracite) and EKSRCRP (tile red)

**EKSRCAP, EKSRCRP** 

### Consists of:

- Roof penetration on-roof mounting in anthracite or tile red,
- 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),
- Connecting fittings (including release tool)
- Solar panel temperature sensor

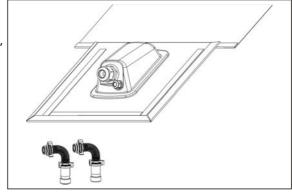


Fig. 2-11 EKSRCAP, EKSRCRP

# 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).

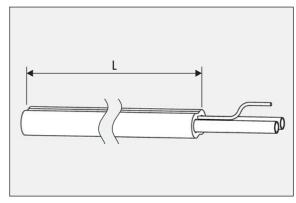


Fig. 2-12 CON 15 / CON 20

# 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.

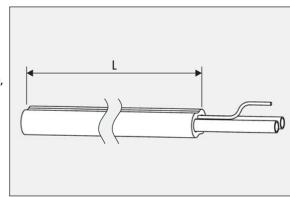


Fig. 2-13 CON X (optional)

# 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.

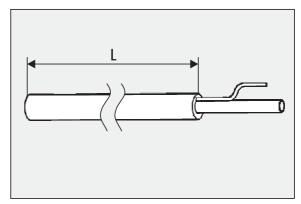


Fig. 2-14 CON XV (optional)

# Support trough kit for connecting pipes CON 15 and CON 20

**TS**, L=1.30 m

Support troughs for supporting the connection pipes CON 15 and CON 20 (avoids pooling of water).

### Consists of:

5x support troughs

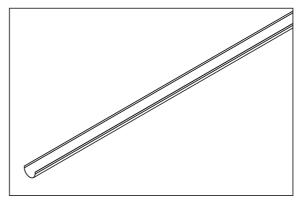


Fig. 2-15 TS (optional)

# 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)

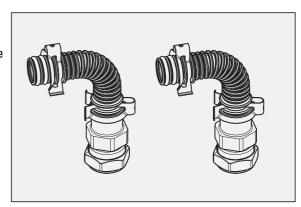


Fig. 2-16 EKSRCP

# Solar panel serial connector

# **CON LCP**

For connecting two rows of solar panels one above the other. Consists of:

- 4x individual clamping block
- 2x equipotential bonding terminal
- 2x end cap
- 2x solar panel connection elbow with compression ring fittings to connect a connecting pipe (Cu Ø 22 mm)

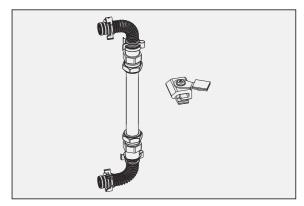


Fig. 2-17 CON LCP

# 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  $25\ m.$ 

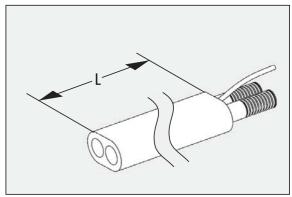


Fig. 2-18 CON 15P16 / CON 15P20

# 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

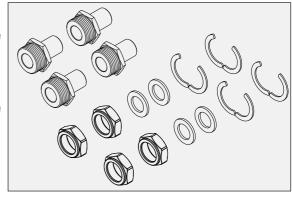


Fig. 2-19 CON CP16 / CON CP20 (optional)

# 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

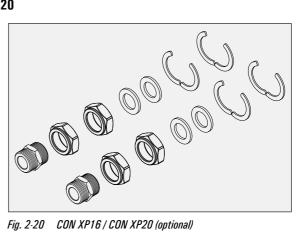


Fig. 2-20 CON XP16 / CON XP20 (optional)

# Solar system fluid

20 Litres of ready-mix with frost protection up to -28 °C.

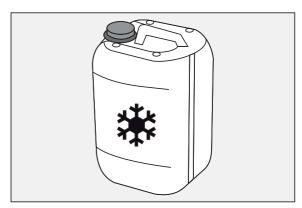


Fig. 2-21

# 3.1 Transport and storage

# 3.1.1 Scope of delivery

- The unpressurised DAIKIN Solar system 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 installation instructions for the Solar panels on-roof installation of the flat solar panels is included with the roof breakthrough package.



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 supplied packed 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 Solar panels on-roof installation of the flat solar panels, the roof surface must be inclined at an angle of  $15^{\circ}$  to  $80^{\circ}$ .

The flat solar panels EKSV26P and EKSH26P can be installed on flat roofs. Further information can be found in the installation instructions for the DAIKIN Solar system flat roof framework.

The flat solar panels EKSV21P and EKSV26P can be integrated into the roof surface. Further information can be taken from the DAIKIN Solar system in-roof installation instructions.

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 systems (p=0 + p=0).

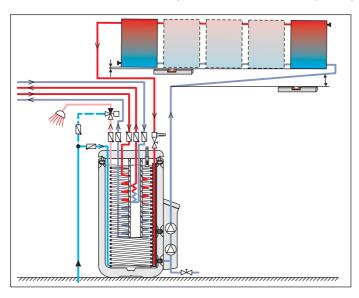


Fig. 3-1 Alternately connected Solar system solar panel with hot water storage tank EKHWP\* (shown in the drain-back system p=0 ).

# 3.3 Laying connection pipes

# Installation instructions concerning differences between unpressurised and pressurized system

Non-pressurised system (Drain Back) p=0	Pressurised system [>+p]
	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). Using plastic piping is not allowed.

Fig. 3-2 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 "Product description",
  page 13) between the planned installation site and 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. 3-1).

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. 3-1 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  $18 \times 1$  mm.

- If vertical copper pipes are already installed in the house, they can be used if a continuous connection pipe gradient can be guaranteed.
- 2. If a uniform gradient from the second roof penetration to all pipe sections can not 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 cylinder 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). Plastic pipes must not be used.

For the roof breakthrough DAIKIN recommends routing the connecting pipes through a ventilation tile to the inside of the roof.

# 3.4 Mounting 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.
- Ensure that, during installation, the bottom edges of the assembled flat solar panels are above the Solar system flow connection on the storage tank.

Unless specified otherwise, the installation steps quoted for tiled roofs are the same for other roof coverings.

# 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 must 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 in Solar panels on-roof installation

Measuring point		Number of collectors:		2	3	4	5	
	Туре	Dim.		Dim	ensions ir	mm		
	EKSV21P		1038	2076	3114	4152	5190	
Solar panel array width (length mounting profile rail)	EKSV26P	b	1332	2664	3996	5328	6660	
	EKSH26P		2032	4064	6096	8128	10160	
Distance from roof penetration box		H <sub>0</sub>	300 to 700					
	EKSV21P		2000					
Height of solar panel array	EKSV26P	$H_1$		2000				
	EKSH26P			1300				
Distance from lower collector edge to lower mounting rail		Y <sub>0</sub>			200			
	EKSV21P			1400 to 1600				
Spacing of the mounting rails	EKSV26P	Y <sub>1</sub>	1400 to 1600					
	EKSH26P		800 to 1000					
Distance from lower collector edge to lower edge of the perforated plate of roof mounting bracket		Υ <sub>2</sub>	235 to 270					
Maximum distance solar panel edge — first on-roof roof hooks		X <sub>0</sub>		400				
				400 to 800				
Spacing of the roof mounting brackets of a flat solar panel	EKSV26P	$X_1$	500 to 1100					
	EKSH26P			1	000 to 180	00		
Spacing of roof mounting brackets between two flat solar panels		X2	230 to 630					
Distance from solar panel edge — first solar panel securing hook		A <sub>0</sub>	120 to 220					
	EKSV21P			600 to 880				
Spacing of the roof mounting brackets of a flat solar panel	EKSV26P	$A_1$	900 to 1100					
			1600 to 1800		00			
Spacing of solar panel mounting brackets between two flat solar panels		A <sub>2</sub>	240 to 440					
Distance of edge of solar panel to hydraulic connection		E <sub>0</sub>		approx. 73				
Centre-to-centre distance of the solar panel couplings					1854			
		E <sub>1</sub>		1854				
					1154			
Distance from solar panel temperature sen- sor to:    P=0   bottom edge of solar panel		f	f 172					
		'	172					

Tab. 3-2 Main dimensions of the Solar system solar panel in Solar panels on-roof installation

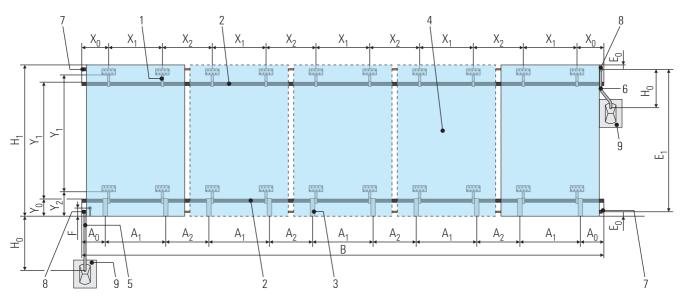
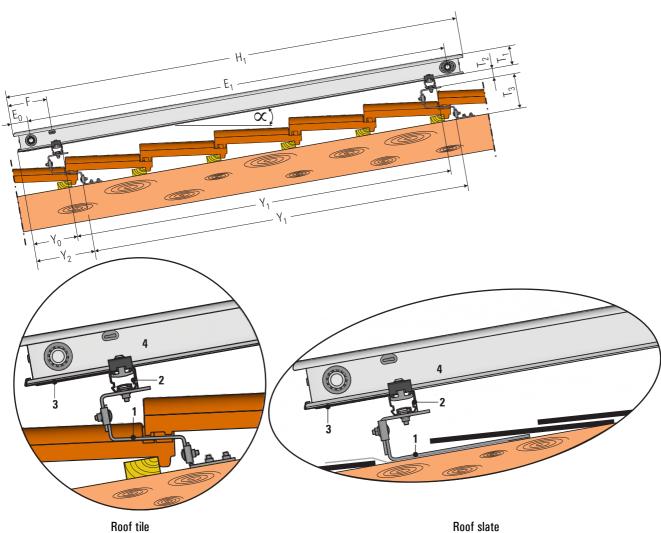


Fig. 3-3 Main dimensions of a Solar system solar panel in Solar panels on-roof installation (shown on the flat solar panel EKSV26P in the drain-back system)

<sup>-</sup> Key see fig. 3-4.

<sup>-</sup> Dimensions see tab. 3-2.

# Installation



- 1 Roof mounting bracket
- 2 Mounting rail
- 3 Collector securing hook
- 4 Flat solar panel EKSV26P
- 5 Return flow connection
- 6 Infeed connection

- 7 Solar panel isolating plug
- 8 Solar panel connection elbow
- Universal roof penetration boxes
- α Inclination angle (permissible from 15° to 80°)
- T1 Solar panel height = 85 mm
- **T2** Height of mounting profile rail = 37 mm
  - Height adjustment range of the on-roof securing hook:

FIX-ADP:

131 to 173 mm

FIX-ADS: 78 to 108 mm

Other dimensions see tab. 3-2

Fig. 3-4 Side-view of an on-roof flat solar collector (shown on a flat collector EKSV26P in the drain-back system)

# 3.4.2 Mounting the support structure



## DANGER!

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



#### WARNING!

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
  "Technical data"). Do not use roofing battens.
- On-roof hooks only with correspondingly appropriately dimensioned screw connections and always screw on the rafters.
- Also note the dimensions X<sub>0</sub>, X<sub>1</sub>, and X<sub>2</sub> given in tab. 3-2 for the rafter spacing if necessary, a suitable supporting structure will have to be provided.



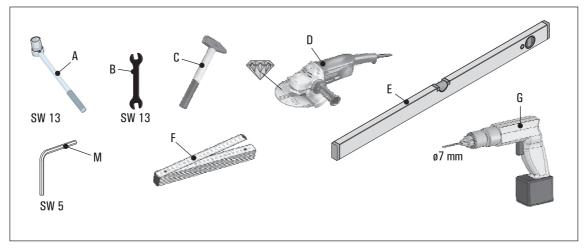
We offer the on-roof mounting packs for roof tiles, the roof fixing FIX-ADP, for slate roofs, the roof fixing FIX-ADS, for corrugated roof covering, the roof fixing FIX-WD and for folded roof covering, the roof fixing FIX-BD.



A defined roof area is required per flat solar panel.

- for the EKSV21P: 2.0 x 1.04 m<sup>2</sup>,
- for the EKSV26P:  $2.0 \times 1.33 \text{ m}^2$ ,
- and for the EKSH26P:  $1.30 \times 2.03 \text{ m}^2$ ,

The main dimensions of the Solar system solar panel (in accordance with fig. 3-3 and fig. 3-4) are summarized in tab. 3-2.



- A Hex socket and socket wrench SW 13
- B Open-ended spanner SW 13
- C Hammer
- D Cut-off grinder with diamond cutting wheel
- E Spirit level
- F Yard stick
- G Cordless drill with Ø 7 mm
- M Hex socket- (Allen Key-) socket wrench SW 5

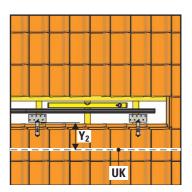
Fig. 3-5 Required tools

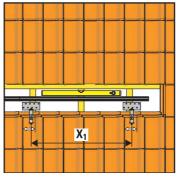


The short names are explained in the following figures for:

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

- 1. Measure the collector array and mark the installation location.
- 2. Remove the row of tiles above the intended lower edge of the flat solar panels.
- 3. Position the mounting rail horizontally centred on the rafters (for the entire width of the solar panel). If several mounting rails are required for an array, they must first be joined by means of the assembly profile connector and the pre-mounted studs from the FIX-VBP mounting kit.
- **4.** Determine the installation points for the on-roof mounting ties. The on-roof mounting ties should be distributed evenly under the mounting profile rail (fig. 3-6 and fig. 3-7).





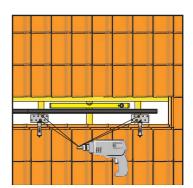


Fig. 3-6 Aligning the on-roof ties from the Fig. 3-7 planned lower edge of the solar panels at distance Y<sub>2</sub>

Fig. 3-7 Determining the mounting positions of the roof brackets

Fig. 3-8 Attach the roof brackets to the rafters with at least two screws

- 5. Position the perforated plate of the roof mounting bracket so that at least two screw holes are located over the rafter.
- 6. Place the mounting rail on the perforated plates, and align the mounting brackets parallel to the roof tiles or roof slates.
- 7. Roof tile:
  - Fix each on-roof hook (FIX-AD, FIX-ADP) to the rafters with at least two of the woodscrews provided (fig. 3-8), using a
    Ø 6 mm drill to produce a pilot hole.

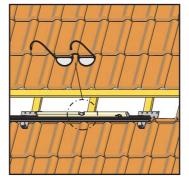
## Roof slate:

- Prepare a covering plate fig. 3-4 (taking care with adequate dimensioning).
- Fix the covering plate and on-roof ties (FIX-ADS) to the rafters with screws.
- The heads of the screws should be sealed off with a suitable silicon compound to prevent the ingress of water.



The mounting brackets may neither press on the roof tiles below, nor raise the roof tiles above.

- 8. If several mounting rails are being used:
  - Release a stud on the assembly profile connector (do not remove) and separate the assembly profile rails again.
- 9. Push the individual mounting rails into the pre-assembled slide blocks of the roof mounting bracket from the side.
- 10. If several mounting profile rails are used on the roof, these should be connected together and fixed in place using the studs.
- 11. Tighten the self-locking nuts with which the slide blocks have been attached to the roof mounting brackets. Take care to align the mounting rails parallel to the edges of the roof tiles (fig. 3-9 / fig. 3-10).



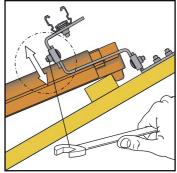


Fig. 3-9 Securely screw the profiles on the Fig. 3-10 on-roof tie top section

s. 3-10 Align the profiles parallel to the roof tile edge

Fig. 3-11 Height adjustment of the mounting bracket

- 12. Adjust the height of the mounting profile rail (fig. 3-11 to fig. 3-12).
  - With connections on both sides (always recommended), align the mounting profile rail with a slight gradient to the return flow connection (water feed to the lower solar panel connection). A negative gradient should be avoided at all costs.
  - With same-side connection (up to max. 3 solar panels) the mounting profile rail must be aligned exactly horizontally. However, we recommend always placing the connection on opposite sides (Ensuring automatic solar panel venting or draining the flat solar panel when the pump is at a standstill).

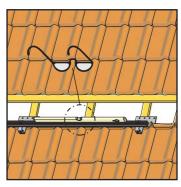


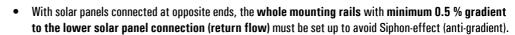
Fig. 3-12 After connection, align the profiles horizontally or with a slight gradient



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.



- 13. Replace the row of roof tiles.
- 14. Mark the transition points of the roof ties on the roof tiles (fig. 3-13).
- **15.** Knock out the lower tile webs at the marked transition points for the mounting brackets, or remove them with the tile cutter (fig. 3-14).

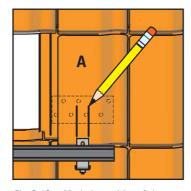


Fig. 3-13 Mark the position of the on-roof tie

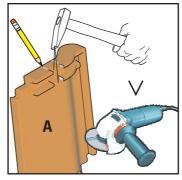


Fig. 3-14 Mark the transition points of the roof ties on the roof tiles and remove the tile webs

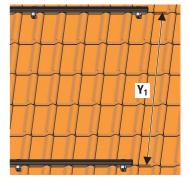


Fig. 3-15 Mounting the upper rails (see tab. 3-2 for dimension)

**16.** Install the upper mounting profile rail at a distance of Y<sub>1</sub> from the lower mounting profile rail (fig. 3-15) (mounting sequence the same as the lower mounting profile rail). Make sure that the upper mounting profile rail forms a flat parallel area for supporting the flat solar panels in connection with the lower mounting profile rail and the height adjustment.



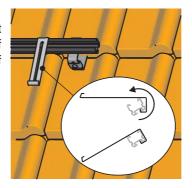
#### **CAUTION!**

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).
- Align both mounting profile rails exactly flat and parallel to each other. If needed, the mounting rails inserted
  in suitable way.

# 3.4.3 1. Installing flat solar panel

 Fit solar panel securing ties vertical to the solar panel support surface, at the distance specified for the type of solar panel into the guiding groove of the lower mounting profile and tilt downwards. After they have been hooked on, the solar panel securing clips can be moved sideways (see fig. 3-16 and fig. 3-17).



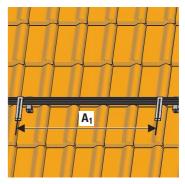
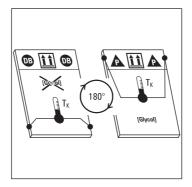
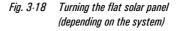


Fig. 3-16 Inserting the solar panel securing clips

Fig. 3-17 Positioning the solar panel securing clips

- 2. Lift the flat solar panel onto the roof area using a crane. If no crane is available, the solar panel can be hoisted onto the roof with a rope, using a ladder leaning against the roof edge. Depending on the installation requirements, unpack the solar panel before or after the transport to the roof and remove the collection pipe protective plugs.
- Turn the flat solar panel into the individual mounting position in accordance with the planned installation system, as depicted on the covering film (fig. 3-18).
- Position the flat solar panel above the mounting rails as shown in fig. 3-19, and carefully lower it into the securing hooks.





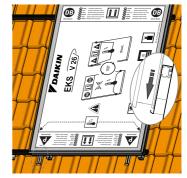


Fig. 3-19 Lowering and aligning the flat solar panel



# CAUTION!

p=0

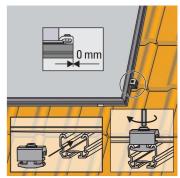
In the Drain-Back system, as opposed to the pressurised system, the flat solar panels need to be installed rotated through 180°, since otherwise partial snow covering of the flat solar panel and if there is a danger of frost, the solar system cannot operate efficiently and frost damage may occur.

- 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 of the solar panel temperature sensor is only supported from version 4.2 on the R3 control system.



The flat solar panel must be lifted onto the roof in the correct orientation for mounting (prevents faults during connection or difficult manoeuvring operations). The top side of the solar panel is marked on the protective cover of the solar panel glazing. The plugs for the solar panel temperature sensor and the round solar panel connection seals must at the top when aligning the flat solar panel.

- 5. Move the flat solar panel sideways until the left-hand outer ends of the two mounting rails project approx. 25 mm beyond the solar panel's edge (fig. 3-20). Slide the individual clamping block sideways into the mounting profile rail (flush to the end) and screw down tightly using an Allen key (fig. 3-20).
- **6.** Slide the individual clamping block onto the mounting rail and tighten using an Allen key.



3

Fig. 3-20 Check correct mounting position, slide the individual clamping block into the mounting profile and screw down tightly



# **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 mounting profile rails exactly flat against the marking line and parallel to each other. If needed, the mounting rails inserted in suitable way.
- Slide the single mounting block with equipotential bonding terminal at the position;
  - a) fthe return flow connection into the mounting profile and secure with the hex socket wrench (fig. 3-21).
  - b) p=0 of the inflow connection into the mounting profile and secure with the hex socket wrench (fig. 3-22).

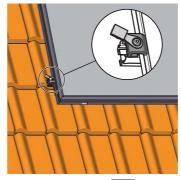


Fig. 3-21 Work step 6a - +++-

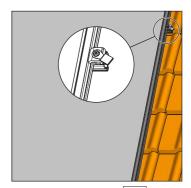


Fig. 3-22 Work step 6b - p=0

# 3.4.4 Installing additional flat solar panels



### **CAUTION!**

If the retaining clips do not clip in place audibly, the DAIKIN Solar system 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 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.



#### **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 of the solar panel temperature sensor is only supported from version 4.2 on the R3 control system.
- 1. Insert the double clamping blocks in the upper and lower mounting profile rail, push down with the Allen key placed on the bolt and turn it clockwise by approx. 45° (so that the bottom clamping profile moves to the clamping position) (fig. 3-23).
- 2. Check the position of the bottom clamping profile (fig. 3-24).
- 3. Slide the double clamping blocks onto the last mounted flat solar panel until the clamping profile clicks into place into the solar panel profile (fig. 3-25).

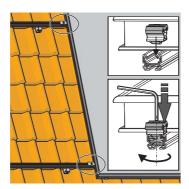


Fig. 3-23 Inserting double clamping block

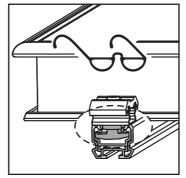


Fig. 3-24 Check the position of the bottom Fig. 3-25 clamping profile.

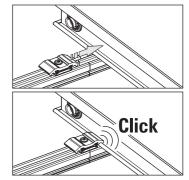


Fig. 3-25 Positioning of the double clamping hlock

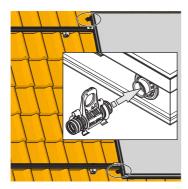


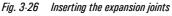
# CAUTION!

Careless handling can damage the components, resulting in difficulties during installation.

- Never crush or squash the expansion joints on the solar panel connections.
- · Check connection pipes of the flat solar panels for burrs and de-burr if necessary.

- **4.** Insert the expansion joints in the connection pipes of the last flat solar panel until the retaining clamps click in place (fig. 3-26 + fig. 3-27).
- **5.** Lift the next flat solar panel onto the mounting rails (see section 3.4.3, step 2), and lower into the securing clips at a distance from the expansion joints (fig. 3-28).





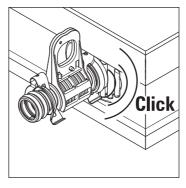


Fig. 3-27 Clicking the expansion joints in place

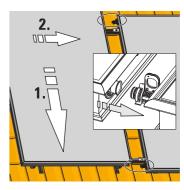


Fig. 3-28 Positioning the next flat solar panel

- **6.** Carefully slide the next flat solar panel up to the last mounted flat solar panel. Make sure that the expansion joints slide cleanly into the connection pipes of the flat solar panel.
- 7. Slide the next flat solar panel further up to the stop against the last mounted flat solar panel (fig. 3-29). You should be able to hear the retaining clamps click in place. The distance between the flat solar panels is determined automatically by the length of the expansion joints with mounting supports fitted.
- 8. Tighten down the double clamping blocks (fig. 3-30).
- 9. Pull off the assembly supports (fig. 3-30).
- 10. Insert the individual clamping blocks for the last flat solar panel and tighten down (fig. 3-31).

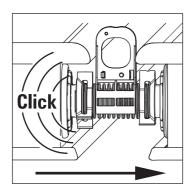


Fig. 3-29 Sliding the flat solar panels together

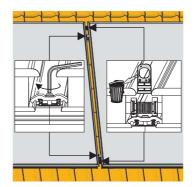
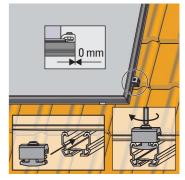


Fig. 3-30 Pulling off the assembly supports Fig. 3-31



3-31 Insert the individual clamping blocks for the last flat solar panel and tighten down

# 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. 3-1, page 17.

### Instructions on pipe installation

- Run the connecting pipe with a continuous gradient between the flat solar panels and the storage cylinder.
- 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 (installation concepts 3.2, page 16).



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 roof frame with the
necessary gradient in order then to lay this also at the side of the return flow line through the roof breakthrough.

# Connect the connecting lines

- 1. Remove three roof tiles at each intended roof penetration points for the connecting pipes (one or two tile rows below the lower collector edge).
- 2. Lay the connection pipes up to the roof penetration and fix in position (e.g. with clamps).
- 3. Carefully open the thermal roof insulation under the penetration point, so that the return flow pipe (VA 18 Solar) can be pulled out and laid to the collector with sufficient gradient to the roof penetration.



#### **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.

- Never damage the surface of the VA Solar system connecting pipes when cutting off the thermal insulation.
- 4. Run the connecting pipes through the roof at the points provided. To ensure uninterrupted thermal insulation (also within the roof structure), the insulation must be resealed at the penetration points (e.g. with adhesive tape).
- **5.** Cut the thermal insulating sleeves on the connecting pipes so that the connecting pipes can be passed through the individual roof breakthroughs (fig. 3-32).
- 6. Pull 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 18 Solar) through the M32 screw connection of the relevant roof breakthrough. Next, push the equipotential bonding cable and the solar panel temperature sensor cable through the respective M 16 glands from inside (fig. 3-33).
- 7. Cover the roof penetrations (fig. 3-34).
  - The roof tiles at the side and above must overlap the roof penetration.
  - The corrugated flashing must overlap the roof tile underneath and be shaped to match the roof tile.



# **CAUTION!**

With special roof coverings, such as roof tiles with very pronounced undulations (large differences in height), sealing problems can occur with the universal roof penetration box.

• In such cases, and also with plane tiles or slate roofing, a professional roofer should be consulted.

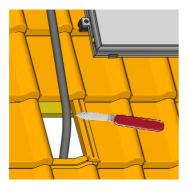


Fig. 3-32 Work step 5

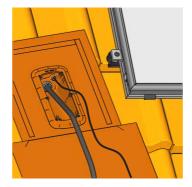


Fig. 3-33 Work step 6

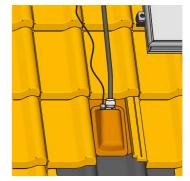


Fig. 3-34 Work step 7

- 8. Tighten the ring nuts of the M glands for the pipes and cables (see fig. 3-35).
- 9. Bend the connecting pipes as necessary, mark the required length (fig. 3-36), and cut off (fig. 3-37).

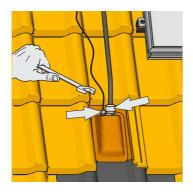




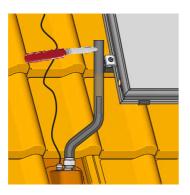


Fig. 3-35 Work step 8

Fig. 3-36 Work step 9- marking

Fig. 3-37 Work step 9- cutting off

- 10. De-burr the ends of the pipes (O-ring protection in push fitting).
- 11. Cut the enclosed UV resistant heat insulation pipes to the required length (fig. 3-38).
- 12. Slide the thermal insulation sleeves onto the VA Solar system connecting pipes and clinch (fig. 3-39).
- 13. Push the push fittings of the solar panel connection elbows onto feed (at the top of the flat solar panel / VA 15 Solar) or return flow connection pipe (at the bottom on the flat solar panel / VA 18 Solar) (fig. 3-40).





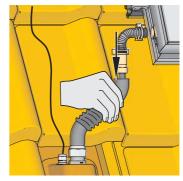


Fig. 3-38 Work step 11

Fig. 3-39 Work step 12

Fig. 3-40 Work step 13

- 14. Insert the solar panel connection elbows in the solar panel connection pipes until the retaining clamps click in place (fig. 3-41).
- 15. Slide the clinched thermal insulation hose over the fitting (fig. 3-42).
- 16. Insert the end plugs into the open solar panel connection pipes until the retaining clamps click in place (fig. 3-43).

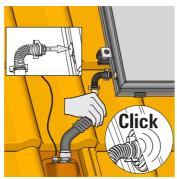






Fig. 3-42 Work step 15

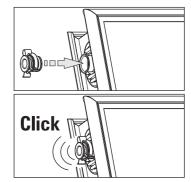


Fig. 3-43 Work step 16



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) [+e]



### 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.
- Using 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  $\emptyset$  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.

Commercially available ventilation tiles for roofing are suitable for the connection pipes penetrating the roof.

# 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 flat solar panel.
  - In the process, thermally insulate the connection pipes indoors.

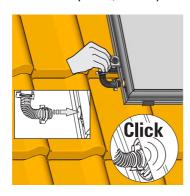


Fig. 3-44 Work step 2



Fig. 3-45 Work step 4

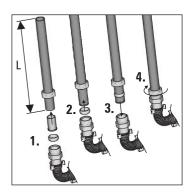


Fig. 3-46 Work step 5

- 2. Install connection fittings (fig. 3-44).
- 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. 3-45).



#### **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.
- **5.** Connect the connection pipe with the compression ring joints of the connection fittings (fig. 3-46).

# 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.

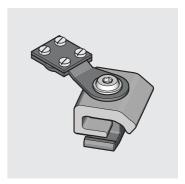


Fig. 3-47 Work step 1

- 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.

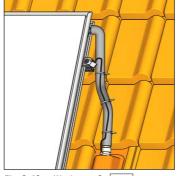


Fig. 3-48 Work step 2 - p=0

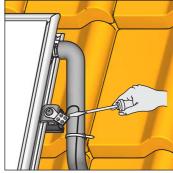


Fig. 3-49 Work step 3 - p=0

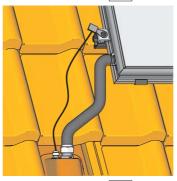


Fig. 3-50 Work step 2 - [+p]



Fig. 3-51 Work step 3 - ++-



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 left and right on the side solar panel frame and are blanked off with plugs in the as-delivered condition.

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

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

- p=0 Installation opening at the bottom edge of the solar panel A
- The Installation opening at the top edge of the solar panel

The different mounting position of the solar panel temperature sensor is only supported from version 4.2 on the R3 control system.

- 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.
- Push solar panel temperature sensor up to the stop in the flat solar panel. The sensor must be clamped to the absorber plate.



Fig. 3-52 Work step 1 - p=0



Fig. 3-54 Work step 1 - ++-



Fig. 3-53 Work step 2 - p=0



Fig. 3-55 Work step 2 - ++-

Run the silicone-covered sensor cable to the roof breakthrough (with drip-off elbow), and secure it to the mounting rail or connecting pipe by means of cable ties.

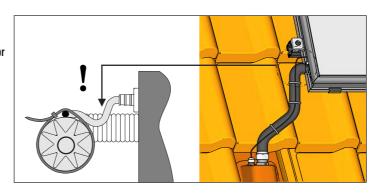


Fig. 3-56 Work step 3 (shown on the Drain-Back system P=0)



# **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. 3-57).
- **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).

# 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. 3-57 and fig. 3-58).
- Pull off the connection elbows (fig. 3-58).

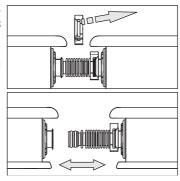


Fig. 3-57 Work step 1

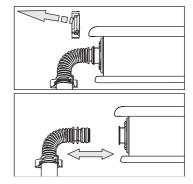


Fig. 3-58 Work step 2

# 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 Taking out of service

## 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 support is not required for hot water generation over an extended period, you can switch the DAIKIN Solar system off temprarily at the mains switch of the Solar system R3 controller.

If there is a danger of frost:

- the DAIKIN Solar system must be taken into operation again
- 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.
- \[ \big| +p\_\( \) :
  - Follow the instructions on shutdown provided in the operating and installation instructions EKSR3PA + EKSRDS1A.

## 4.2.2 Final shutdown

- Solar system taken out of service (see chapter 4.2.1 "Temporary shutdown"),
- 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 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 Basic data

Flat solar panel	V21P	V26P	H26P		
Basic data					
Dimensions L x W x H	2000 x 1006 x 85 cm	2000 x 1300 x 85 cm	1300 x 2000 x 85 cm		
Gross surface area	2.01 m <sup>2</sup>	2.60 m <sup>2</sup>	2.60 m <sup>2</sup>		
Aperture surface area	1.79 m <sup>2</sup>	2.35 m <sup>2</sup>	2.35 m <sup>2</sup>		
Absorber surface area	1.80 m <sup>2</sup>	2.36 m <sup>2</sup>	2.36 m <sup>2</sup>		
Absorber	Harp-shaped copper tube register with welded-on highly selective coated aluminium sheet				
Coating	MIRO-THERM (absorption max. 96 %, emission approx. 5 % $\pm$ 2 %)				
Glazing	Single pane safety glass, Transmission approx. 92 %				
Heat insulation	Rock wool (50 mm)				
Weight	35 kg	42 kg	42 kg		
Water content	1.31	1.7	2.11		
Max. pressure drop at 100 l/h	3.5 mbar 3.0 mbar		0.5 mbar		
Possible inclination angle on-roof	15° to 80°				
Max. standstill temperature	approx. 200°C				
Max. operating pressure	6 bar				
		od and is protected against the			

Minimum solar panel yield above 525 kWh/m<sup>2</sup> per year with 40 % cloud coverage (location Würzburg)

Tab. 5-1 Technical Data Flat Solar Panel

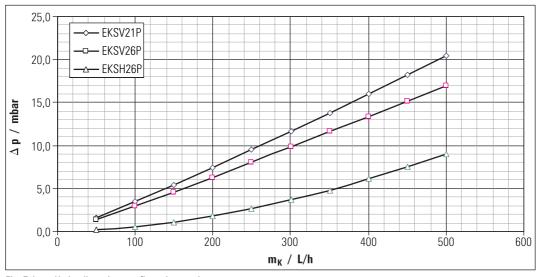


Fig. 5-1 Hydraulic resistance flat solar panels

# 5.2 Wind zones

# 5.2.1 Subdivision into areas

Wind zone Area		Wind speed at			
		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	
	Coast	161 km/h	170 km/h	179 km/h	

Tab. 5-2 Wind zone sub-division

# 5.2.2 Maximum permissible building heights

Location	Wind zone 1 and 2	Wind zone 3		Wind zone 4	
	Maximum permissible building heights for flat solar panel installation			llation	
Inland	25 m	25 m	25 m	18 m	25 m
Coast	25 m	10 m	25 m	_	10 m
Min. number of roof ties per flat solar panel	4	4	6	4	6

Tab. 5-3 Max. permissible building heights for flat solar panels for on-roof installation

# 5.3 Snow load zones

Snow load	Snow load zone	Maximum permissible altitude for flat solar pane installation		
< 0.65 kN/m²	1	448 m	507 m	
< U.OO KIN/III	1a	400 m	418 m	
< 0.0E LN/m²	2	not permissible	286 m	
< 0.85 kN/m²	2a	not per	missible	
< 1.10 kN/m² 3 not permissit		missible		
Min. number of roof ties per flat solar panel		4	6	

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

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