Installation instructions

Solar collectors in-roof mounting

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Solar collectors in-roof mounting

English

EKSV21P
EKSV26P

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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. 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* (pressurized system [+p]):

- Control and pump unit for solar systems (pressurized 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*(unpressurized system [p=0]):

- Control and pump unit for solar systems (unpressurized 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 in-roof installation of the solar panel area. For other types of installation (on-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.

 Only applicable for the unpressurised system (Drain Back)

 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 Avoid danger

The DAIKIN Solar system are built 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 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.

1.4 Intended use

The DAIKIN Solar system must only be used for hot water generation and for 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 original spare parts.

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.

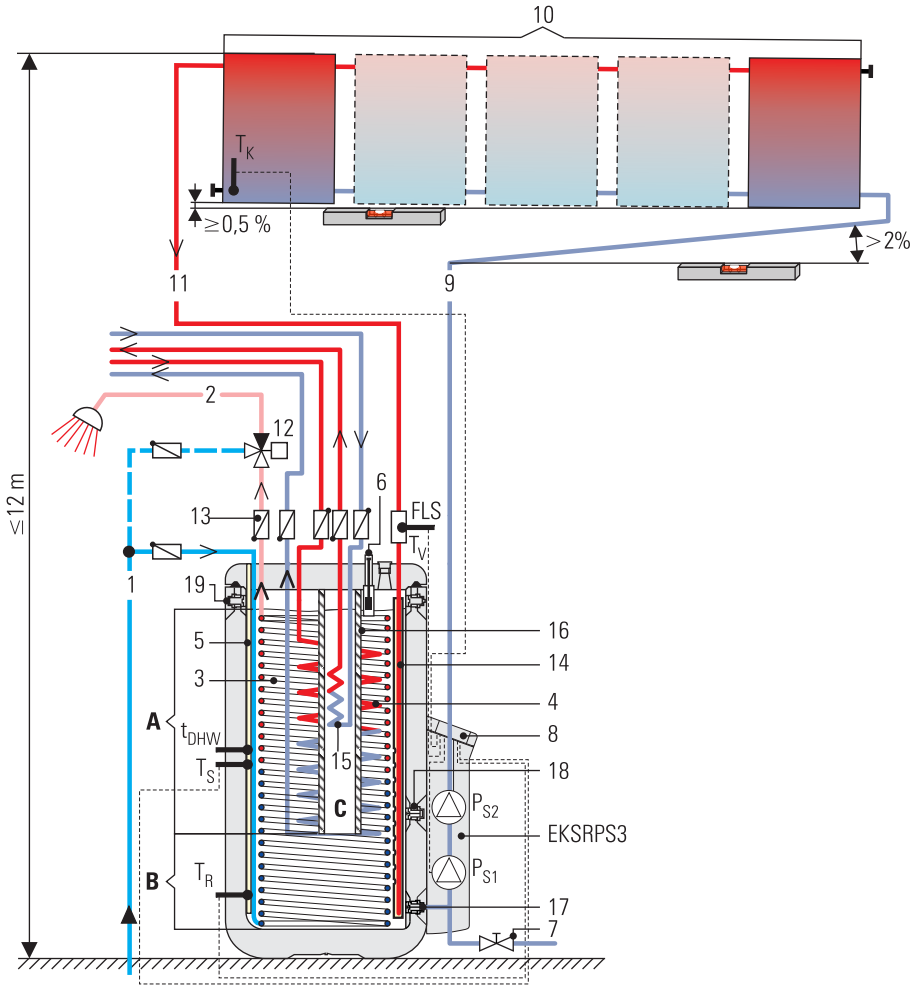
Electrical installation

- 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 constituents 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	*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 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	*Hot water zone*
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	*Regulation 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 structure of a Solar system (shown on the drain-back system p=0 *)*

2 Product description

2.2 Brief description

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

p=0 The depressurised 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).

+p The pressurised system must only be operated with the regulation and 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 the fulfilling of 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

In-roof basic mounting package

IBV21P

– for two EKSV21P flat solar panels

IBV26P

– for two EKSV26P flat solar panels

Consists of:

1a Upper left cover plate
1b Upper right cover plate
1c Upper cover strip
1d Left side part
1e Right side part
1f Plug-in strip
1g Lower left drainboard
1h Lower right drainboard
1i Lower left inspection safety screen
1k Lower left inspection safety screen
1m Holder for drainboard

X_1 Corner dimension, outer edges, lower inspection safety screens
X_2 Corner dimension, inner edges (face), lower inspection safety screens
X View of left outer edge
Y View of inner edges (face)
Z View of right outer edge

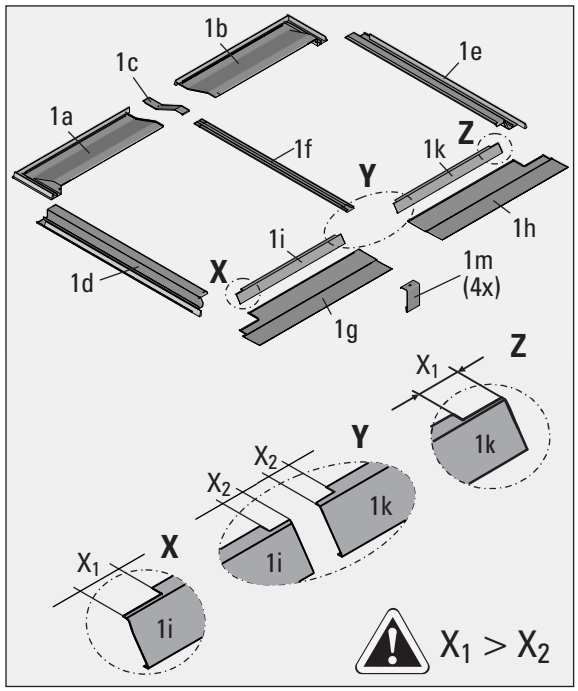


Fig. 2-2 IBV21P / IBV26P

In-roof extension package

IEV21P

– for each additional EKSV21P flat solar panel (3 to max. 5)

IEV26P

– for each additional EKSV26P flat solar panel (3 to max. 5)

Consists of:

2a Upper middle cover plate
2b Upper cover strip
2c Plug-in strip
2d Lower middle drainboard
2e Lower middle inspection safety screen
2f Holder for drainboard

X_2 *Corner dimension, inner edges (face), middle inspection safety screen (= inner edge of items 1i + 1k in fig. 2-2)*

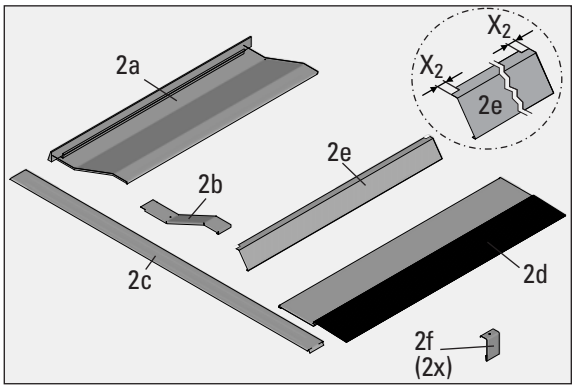


Fig. 2-3 IEV21P / IEV26P

High performance flat solar panels

EKSV21P

– H x W x T: 2000 x 1006 x 85 mm, weight: approx. 35 kg

EKSV26P

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

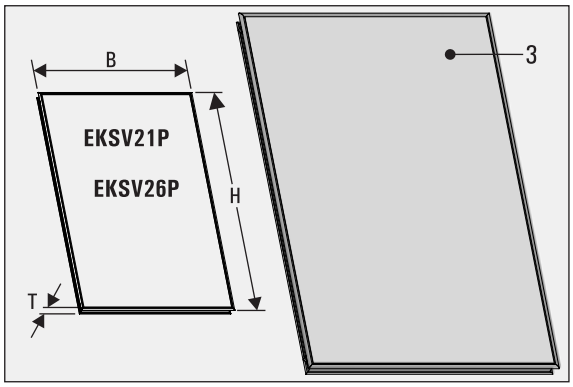


Fig. 2-4 Flat solar panel

Solar panel mounting rails FIX-MP

FIX-MP100

– for a EKSV21P flat solar panel

FIX-MP130

– for a EKSV26P flat solar panel

Consists of:

4a 2x Mounting rail
4b 2x Collector securing clip

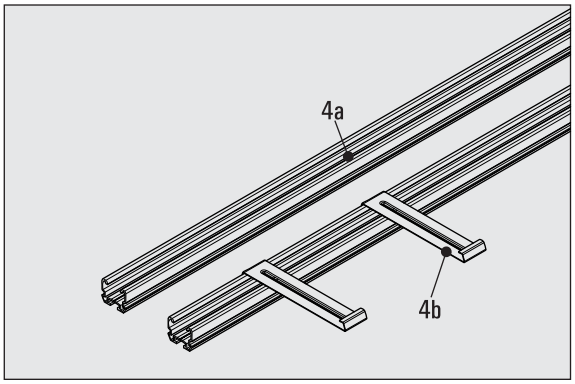


Fig. 2-5 FIX-MP

Solar panel connection Solar system

FIX-VBP

Consists of:

5a 2x Double clamping blocks for solar panel fixing
5b 2x Assembly profiler connector
5c 2x Expansion joints for solar panel connection with mounting support

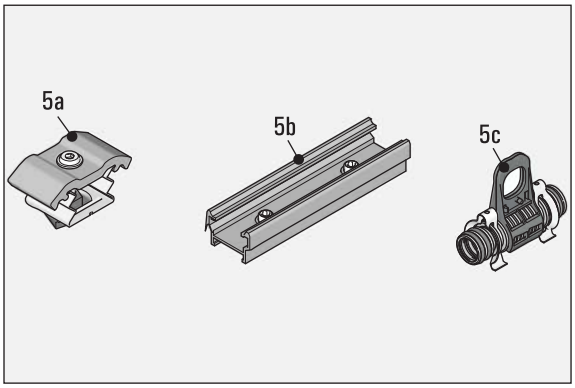


Fig. 2-6 FIX-VBP

Supplementary package for flat roofing

FIX-IES

Consists of:

– 30x lamination for flat roofing (e.g. Slate)

Per in-roof basic mounting package, 1 supplementary package is required.

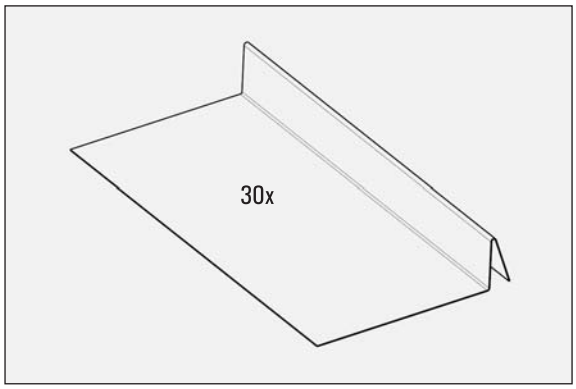


Fig. 2-7 FIX-IES

2.4 System components for the unpressurised system p=0

Solar panel serial connector Solar system

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 Al-PEX compound pipe

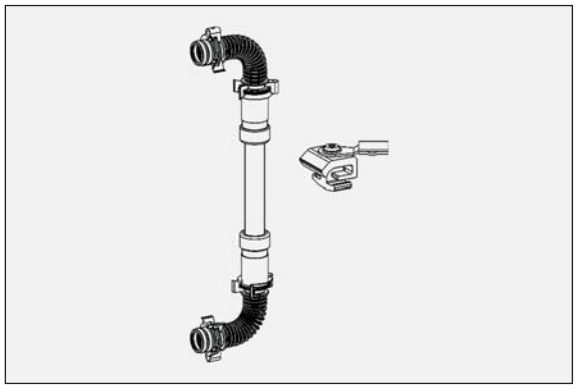
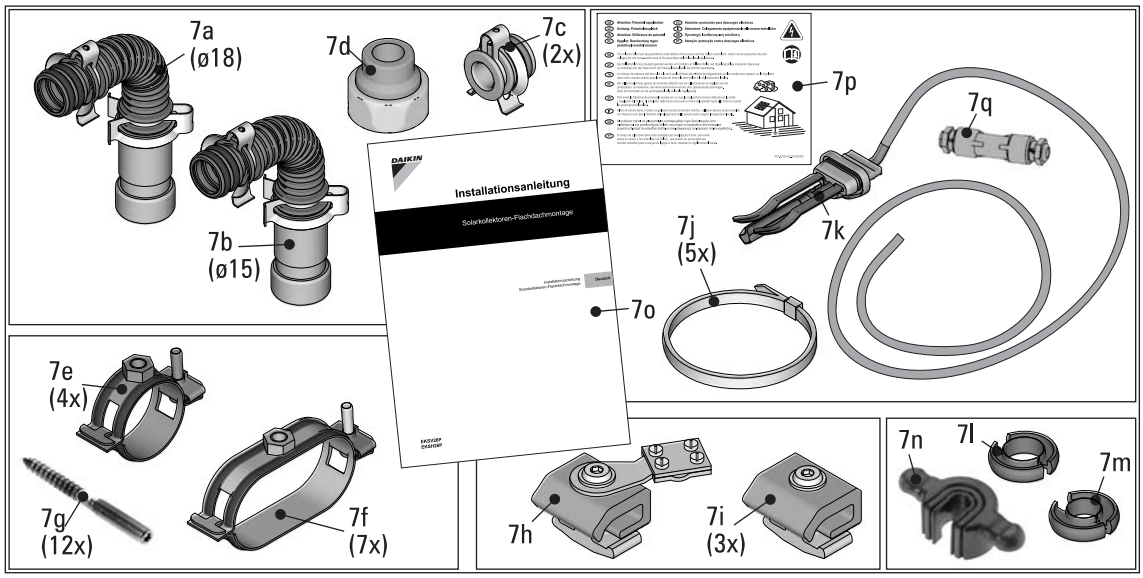


Fig. 2-8 CON-RVP

Solar panel connection set
EKSRCIP



Consists of:

7a Connection fitting
7b Connection fitting
7c End plug
7d Transition fitting
7e Casing clamp
7f Casing clamp
7g Stud bolt casing clamp
7h Single clip equipotential bonding terminal
7i Single clip
7j Cable tie
7k Solar panel temperature sensor
7l Application for detaching tool (Ø 18 mm)
7m Application for detaching tool (Ø 15 mm)
7n Handle for detaching tool
7o Installation instruction
7p Sheet
7q Cable connection console

Fig. 2-9 EKSRCIP

Connection pipes CON 15 and CON 20

CON 15 (**16 47 22**), L = 15 m
and
CON 20 (**16 47 16**), L = 20 m

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

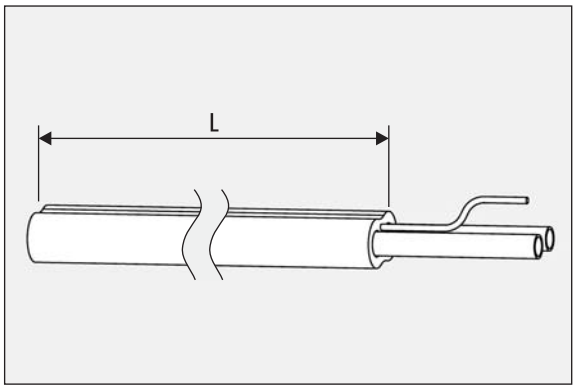


Fig. 2-10 CON 15 / CON 20

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.

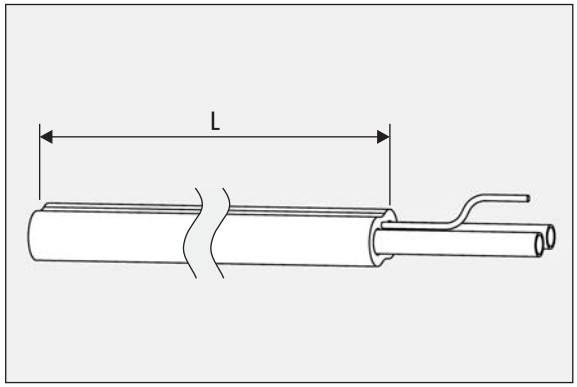


Fig. 2-11 CON X (optional)

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.

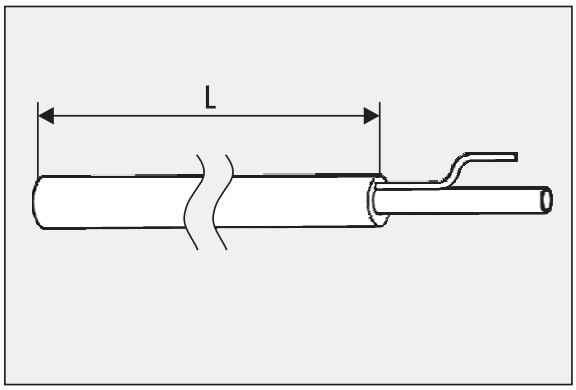


Fig. 2-12 CON XV (optional)

Support trough kit for connection lines 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 trough

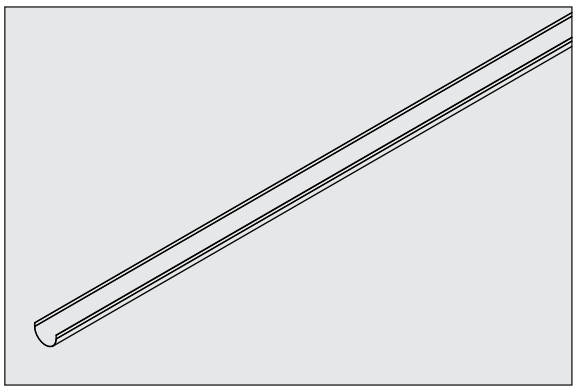


Fig. 2-13 TS (optional)

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)

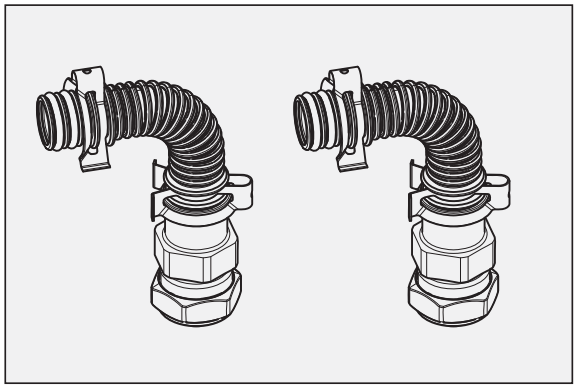


Fig. 2-14 EKSRCP

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 plugs
- 2x Solar panel connection elbow with compression ring fittings to connect a connecting pipe (Cu Ø 22 mm)

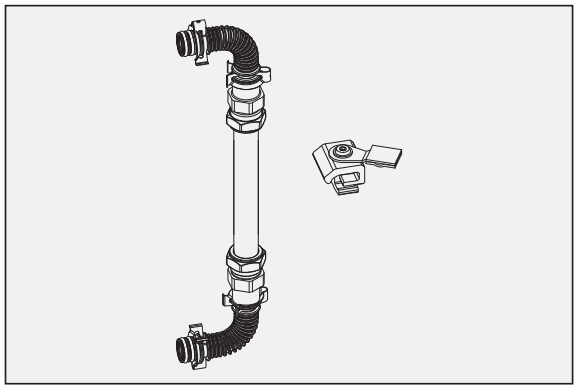


Fig. 2-15 CON LCP

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.

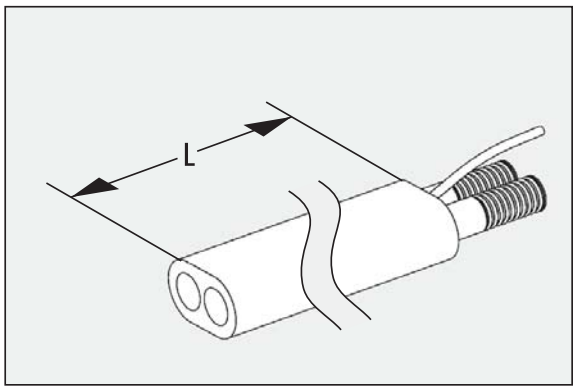


Fig. 2-16 CON 15P16 / CON 15P20

Pressurised solar connection kit CON CP16 and CON CP20

CON CP16

For incorporation of the pressurised solar line (nominal size DN 16) to the solar panel connection kit EKSRCP and to the pressure station.

CON CP20

For incorporation of the pressurised solar line (nominal size DN 20) to the solar panel connection kit EKSRCP and to the pressure station.

Consists of:

– Swivel nut with accessory

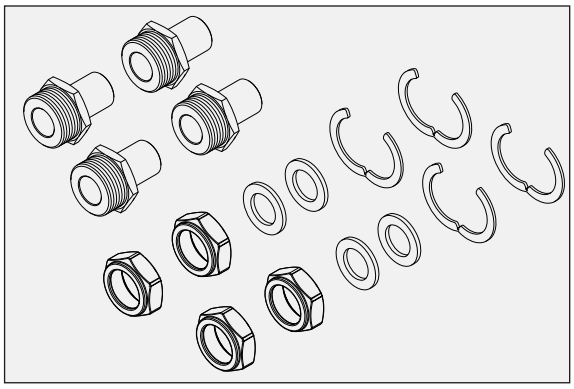


Fig. 2-17 CON CP16 / CON CP20 (optional)

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

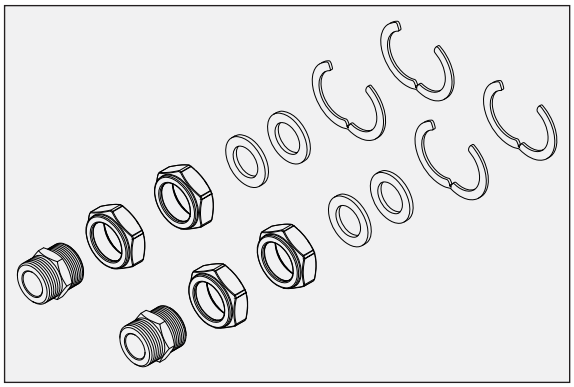


Fig. 2-18 CON XP16 / CON XP20 (optional)

Solar system fluid

GFL

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

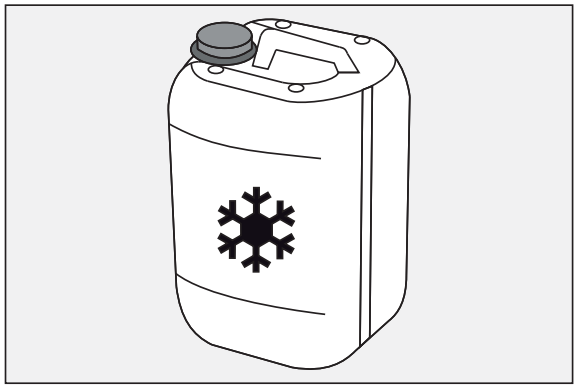


Fig. 2-19 GFL

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, regulation and pump unit EKSRPS3, roof transitions, connecting lines and installation materials.
– The DAIKIN Solar system pressurised system +p consists of: High-performance flat solar panels, regulation and pump unit EKSR3PA/EKSRDS1A, pressure station, plate heat exchanger, connecting lines and installation materials.
– The installation instructions for the Solar collectors in-roof mounting mounting of the flat solar panels is included with the basic in-roof mounting pack.

DAIKIN hot water storage tanks, such as the EKHWP* or the EKHWE*/EKHWS*, and other 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. Additional DAIKIN Solar system components are supplied packed separately.

3.1.3 Storage

When storing the components of the DAIKIN Solar system you must observe 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 collectors in-roof mounting of the flat solar panels, the roof surface must be inclined at an angle of 15° to 80°.

The flat solar panels EKSV21P, EKSV26P and EKSH26P can be also mounted on the roof in case of roofs having minimum inclination of 18°. Further information is available in the DAIKIN Solar system on-roof installation manual.

The flat solar panels EKSV26P and EKSH26P can be installed on flat roofs. Further information is available in the installation manual for the DAIKIN-Solar system flat roof frame.

DAIKIN Solar system are generally structured in accordance with one of the following illustrated installation concepts. 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).
– Connecting on both sides is permitted for both DAIKIN Solar system systems (p=0 + +p).

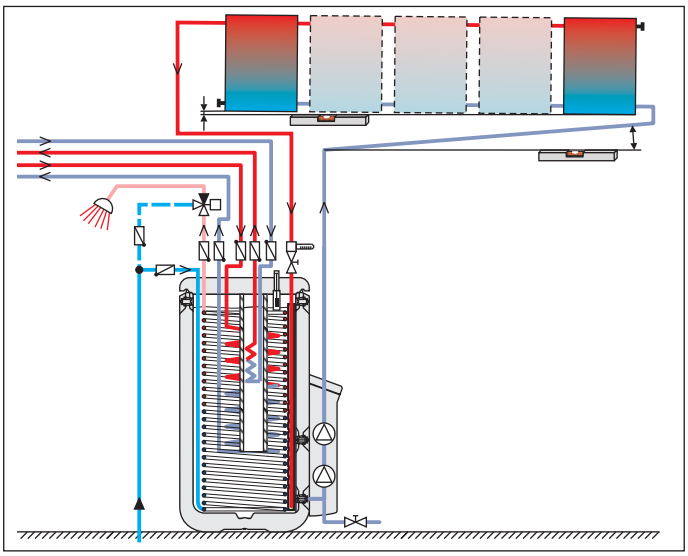


Fig. 3-1 Solar system solar panels connected at opposite ends with hot water storage tank EKHWP (shown on drain-back system p=0).*

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.
The connection pipe must be set up with a continuous gradient 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.

Tab. 3-1 Installation instructions

3.3.1 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 %.
- Lay the lines in the **optional support troughs TS** (see page 12) or fix them to a rigid support structure (e.g. profile rail, pipe etc.).
- DAIKIN recommends always using the support trough kit **(TS)** for extended horizontal line sections.

- Lay prefabricated connection pipes (feed and return flow) with integrated sensor cable (see chapter 2 "Product description", page 11) 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. 3-2).

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

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

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

Contact DAIKIN Service.

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 x 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.
2. 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 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.

3.3.2 Pressurised system +p

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.

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.

p=0

- Permit the system to drain.
- In the installation, ensure that the bottom edges of the installed flat solar panels are above the Solar system feed 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 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 collectors in-roof mounting

Measuring point	Number of collectors:		1	2	3	4	5
	Type	Dim.	Dimensions in mm				
Solar panel array width (length mounting profile rail)	EKSV21P	b	1038	2076	3114	4152	5190
	EKSV26P		1332	2664	3996	5328	6660
Solar panel array width (required for covering frame)	EKSV21P	C		2620	3630	4640	5650
	EKSV26P			3200	4500	5800	7100
Clearance height of solar panel array cut-out in the roof covering		H_3	2410				
Distance from lower collector edge to lower mounting rail		Y_0	200				
Spacing of the mounting rails		Y_1	1400 to 1600				
Distance between lower row of tiles and lower edge of lower mounting rails		Y_3	235 to 355				
Distance between lower roof tile row and upper edge covering frame upper part		Y_4	2505 to 2625				
Overlap of lead collar on lower roof tile row		Y_5	100 to 200				
Distance between lower edge of lower mounting rail and upper edge of upper roof tile row		Y_6	1975 to 2025				
Distance between lower roof tile row and lower edge of flat solar panel		Y_7	50 to 170				
Distance from solar panel edge — first solar panel securing hook		A_0	100 to 200				
Spacing of the roof mounting brackets of a flat solar panel	EKSV21P	A_1	700 to 850				
	EKSV26P		800 to 1100				
Spacing of solar panel mounting brackets between two flat solar panels		A_2	240 to 440				
Distance from collector edge to pipe coupling		E_0	approx. 73				
Center-to-center distance of the solar panel couplings		E_1	1854				
Distance from solar panel temperature sensor connection to p=0 bottom edge of solar panel / +p top edge of solar panel		f	172				

Tab. 3-3 Main dimensions of a Solar system solar panel with Solar collectors in-roof mounting

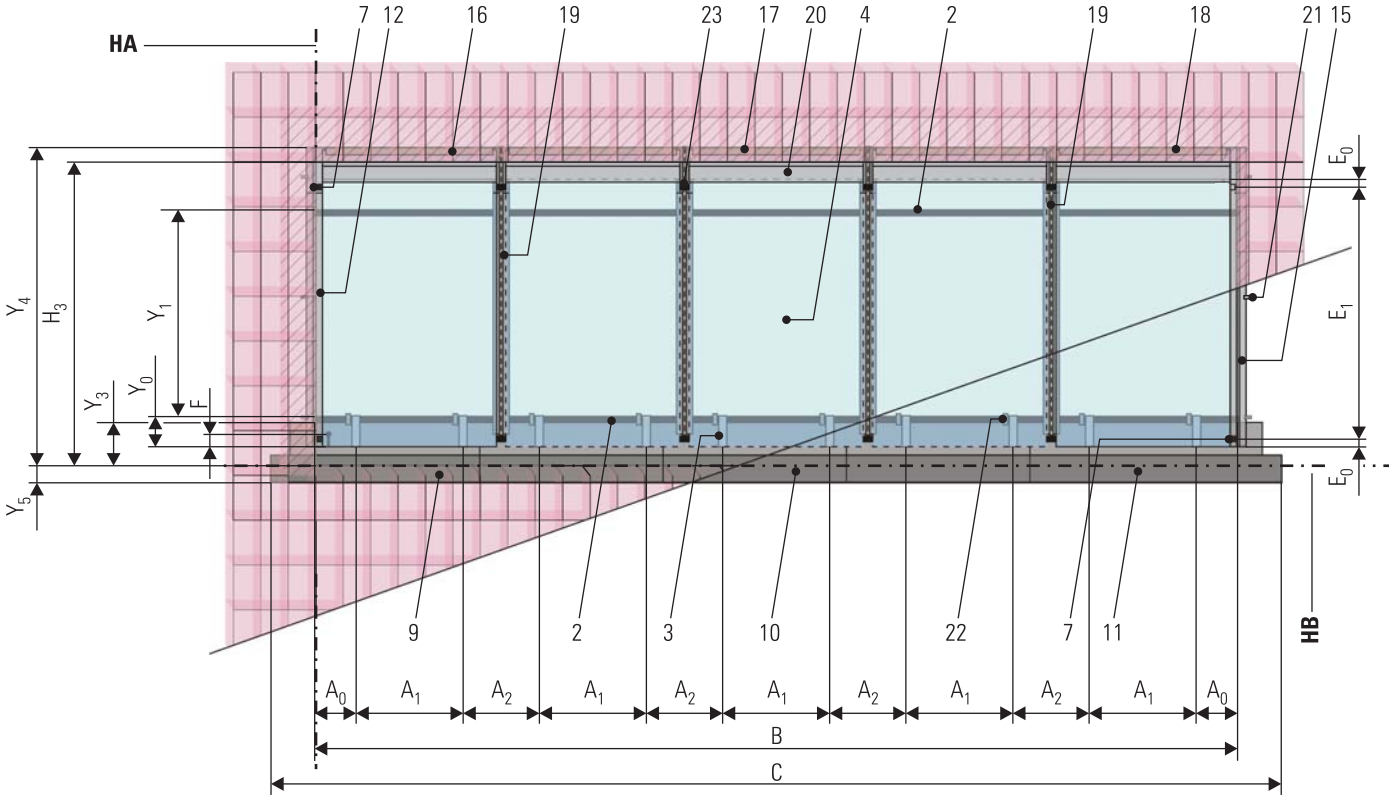
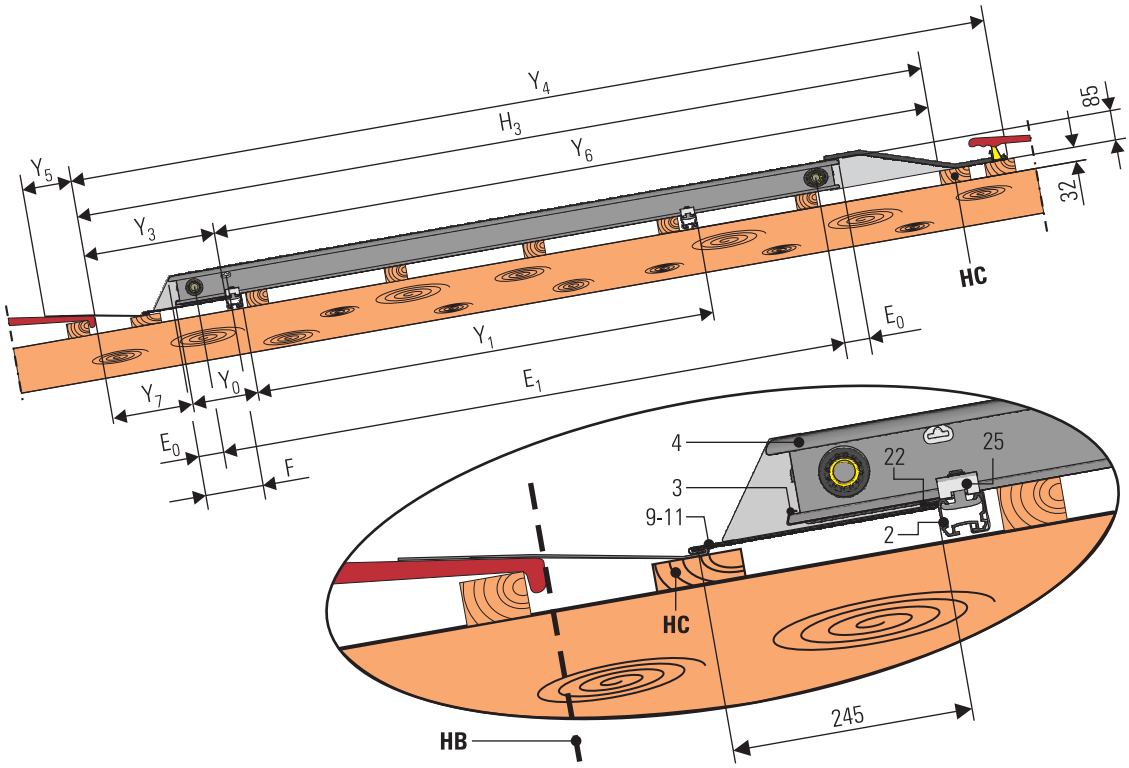


Fig. 3-2 Main dimensions of a Solar system solar panel with Solar collectors in-roof mounting (shown on the flat solar panel EKSV26P in the drain-back system)

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



2	*Mounting rail*	**20**	*Upper cover plate*
3	*Collector securing hook*	**21**	*Inflow connection pipe*
4	*Flat solar panel EKSV21P/EKSV26P*	**22**	*Clamping plates for securing the lower covering sheet*
7	*End plugs*	**23**	*Expansion joint (Solar panel-connecting element)*
9	*Lower covering sheet on left*	**25**	*Solar panel-screw terminal*
10	*Lower covering sheet for central flat solar panel*		
11	*Lower covering sheet on right*	**H**	*Auxiliary strips 8 mm (in the scope of delivery)*
12	*Left side part*	**HA**	*Marking line A*
15	*Right side part*	**HB**	*Marking line B*
16	*Upper covering sheet on left*	**HC**	*Auxiliary batten*
17	*Upper covering sheet for central flat solar panel*		
18	*Upper covering sheet on right*		*Dimensions see tab. 3-3*
19	*Plug-in strip*		

Fig. 3-3 Side view of a flat solar panel integrated in a roof (shown on a flat solar panel EKSV26P in drain-back system)

The positioning of the mounting rails (fig. 3-3, item 2) is shown on a wooden roof sub-structure ventilated from below.

However, it is essential that mounting rails are also used with other roof sub-structures to ensure the proper attachment of flat solar panels.

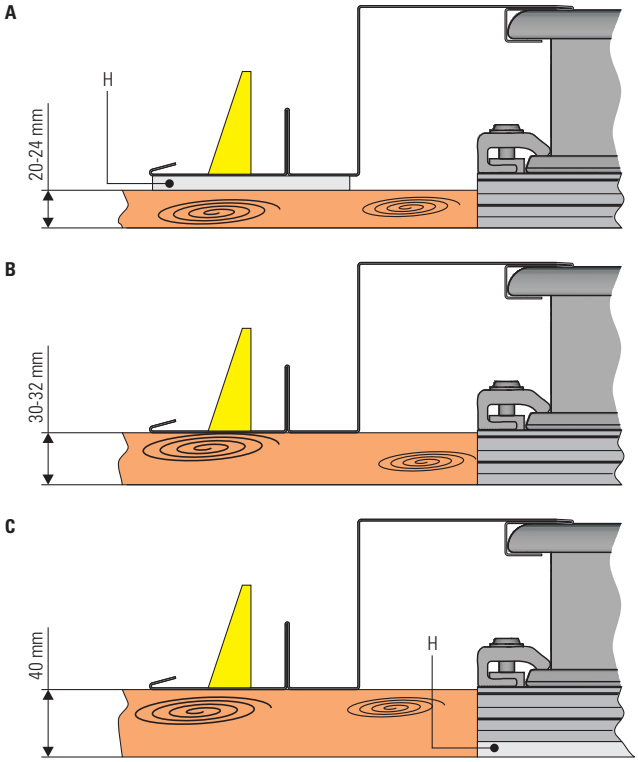


Fig. 3-4 Auxiliary strips mounted on the side part depending on the roof batten thickness (Key see fig. 3-3)

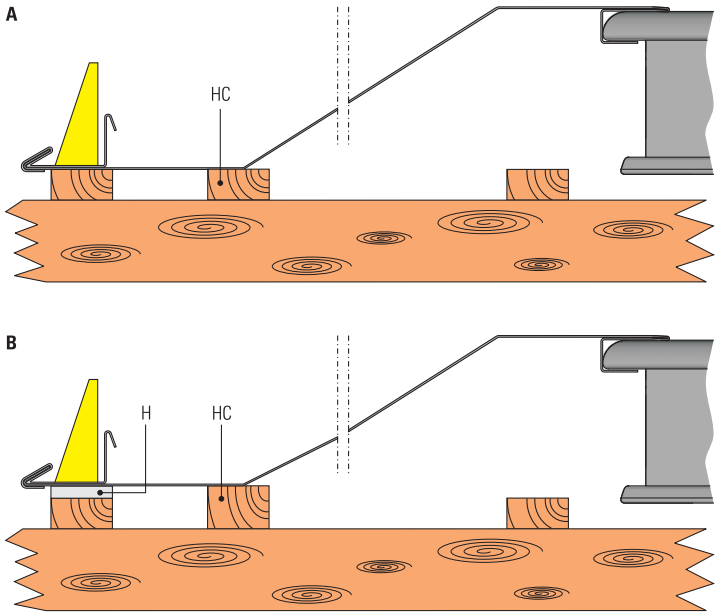


Fig. 3-5 Auxiliary strips mounted on the upper part depending on the roof batten thickness (Key see fig. 3-3)

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.

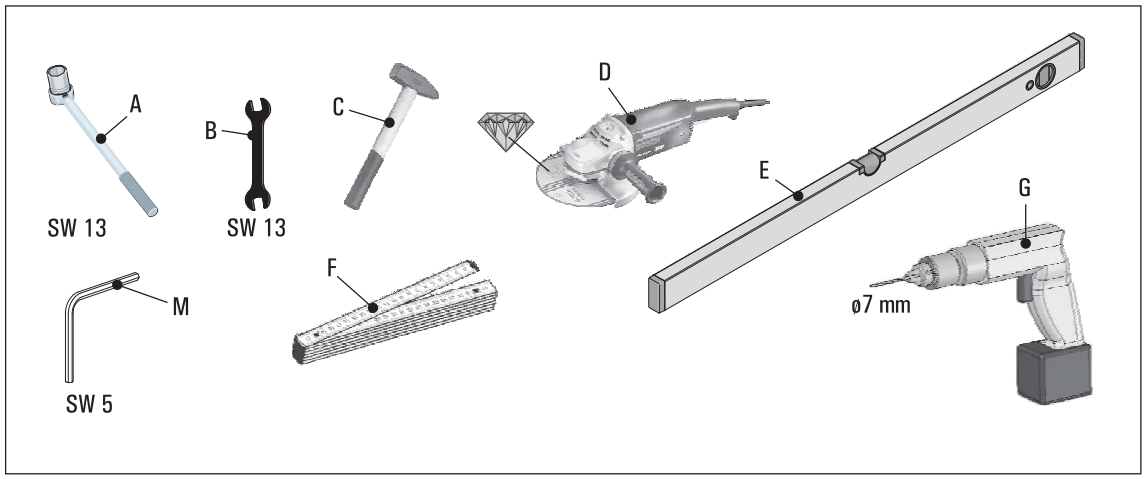
- **Check carrying capacity of the supporting structure** (Note wind and snow loads, see chapter 5 "Technical data").
- Mounting rails only with correspondingly appropriately dimensioned screw connections and always screw on the rafters.
- If required, insert sufficiently sustainable supporting structure between the rafters.

As in-roof-mounting package, the in-roof basic mounting package and the extension in-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.

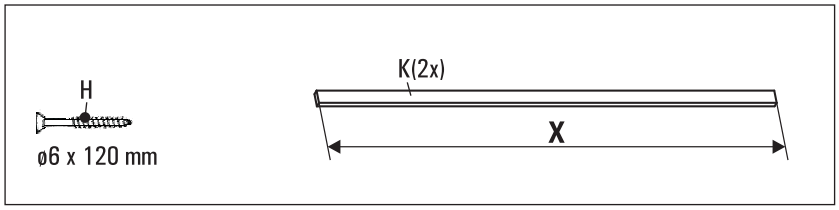
- for the EKSV21P: 2.0 x 1.04 m^2 (HxB),
- for the EKSV26P: 2.0 x 1.33 m^2 (HxB).

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



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. 3-6 Required tools



H Particle board screws 6 x 120
K 2 Auxiliary battens in relevant roof batten thickness (X= array width)

Fig. 3-7 Additional material

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 resources in fig. 3-6 and in fig. 3-7.

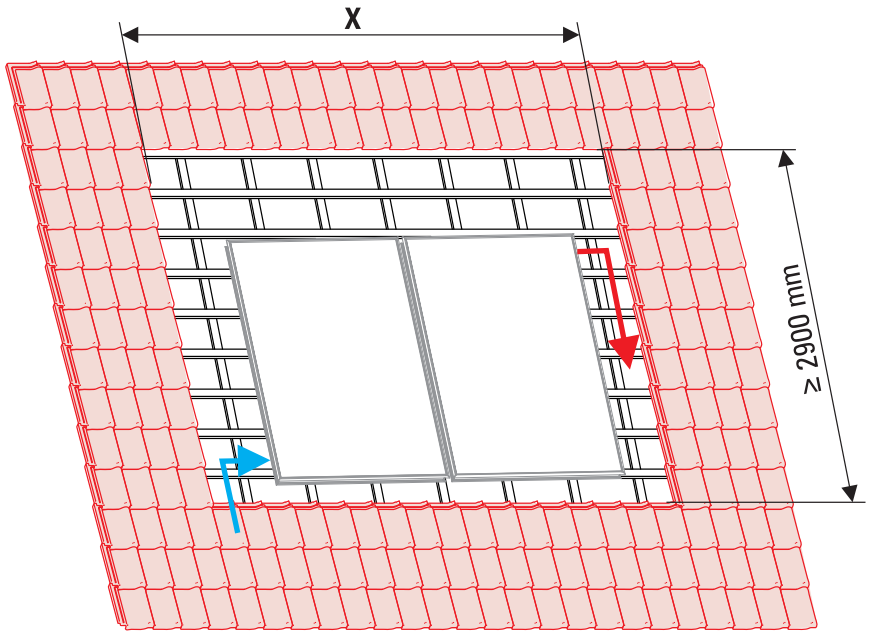


Fig. 3-8 Cover roof area (Dimension X = Dimension C in tab. 3-3)

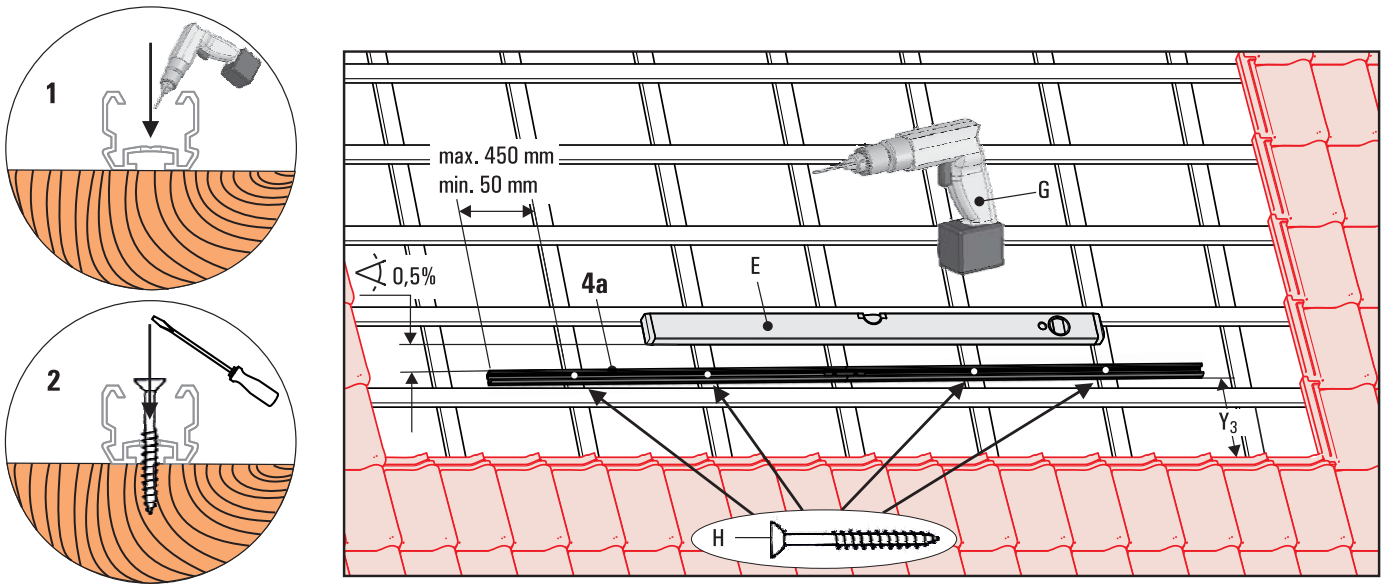


Fig. 3-9 Adjust lower mounting rails (4a) and tighten with particle board screws (H) on the rafters.

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.

- 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).

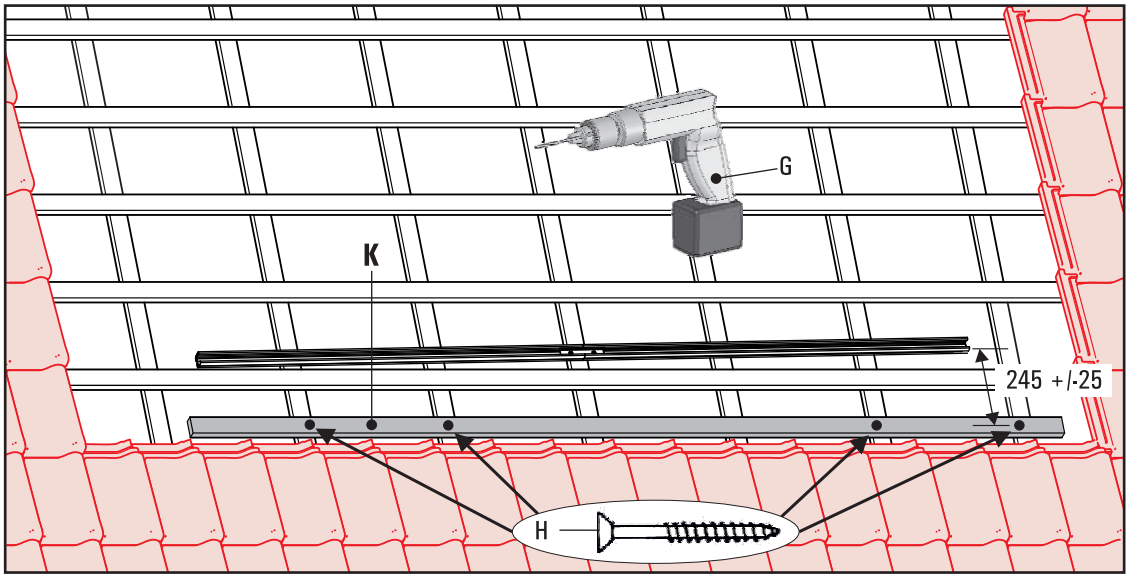


Fig. 3-10 Fix lower auxiliary batten (K) with particle board screws (H) in the specified distance to the mounting rails.

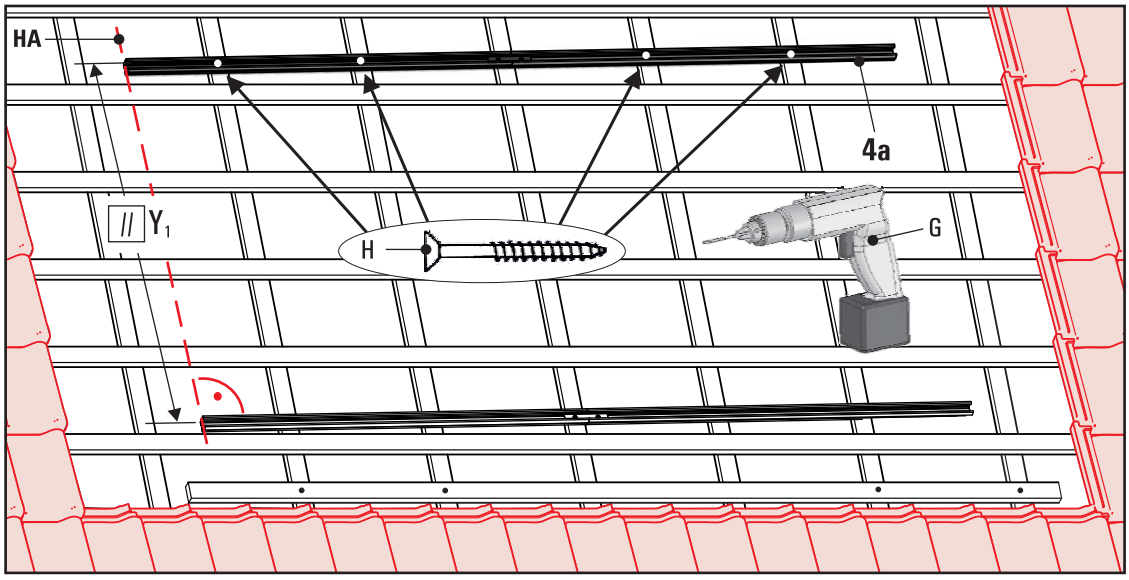


Fig. 3-11 Set up upper mounting rails (4a) parallel to the lower mounting rails and fix with particle board screws (H) on the rafters.

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.

- 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).

CAUTION!

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

- 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.

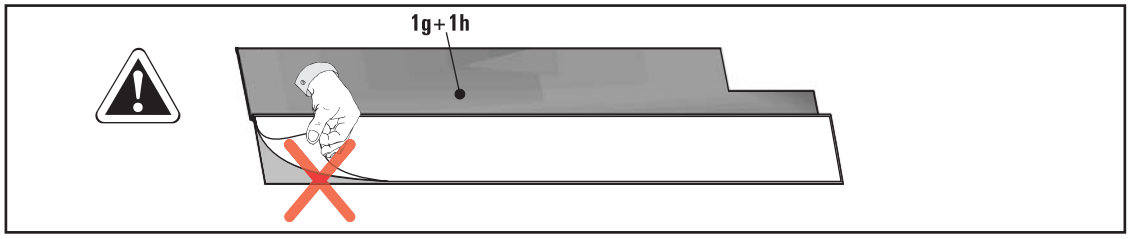


Fig. 3-12 Mount all of the flat solar panels before removing the covering foil for the bitumen strip during the covering process (section 3.4.9)!

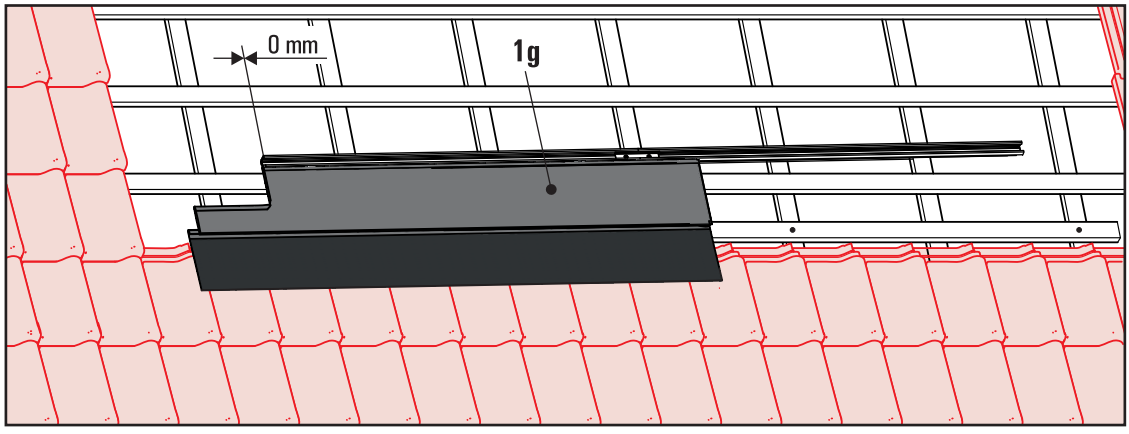


Fig. 3-13 Erect left covering sheet (1g) distance on the mounting profile rails.

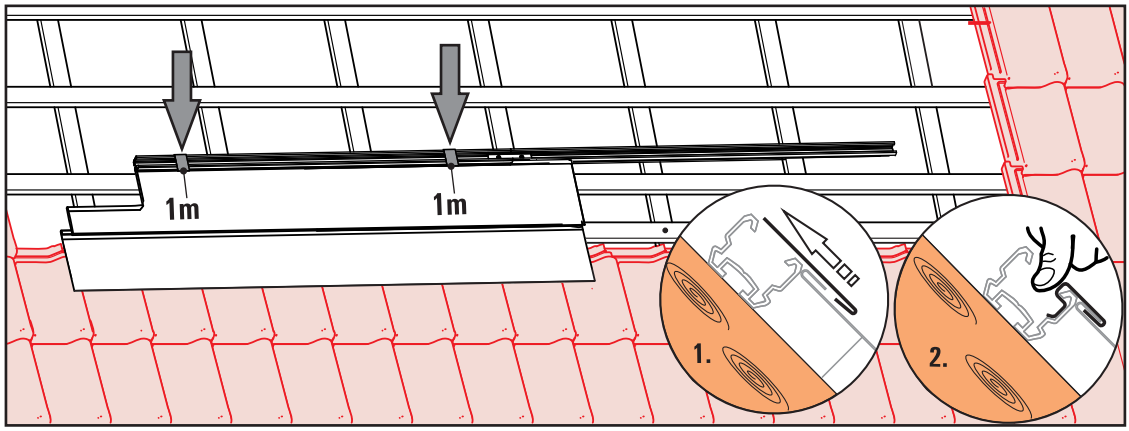


Fig. 3-14 Fix left covering sheet (1g) with safety sheets (1m) (hook it from below into the covering plate and then bend inwardly into the mounting profile edge).

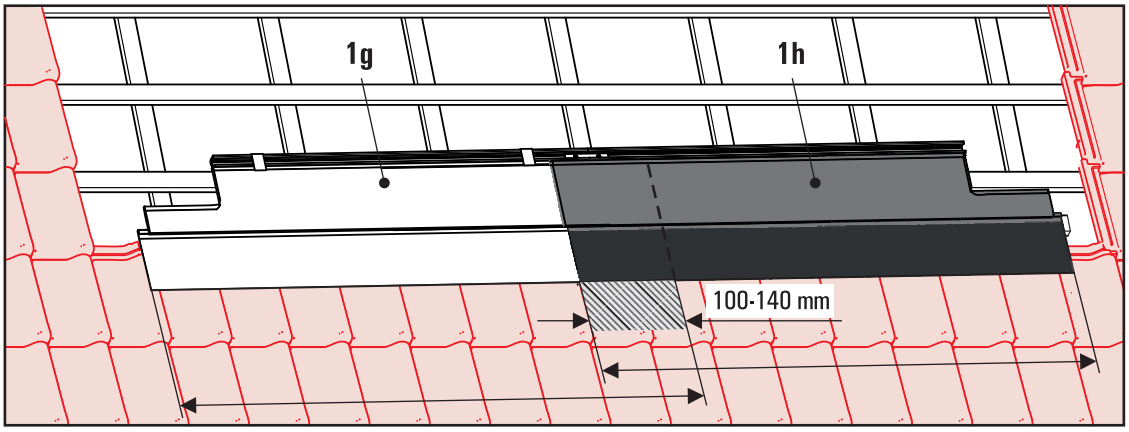


Fig. 3-15 Ensure that the respective covering sheets (1g / 1h) interlock and overlap sufficiently from both sides.
If more than 2 flat solar panels are installed, 1 extension covering sheet (Lower middle drainboard, see Extension package chapter 2.3) is required between left and right covering sheet per additional flat solar panel.

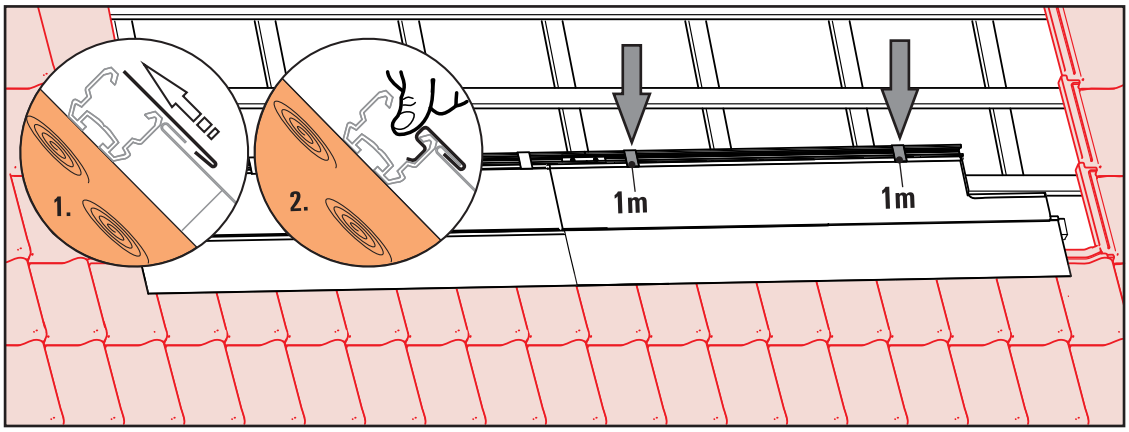


Fig. 3-16 Fix right covering sheet (1h) (same procedure like left covering sheet (1g)).

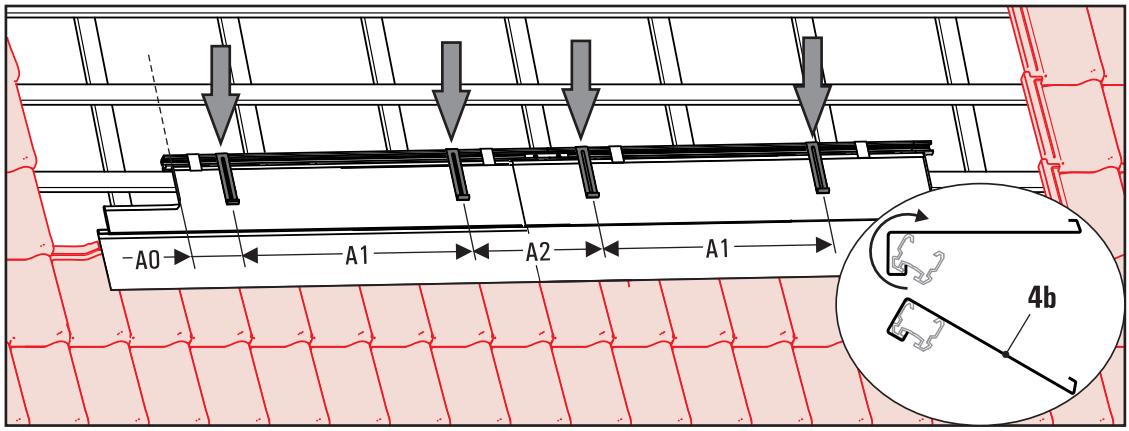


Fig. 3-17 Hang solar panel securing hooks (4b) into the upper side guiding groove of the lower mounting rails and tilt downwards. Pay attention to distances!

3.4.3 1. Installing flat solar panel

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 adamage 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.

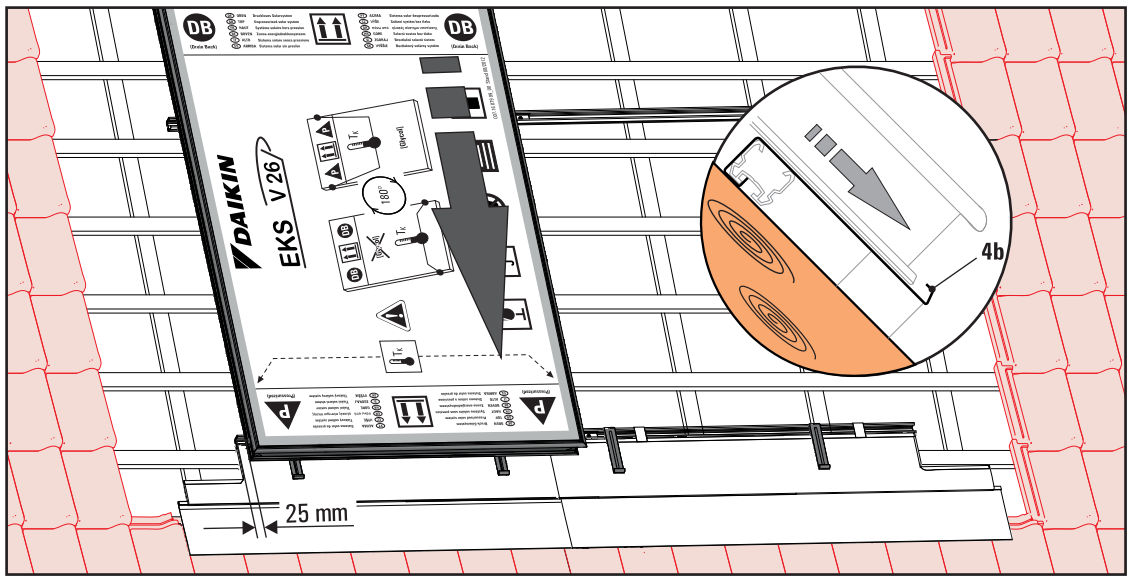


Fig. 3-18 Lift the flat solar panel over the mounting rails, and carefully suspend it in the solar panel securing hooks (4b). Pay attention to distances! ***Shown on a flat solar panel EKSV26P in drain-back system***

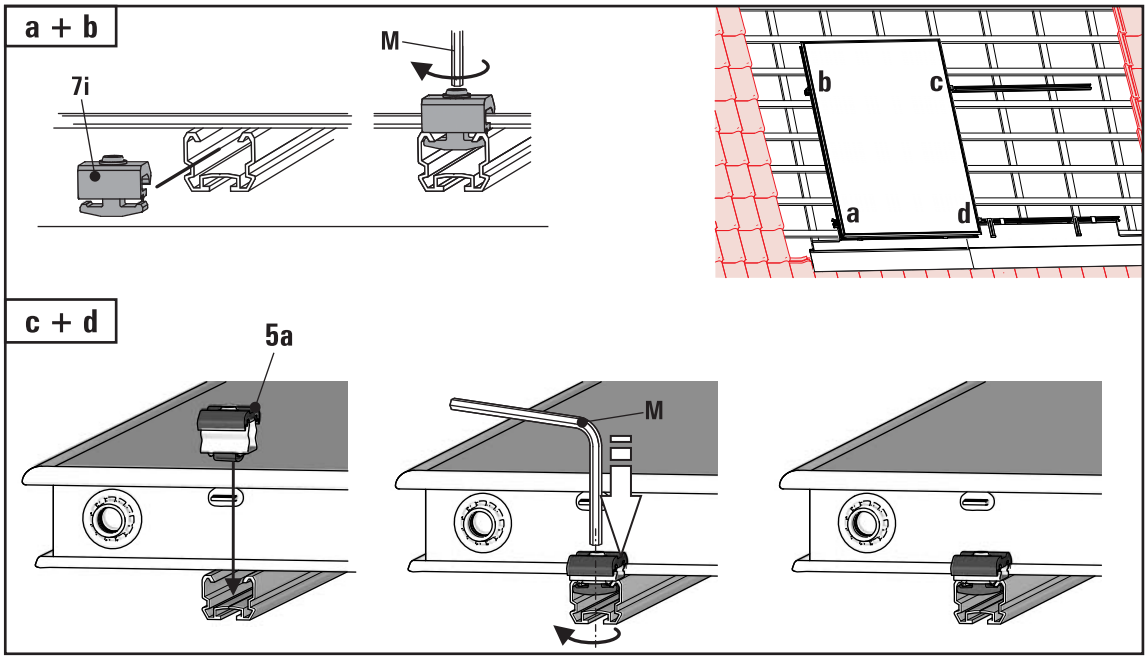


Fig. 3-19 Screw flat solar panel with individual single clamping blocks (7i) on the mounting profile rails and insert double clamping blocks (5a).

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.

3.4.4 Installing another flat solar panels

CAUTION!

If the retaining clips do not engage audibly, the DAIKIN Solar system can develop leaks and thus limit 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 solarpanel (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!

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 adamage 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.

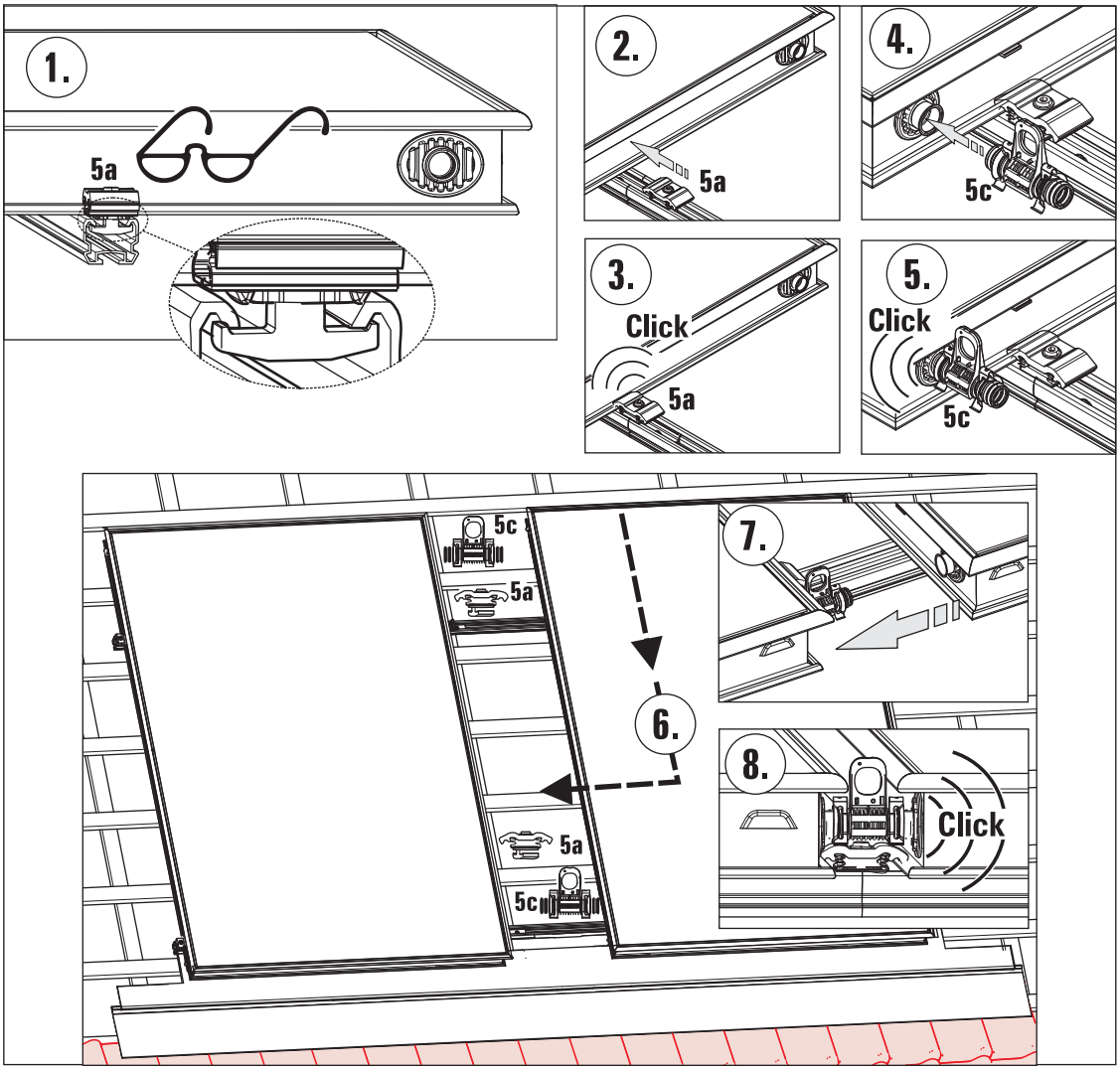


*Fig. 3-20 Install double clamping blocks (5a) and expansion joints (5c). Installing flat solar panel In case of big solar panel fields, install additional solar panels **in same procedure**.*

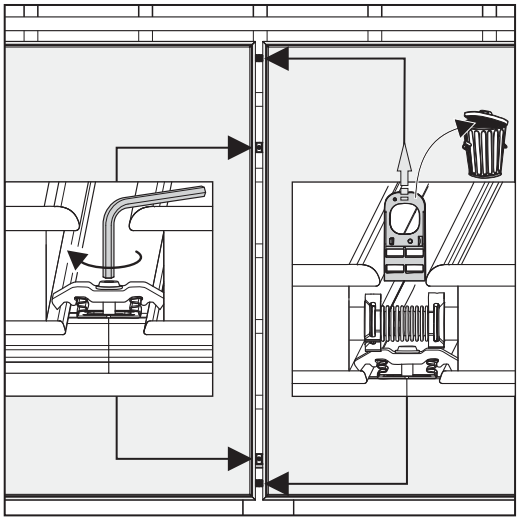


Fig. 3-21 Tighten double clamping blocks between the flat solar panels and detach assembly supports from the expansion joints.

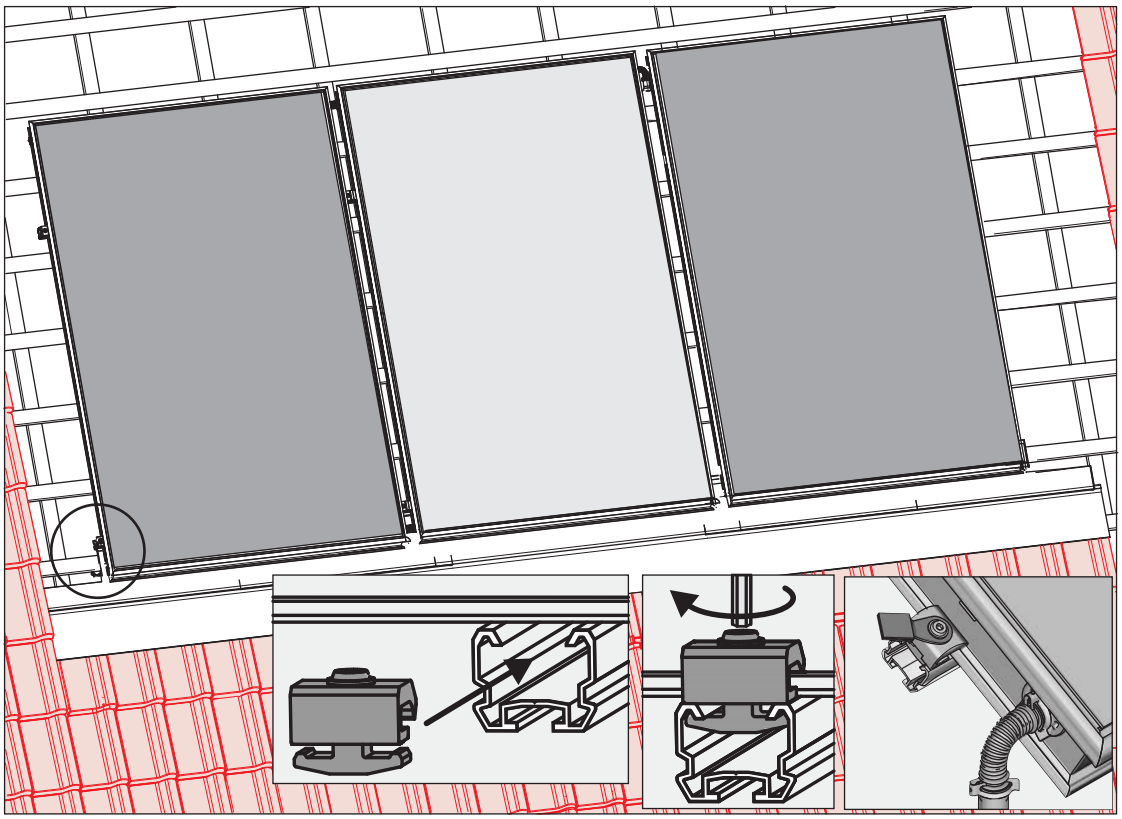


Fig. 3-22 Insert the individual clamping blocks for the last flat solar panel and tighten down. Mount the clamping block with potential balancing terminal close to the return flow connection. ***Shown on a flat solar panel EKSV26P in drain-back system***

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 %.
- Lay the lines in the **optional support troughs TS** (see page 12) or fix them to a rigid support structure (e.g. profile rail, pipe etc.).
- DAIKIN recommends always using the support trough kit **(TS)** for extended horizontal line 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, 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 (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 break-throughs.

In principle, an alternative connection with a single roof transit is possible.

- 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 break-through.

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.
- Never cause damage to the surface of the VA Solar system connection lines when cutting away the thermal insulation.

3. Run the connecting pipes through the roof at the points provided, until solar panel connection is laid and the heat insulation of the connection pipes is cut off at solar panel connection.
   This can be carried out either directly on the respective flow and return connection of the flat solar panel or within the solar panel field (e. g. on the covering sheet), see fig. 3-23 and fig. 3-24.

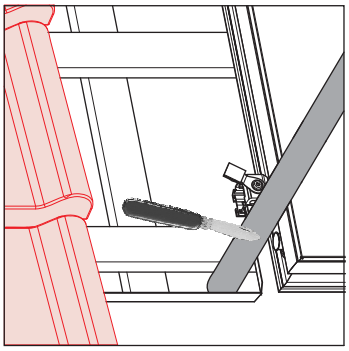


Fig. 3-23 Lead through the connection pipe directly on the solar panel connection

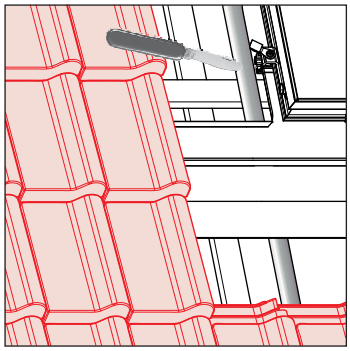


Fig. 3-24 Lead through the connection pipe below the solar panel field

4. To ensure the necessary uninterrupted thermal insulation (also within the roof structure), the insulation must be re-sealed at the penetration points (e.g. with adhesive tape).
5. 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. 3-25).
6. 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. 3-26).
7. 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. 3-27).

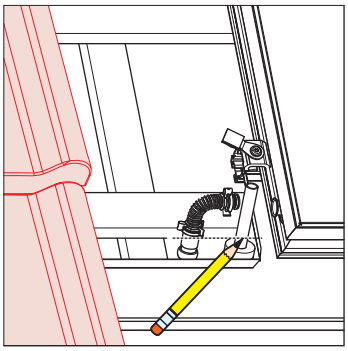


Fig. 3-25 Work step 5

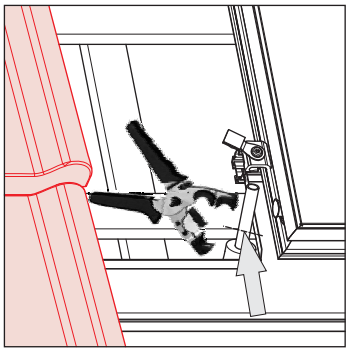


Fig. 3-26 Work step 6

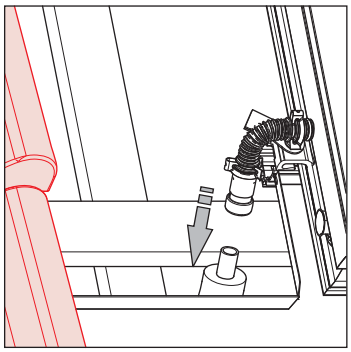


Fig. 3-27 Work step 7

8. Insert the flat solar panel connection elbows into the flat solar panel connecting pipes, until the retaining clamps click in place (fig. 3-28).
9. Slide the clinched thermal insulation hose over the fitting.
10. Insert the end plugs into the open solar panel connection pipes until the retaining clamps click in place. (fig. 3-29).

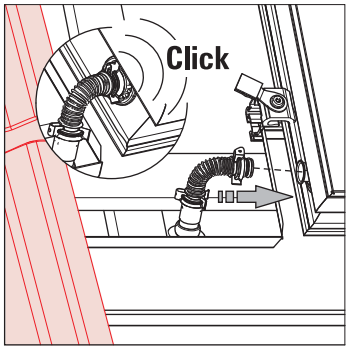


Fig. 3-28 Work step 8

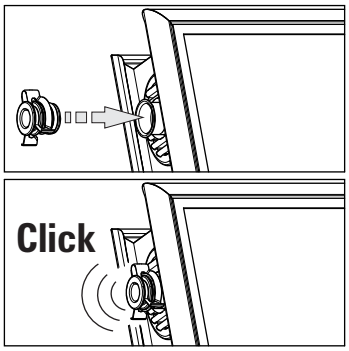


Fig. 3-29 Work step 10

In order to protect the VA Solar system connection lines from excess temperature, the feed flow and return fittings are fitted with thermal isolation.

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 pipes made of pressure-resistant metals (CON XP16 / CON XP20 or Cu Ø 22 mm) between the EKSV21P/EKSV26P solar panel and the 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 Ø 22 mm. Therefore we recommend also using DAIKIN CON XP16 / CON XP20 as the connection pipe between the solar panel array and the hot water storage tank.

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 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 Solar system 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.
2. Install connection fittings (fig. 3-30).
3. Outdoors cover the connection pipes with UV resistant thermal insulation tubing.
4. Insert end plugs into the open solar panel connection pipes until the retaining clamps click in place (fig. 3-31).

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. 3-32).

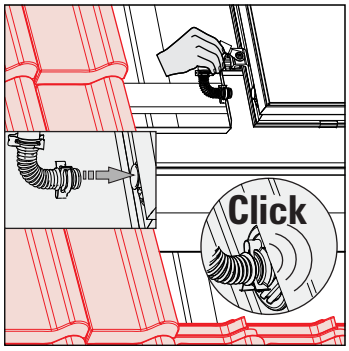


Fig. 3-30 Work step 2

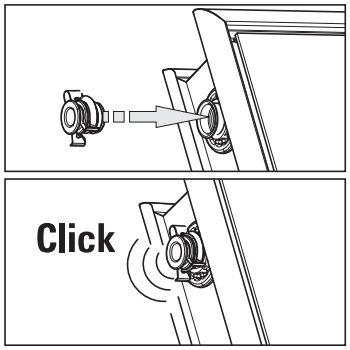


Fig. 3-31 Work step 4

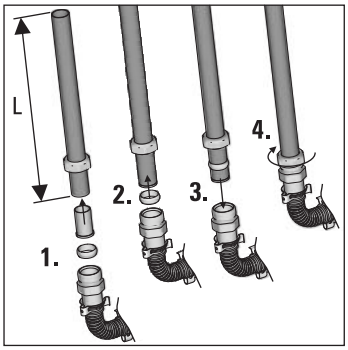


Fig. 3-32 Work step 5

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.

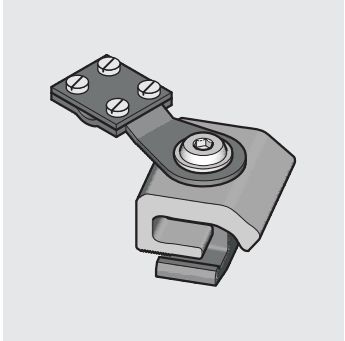


Fig. 3-33 Work step 1

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.

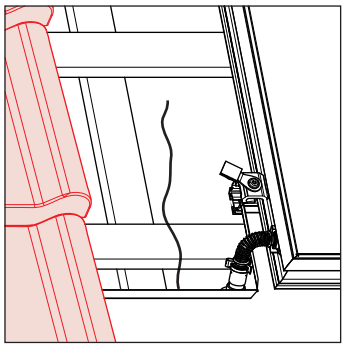


Fig. 3-34 Work step 2

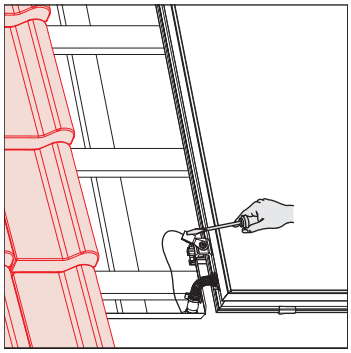


Fig. 3-35 Work step 3

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

– p=0 in the CON RVP package and

– +p- in the CON LCP package.

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 need to be 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 ⚠
– +p at the top edge of 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 (fig. 3-37).
2. Push solar panel temperature sensor up to the stop in the flat solar panel (fig. 3-36). 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. 3-37).

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 (installation with drip-off elbow).

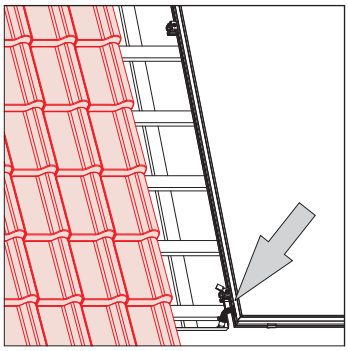


Fig. 3-36 Installation position for collector temperature sensor - p=0

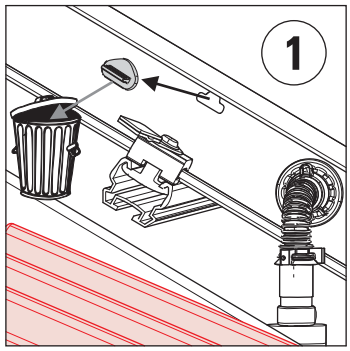


Fig. 3-37 Work step 1 - p=0

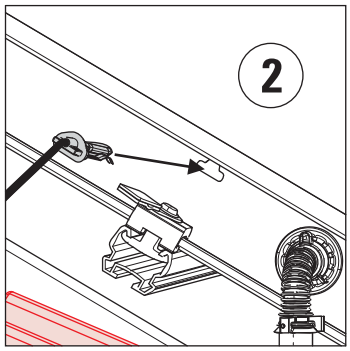


Fig. 3-38 Work step 2 - p=0

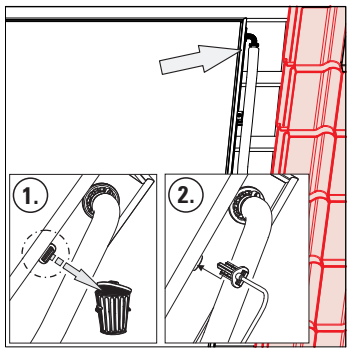


Fig. 3-39 Work step 1+2 - [+p]

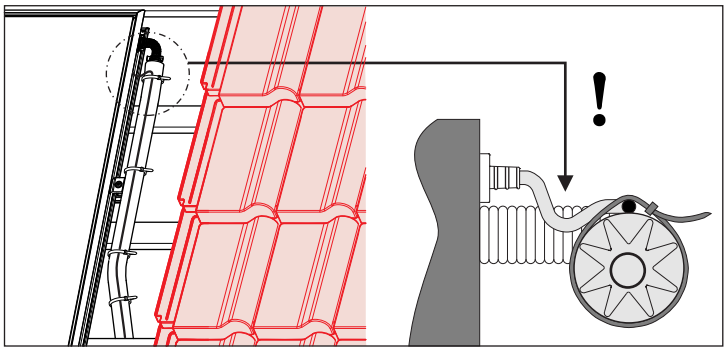


Fig. 3-40 Work step 3 - [+p]

4. Inside the roof, connect the silicone cable of the solar panel temperature sensor to the supply cable of the solar panel temperature sensor on the regulation and pump unit ([p=0] EKSRPS3 or [+p] EKSR3PA).

3.4.9 Covering the flat solar panels

1. Mount second auxiliary batten at a distance of 350 mm from the solar panel upper edge (fig. 3-41).

The auxiliary batten serves to fix the upper part and to stabilise the upper plate sections against bending and must protrude across the entire solar panel width.

2. Mount the plug-in strip (1f) of the in-roof package on the lower end of the flat solar panels and push in the direction of the roof ridge. With a flat hand press the plug-in strip onto the collector in the area of the beginning of the flat solar panel (fig. 3-42).
3. Manually bend the two tongues on the upper edge of the plug-in strip (1f) on the flat solar panel so that the strip does not slip downwards (fig. 3-43).

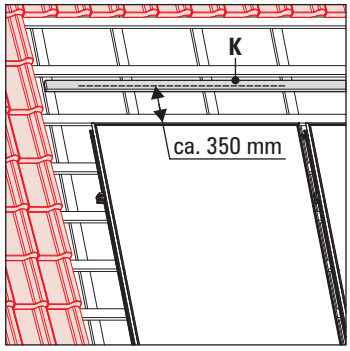


Fig. 3-41 Work step 1

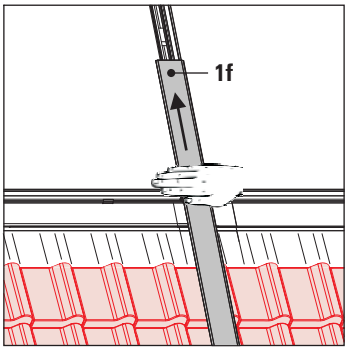


Fig. 3-42 Work step 2

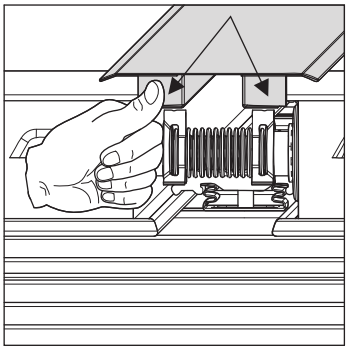


Fig. 3-43 Work step 3

4. Insert the right lower inspection safety screen (1k). To do this, slide the visual protection screen (1k) under the slider rail in the direction of the left-hand flat solar panel (fig. 3-44) and align on the right-hand side.
5. Insert the right-hand side section (1e) into the visual protection screen and place onto the solar panel profile. Snap into place and position side part (1e) by pressing in the direction of the roof and simultaneously pushing towards the flat solar panel (fig. 3-45).
6. Insert the left lower inspection safety screen (1i). To do this, push the inspection safety screen below the plug-in strip (1i) in the direction of the right flat solar panel (fig. 3-46) and align to the left side. Both inspection safety screens now overlap in the area of the plug-in strip.

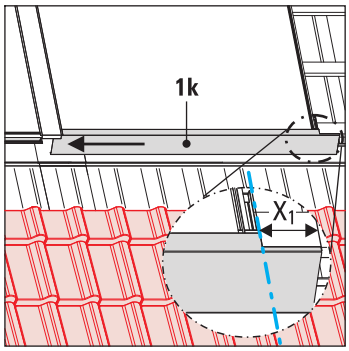


Fig. 3-44 Work step 4

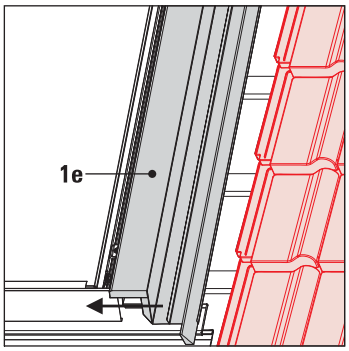


Fig. 3-45 Work step 5

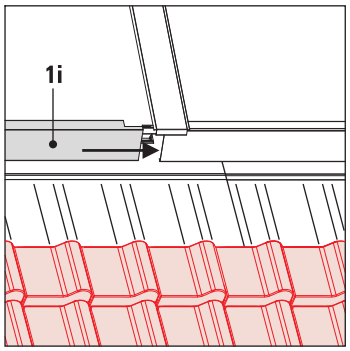


Fig. 3-46 Work step 6

7. Insert the left-hand side section (1d) into the visual protection screen and place on the solar panel profile. Click the left-hand side section (1d) in place by pressing towards the roof and simultaneously sliding towards the flat solar panel (fig. 3-47).
8. Aligning and screwing down the right-hand and left-hand visual protection screens with the respective side section using 3 self-tapping screws (included in the delivery) (fig. 3-48 and fig. 3-49).

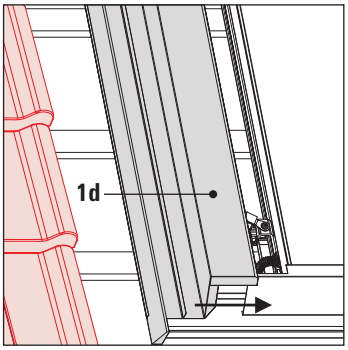


Fig. 3-47 Work step 7

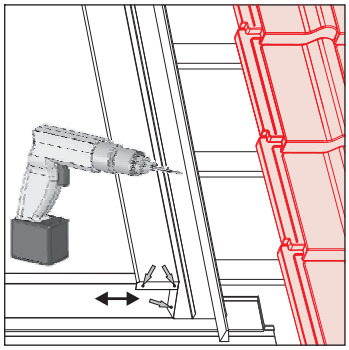


Fig. 3-48 Work step 8

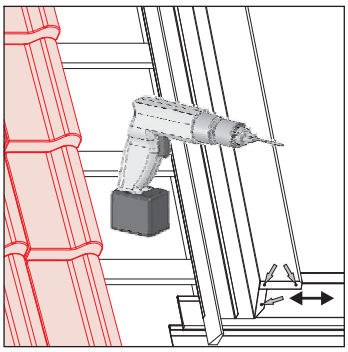


Fig. 3-49 Work step 8

9. Screw on the plug-in strip with the upper and lower inspection safety screen using two self-tapping screws each (included in the delivery) (fig. 3-50).
10. Arrange the upper covering sheet (1a and 1b). To do this, stick the supplied foam adhesive strips onto the border to the respective next covering sheet (fig. 3-51).
11. Snap into place prepared covering sheet (1a and 1b) by pressing in the direction of the roof and simultaneously pushing towards the flat solar panel (fig. 3-52).

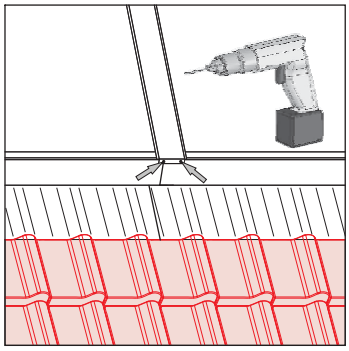


Fig. 3-50 Work step 9

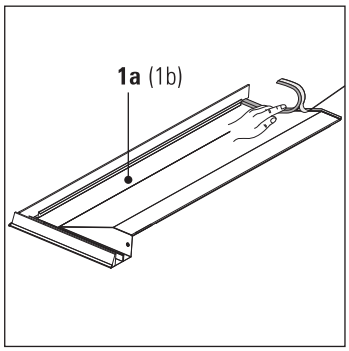


Fig. 3-51 Work step 10

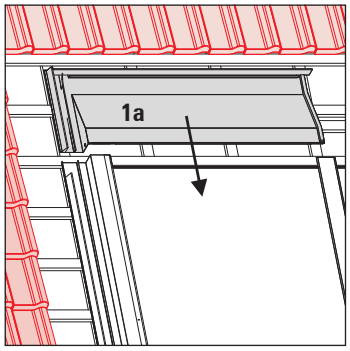


Fig. 3-52 Work step 11

12. On both outer sides, fix the covering sheets of the covering frame and the side parts with two or three stickers (included in delivery) onto the batten construction (fig. 3-53).

13. Mount covering strip (1c) through the plug-in strip onto the upper covering sheets (fig. 3-54).

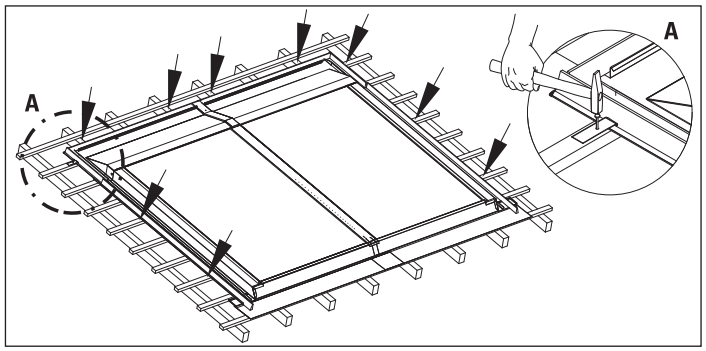


Fig. 3-53 Work step 12

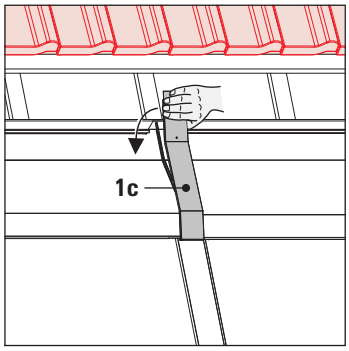


Fig. 3-54 Work step 13

14. Screw upper covering sheet with the plumber's sealing screw (included in delivery) onto the upper auxiliary batten (fig. 3-55).

15. Join side and upper part at the place provided using self-tapping screws. To do this, always align the side part to the upper part and minimise the gap (fig. 3-56).

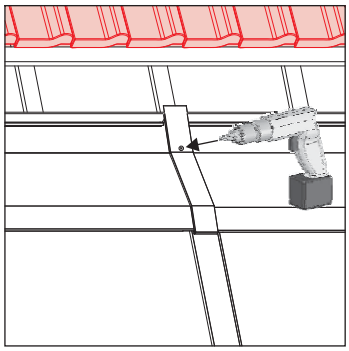


Fig. 3-55 Work step 14

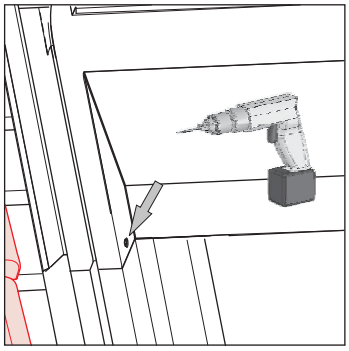


Fig. 3-56 Work step 15

Fig. 3-57 shows the complete system before covering with roof tiling.

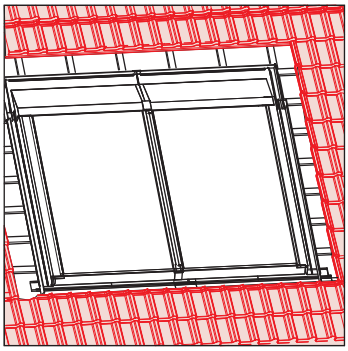


Fig. 3-57 System before covering

16. Lift the bitumen strip slightly (fig. 3-58).

17. Pull the lower covering foil away from the bitumen strip. (fig. 3-59).

18. Lightly press the bitumen strip down to adhere it to the lower roof tile row such that it is flush (fig. 3-60).

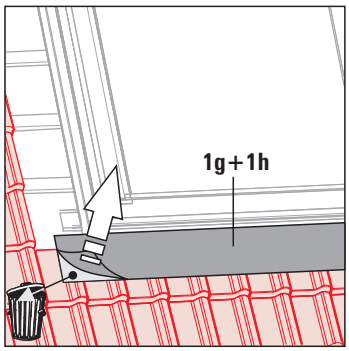


Fig. 3-58 Work step 16

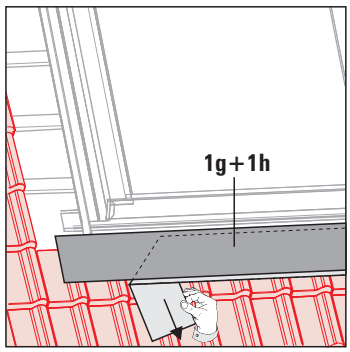


Fig. 3-59 Work step 17

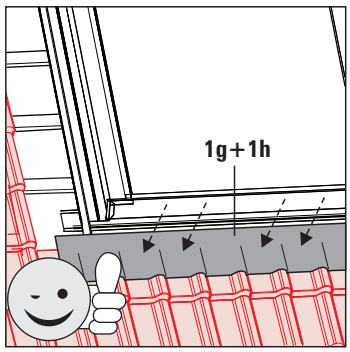


Fig. 3-60 Work step 18

19. Cut tiles to size and cover right side (fig. 3-61).

If the tiles do not have adequate support surface, they must be joined with the roof substructure.

20. Cut upper row of tiles properly. If needed, bend the tile support plate to the required height. The row of tiles must be fitted flush with the groove of the upper part and must protrude maximum 50 mm over this edge. The maximum dimension depends on the tile shape. Under no circumstances must the tiles be placed on the incline of the upper parts (fig. 3-63).

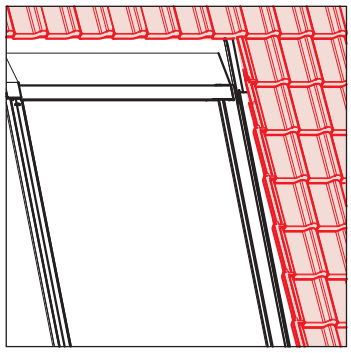


Fig. 3-61 Work step 19

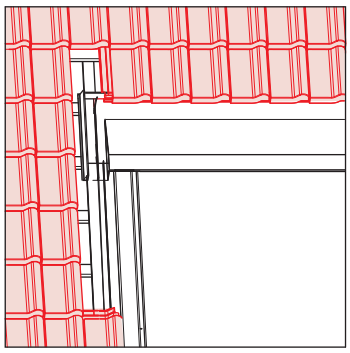


Fig. 3-62 Work step 20

21. Cover upper side and place tiles on the left side starting from below (fig. 3-63).

22. Place roof tiles in the left upper corner (fig. 3-64). Fig. 3-65 shows a fully covered roof.

CAUTION!

With special roofing, such as roof tiles with very pronounced undulations (large differences in height), sealing problems can occur.

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

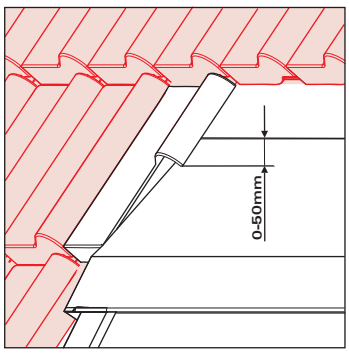


Fig. 3-63 Work step 21

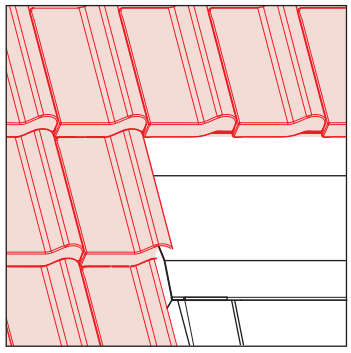


Fig. 3-64 Work step 22

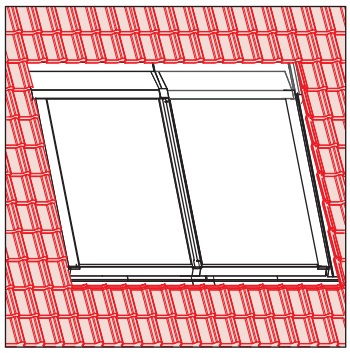


Fig. 3-65 Fully covered roof

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:

1. Press the retaining clamps out of the engagement positions and pull off (fig. 3-66 and fig. 3-67).
2. Pull off the connection elbows (fig. 3-67).

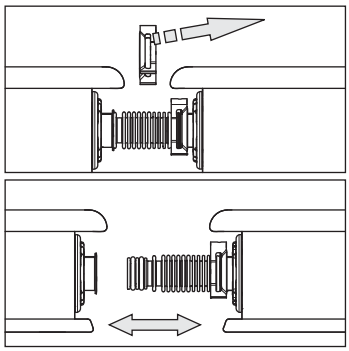


Fig. 3-66 Work step 1

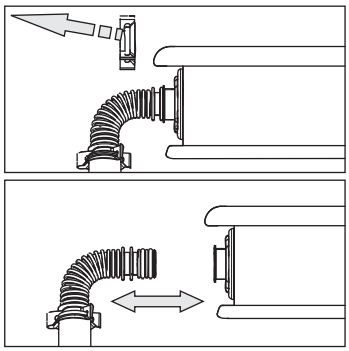


Fig. 3-67 Work step 2

4.1 Start-up

The instructions for the hydraulic system incorporation, the commissioning, the operation of the controller and the fault and malfunction rectification are included in the installation and maintenance instructions of the regulation and pump unit (p=0 EKSRPS3 or +p EKSR3PA + EKSRDS1A).

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 water heating for an extended period, the DAIKIN Solar system can be switched off temporarily at the mains switch of the DAIKIN Solar system R3 controller.

If there is a danger of frost:

- the DAIKIN Solar system must be taken into operation again
  or
- 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 4.2.1).
- 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

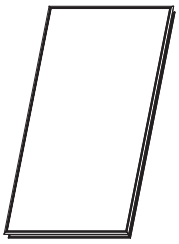
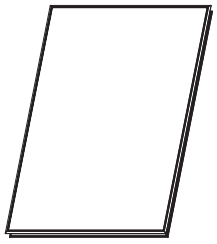
The DAIKIN Solar system has an environmentally friendly design. During the disposal process, the only waste created is that which can be used for material or thermal recycling.

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 Technical data

5.1 Basic data

Flat solar panel	EKSV21P	EKSV26P
Basic data		
Dimensions L x W x H	2000 x 1006 x 85 cm	2000 x 1300 x 85 cm
Gross surface area	2.01 m2	2.60 m^2
Aperture surface area	1.79 m^2	2.35 m^2
Absorber surface area	1.80 m^2	2.36 m^2
Absorber	Harp-shaped copper tube register with welded-on highly selective coated aluminium sheet.	
Coating	MIRO-THERM (absorption max. 96 %, emission approx. 5 % ± 2 %)	
Glazing	Single pane safety glass, Transmission approx. 92 %	
Heat insulation	Rock wool (50 mm)	
Weight	35 kg	42 kg
Water content	1.3 l	1.7 l
Max. pressure drop at 100 l/h	3.5 mbar.	3.0 mbar.
Permissible roof inclination (in-roof mounting)	15° to 80°	
Max. standstill temperature	approx. 200 °C	
Max. operating pressure	6 bar	
The flat solar panel is stable for a long period and is protected against thermal shock. Minimum solar panel yield above 525 kWh/m^2 per year with 40 % cloud coverage (location Würzburg)		

5.2 Technical Data Flat Solar Panel

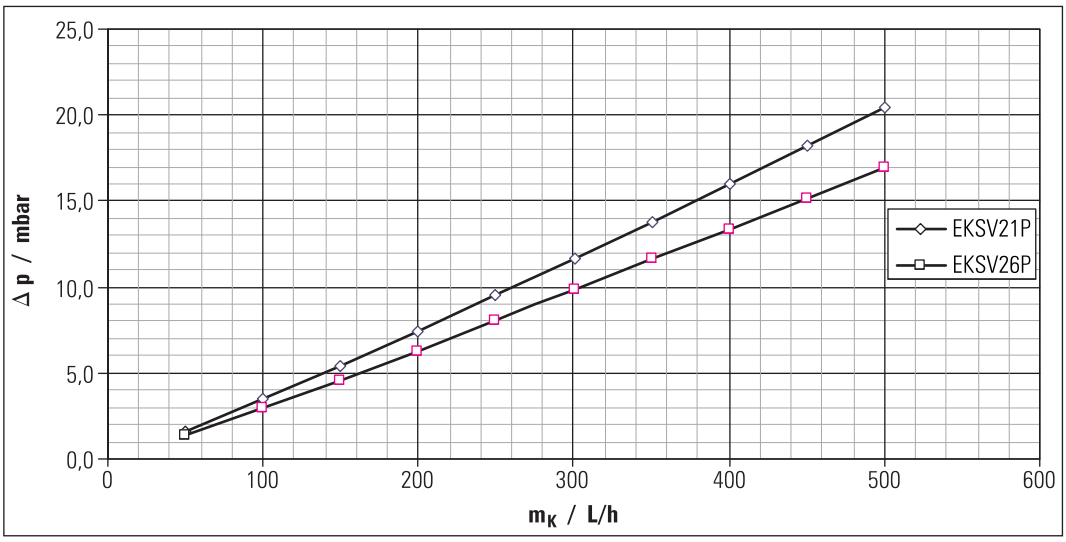


Fig. 5-1 Hydraulic resistance flat solar panels

5.3 Wind zones

5.3.1 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. 5-1 Wind zone sub-division

5.3.2 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				
Inland	25 m	25 m	25 m	18 m	25 m
Coast	25 m	10 m	25 m	–	10 m

Tab. 5-2 Max. permissible building heights for flat solar panels for in-roof installation

5.4 Snow load zones

Snow load	Snow load zone	Maximum permissible altitude for flat solar panel installation	
< 0.65 kN/m²	1	448 m	507 m
	1a	400 m	418 m
< 0.85 kN/m²	2	not permissible	286 m
	2a	not permissible	
< 1.10 kN/m²	3	not permissible	

Tab. 5-3 Max. permissible snow loads for flat solar panels for in-roof installation

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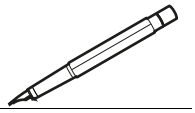

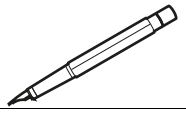

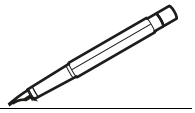

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