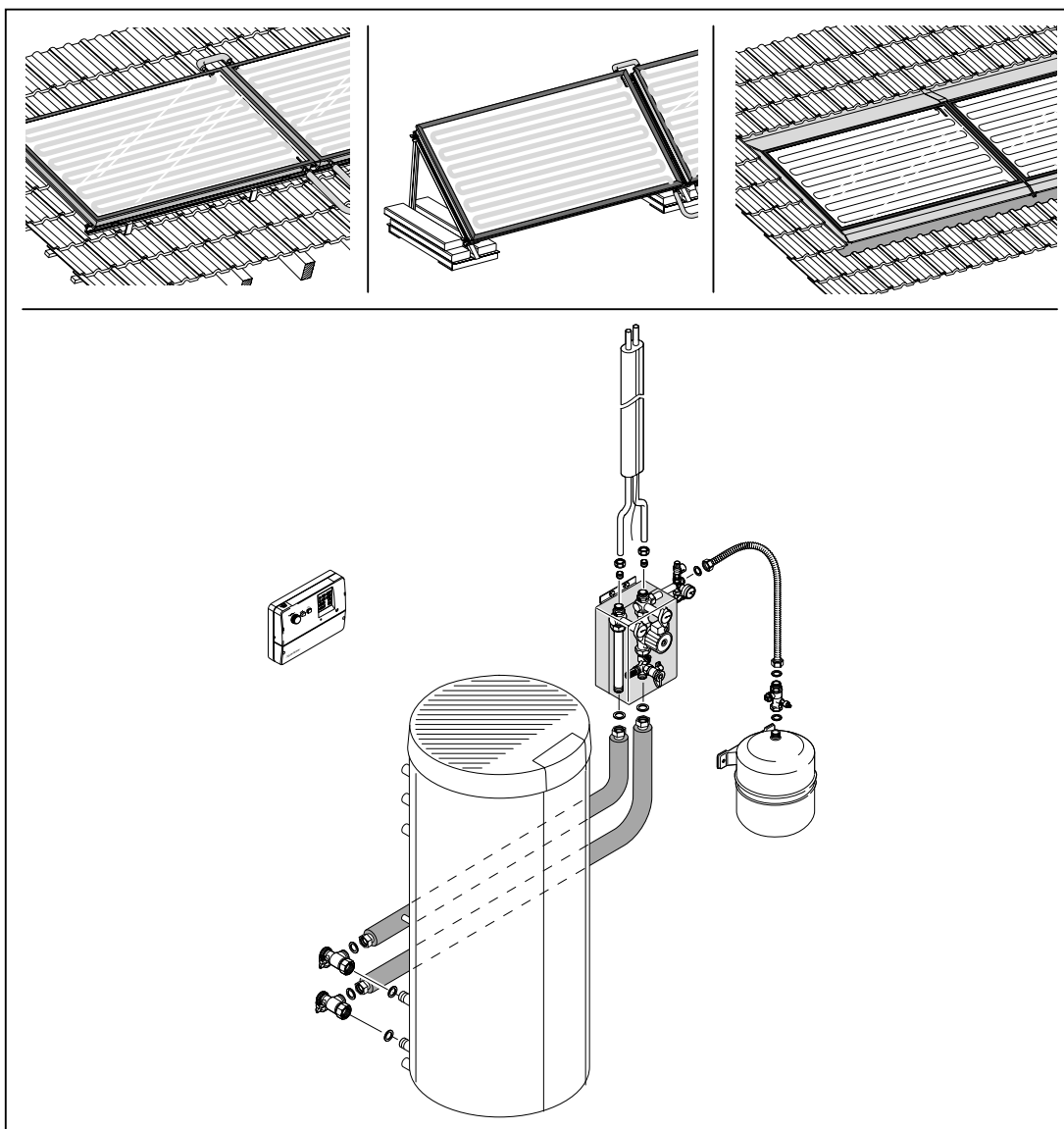


–weishaupt–

manual

Installation and operating instruction



Conformity certification

4801000002

Manufacturer: **Max Weishaupt GmbH**

Address: **Max-Weishaupt-Straße
D-88475 Schwendi**

Product: Solar flat collector

**WTS-F1 K1,
WTS-F1 K2**


The product described above conforms with
the regulations of directives:

PED 97 / 23 / EC

This product is labelled as follows:

CE

Schwendi, 15.02.2010

ppa. 
Dr. Lück

ppa. 
Denkinger

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1 User instructions









1 User instructions

These installation and operating instructions form part of the system and must be kept on site at all times.

Translation of original
operating instructions

1.1 User guide

1.1.1 Symbols

 DANGER	<p>Immediate danger with high risk. Non observance can lead to serious injury or death.</p>
 WARNING	<p>Danger with medium risk. Non observance can lead to environmental damage, serious injury or death.</p>
 CAUTION	<p>Danger with low risk. Non observance can cause damage to the equipment and injury to personnel.</p>
	<p>Important information.</p>
	<p>Requires direct action.</p>
	<p>Result after an action.</p>
	<p>Itemisation.</p>
	<p>Range.</p>

1.1.2 Target group

These installation and operating instructions are intended for the operator and qualified personnel. They should be observed by all personnel working on the system.

Work on the system must only be carried out by personnel who have the relevant training and instruction.

1 User instructions

1.2 Guarantee and Liability

Guarantee and liability claims for personal and equipment damage are excluded, if they can be attributed to one or more of the following causes:

- Non approved application of the unit,
- non-observance of the installation and operating instruction,
- operating the unit with faulty safety equipment,
- continual operation despite a fault,
- improper installation, commissioning, operation and service of the unit,
- alterations to the unit,
- the installation of additional components, which are not intended for the use with the solar system,
- repairs, which have been carried out incorrectly,
- the use of non original Weishaupt parts,
- unsuitable media,
- defects in the inlet lines,
- acts of God.

2 Safety

2 Safety

2.1 Permissible application

The solar system is suitable for heating a heat transfer medium in a closed circuit by solar radiation. The ready mixed Tyfocor L, with frost protection up to $-30\text{ }^{\circ}\text{C}$, is used as the heat transfer medium.

The system should only be constructed and operated with the designated control options.

It is not permitted to use shut off valves (exception: cap valves) between collector and expansion vessel.

Improper use could:

- endanger the health and safety of the user or third parties,
- cause damage to the system or other material assets.

2.2 Safety measures

Safety relevant fault conditions must be eliminated immediately.



Observe TYFO EU Safety Datasheet for heat transfer medium Tyfocor L.
See www.weishaupt.de, Print No. 860001xx

2.2.1 Normal operation

- All labels on the system must be kept in legible condition,
- stipulated settings, service and inspection work should be carried out at regular intervals.

2.2.2 Electrical connection

For all work carried out on live parts:

- Observe the accident prevention instructions BGV A3 and adhere to local directives,
- tools in accordance with EN 60900 should be used.

2.3 Alterations to the construction of the equipment

All conversions require written approval from Max Weishaupt GmbH.

- Use only additional components which are intended for use with solar systems,
- use only original Weishaupt replacement parts.

2.4 Disposal

Dispose of all materials used in a safe and environmentally friendly way. Observe local regulations.

3 Product description

3 Product description

3.1 Type key

WTS-F1, K1

WTS-	Series: Weishaupt Thermo Solar
F	Type of construction: Flat collector
1,	Construction: 1
K1	Version: In roof, on roof, flat roof

3.2 Variations

K1

In roof horizontal

On roof

Flat roof

K2

In roof vertical

On roof

Flat roof

K3

Flat roof horizontal with integrated collectors

K4

Flat roof vertical with integrated collectors

3 Product description

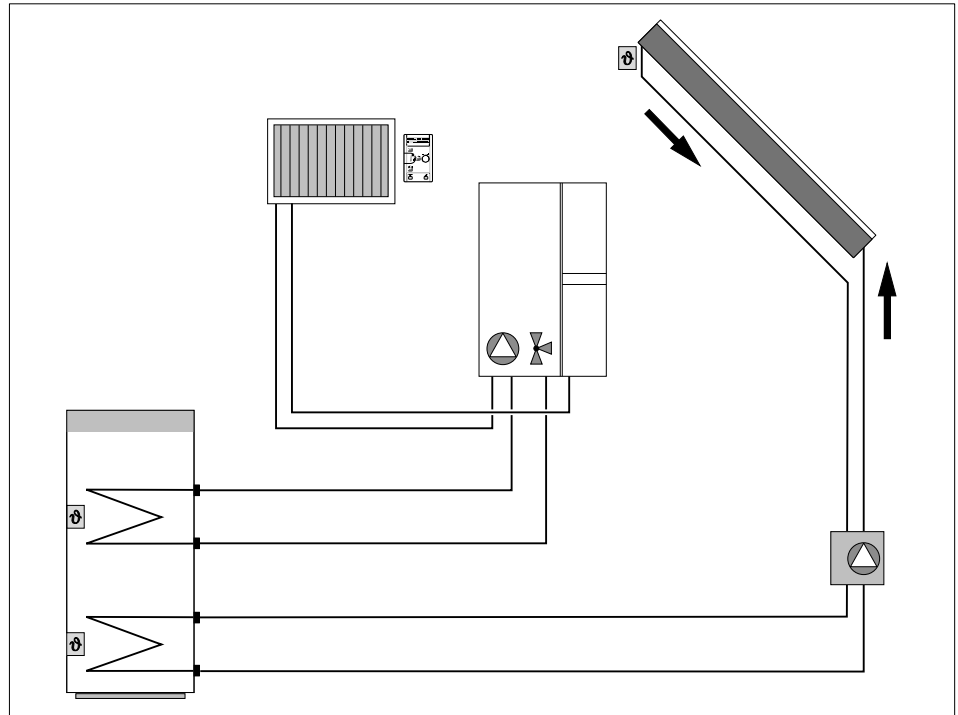
3.3 Function

Temperature sensor

The temperature sensor measures the temperature in the collector or in the water heater and transmits this to the Solar controller.

System pipework

The heat is transferred to the water heater in a closed circuit via a system pipework and fittings.



Solar controller

The solar controller is used to control the circulation pump. A temperature difference between water heater and collector is programmed into the controller.

Circulation pump

If, after reaching the temperature difference set in the solar controller, the temperature in the collector:

- is higher than in the water heater, the pump is switched on,
- is lower than in the water heater, the pump is switched off.

3 Product description**3.4 Technical data****3.4.1 Approval data**

	K1	K2	K3 and K4
DIN CERTCO	011-7S094F	011-7S094F	011-7S330F
ITW	06COL476OEM01	05COL4030EM01	-
SPF	-	-	C907
CSTBat	ATec 14/07 - 1113	ATec 14/07 - 1113	ATec 14/07 - 1201

3.4.2 Hydraulic data

	K1 and K2	K3 and K4
Nominal volume flow at 20 l/hm ²	46 l/h	-
Nominal volume flow at 30 l/hm ²	-	69 l/h
Pressure loss based on the nominal volume flow	15 mbar	200 mbar

3.4.3 Ambient conditions

Temperature in operation	-30 °C ... +120 °C
Temperature during transport/storage	+10 °C ... +50 °C
relative humidity during transport/storage	max 60 %

3.4.4 Rating

	K1 and K2	K3	K4
Heat capacity without heat transfer medium	12.8 kJ/K	10.6 kJ/K	10.6 kJ/K
Heat capacity with heat transfer medium	21.5 kJ/K	19.7 kJ/K	17.8 kJ/K
Thermal loading	1860 W	1888 W	1888 W

3.4.5 Efficiency

To DIN EN 12975, based on aperture area:

	K1 and K2	K3 and K4
Efficiency η_0	0.802	0.827

3.4.6 Operating pressure

	K1 and K2	K3 and K4
Operating and test pressure	max 6 bar	max 5 bar

3.4.7 Operating temperature

	K1 and K2	K3 and K4
Stagnation temperature (1000 W/m ² , 30°C)	201°C	209°C

3 Product description

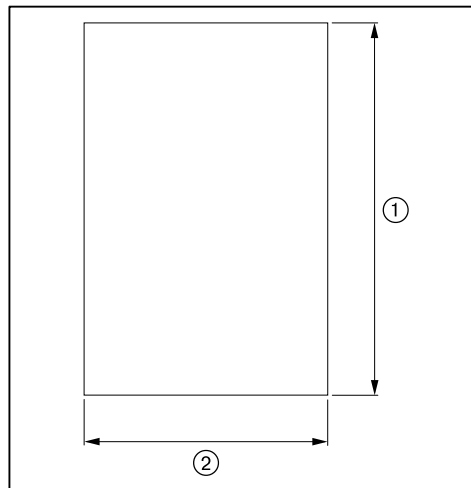
3.4.8 Wind and snow load

	K1 and K2	K3 and K4
Maximum wind drag vertical to roof level (in roof)	1.6 kN/m ²	1.6 kN/m ²
Maximum wind drag vertical to roof level (on roof)	1.4 kN/m ²	1.4 kN/m ²
Maximum snow and wind pressure vertical to roof level (in roof)	6.5 kN/m ²	6.5 kN/m ²
Maximum snow and wind pressure vertical to roof level (on roof)	1.4 kN/m ²	1.4 kN/m ²

3.4.9 Contents

	K1	K2	K3	K4
Content heat transfer medium	2.3 litre	2.3 litre	2.4 litre	1.9 litre
Type of heat transfer medium	Tyfocor L 45 %			

3.4.10 Dimensions



	K1	K2	K3	K4
Gross area	2.58 m ²	2.58 m ²	2.55 m ²	2.55 m ²
Absorber area	2.30 m ²	2.30 m ²	2.28 m ²	2.28 m ²
Aperture area	2.32 m ²	2.32 m ²	2.28 m ²	2.28 m ²
① Length	1234 mm	2092 mm	1223 mm	2081 mm
② Width	2092 mm	1234 mm	2081 mm	1223 mm
Height	108 mm	108 mm	111 mm	111 mm

3.4.11 Weight

	K1	K2	K3	K4
Empty weight	42 kg	42 kg	52 kg	52 kg

4 Installation

4 Installation

4.1 Installation conditions

Observe rules and standards of the German roofers trade and local regulations.



Observe regulations for lightening protection (see VDE V0185, Part 1 to 5).

- ▶ Earth flow and return pipework of the solar circuit with minimum 16 mm² CSA cable at the potential equalisation rail.

- ▶ Ensure the roof construction is in tip-top condition.
- ▶ Check design of substructure.
- ▶ Check bearing capacity of roof.
- ▶ Check hydraulic layout of collectors.
- ▶ Check layout and sizing of manifolds.
- ▶ Check alignment and shading of collectors.
- ▶ Leave edge of area free for high wind load and safe accessibility.
- ▶ Avoid copper plating above the collector area due to corrosion.



It must be possible for the snow to slide off unobstructed.

- ▶ If a snow guard or other obstacle is present, check snow load.
- ▶ Reinforce substructure or use multiple roof hooks.

- ▶ Check that the permissible pitch is observed.

	permissible roof pitch
On roof	15° ... 70°
Flat roof	max 6°
In roof	23° ... 70°
In roof with special accessories	15° ... 22°



To avoid unnecessarily high thermal loading of the collectors, commission the solar system as soon as possible after installation.

4 Installation

4.2 Transport



Damage to the collectors due to incorrect positioning

Frame is bent.

Glass pane is damaged.

▶ Let the collector rest on an even surface or on its corners only.

▶ Always transport collector with the glass pane facing upwards.

▶ Do not stand the collector on its connection points.

▶ If necessary place on wooden blocks.



Further installation instructions are described in the abbreviated instructions enclosed.

5 Installation

5 Installation

5.1 Hydraulic connection

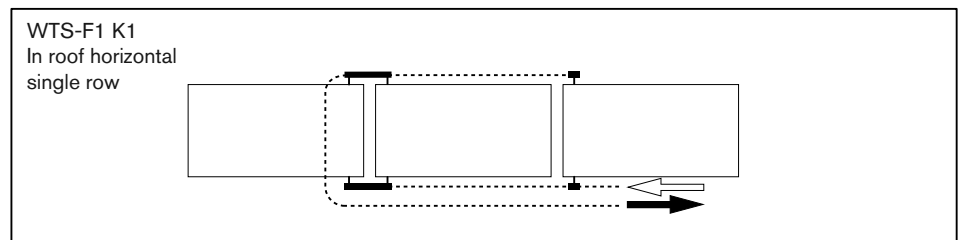
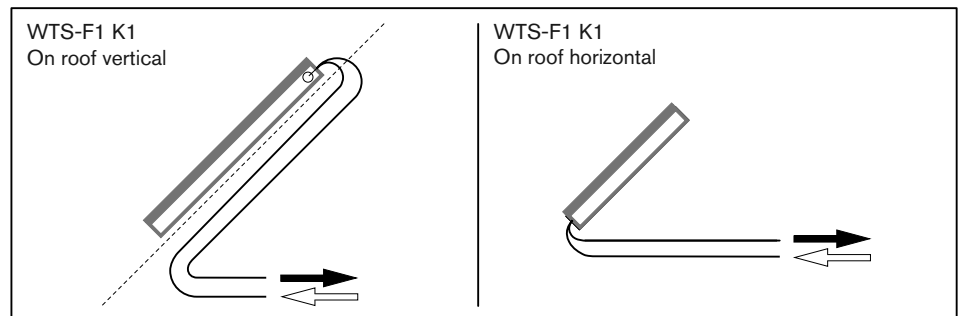
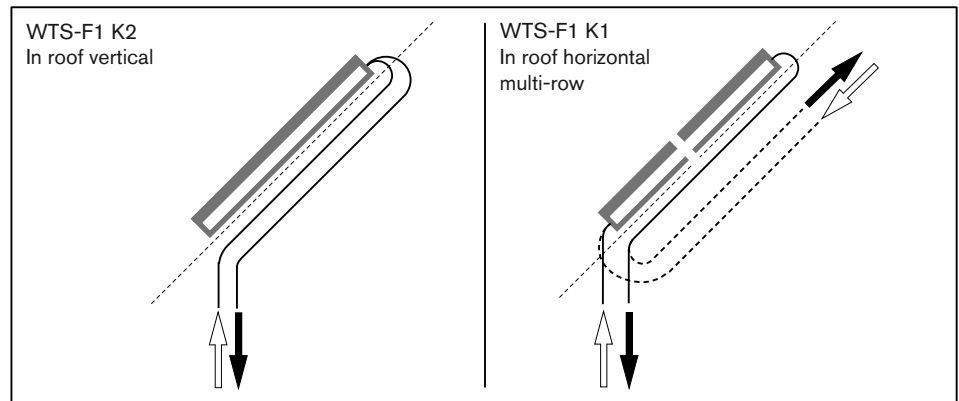
Pipework installation



The collector's connection unions are self sealing.
▶ Do not use additional seals.

Bending radius of stainless steel corrugated tube: 40 mm.

- ▶ Install the pipework to the water heater without siphon bends.
- ✓ The pipework can be drained for servicing.



Safety valve

- ▶ Install vent line securely to the safety valve of the solar pump assembly.
- ▶ Place collecting vessel under the vent line.

6 Commissioning

6 Commissioning

6.1 Prerequisite

The commissioning may only be carried out by qualified personnel.

- ▶ Please check that all installation work has ben completed prior to commissioning.

6 Commissioning

6.2 Set expansion vessel



Pressure increase due to closed cap valve

System could be destroyed

- ▶ Only close cap valve if:
 - sun radiation is limited (e. g. in the morning),
 - the collectors are covered.

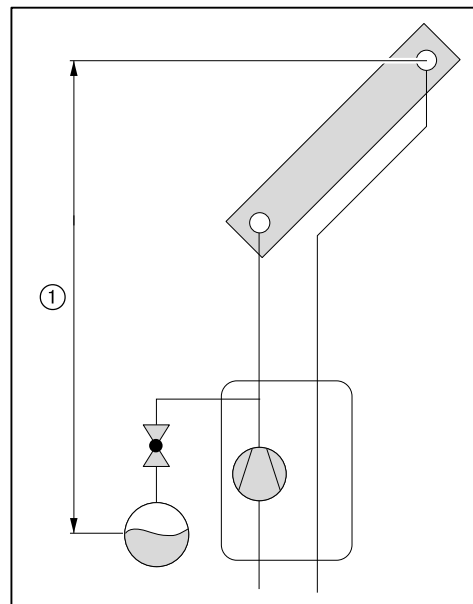
The expansion vessel is filled with Nitrogen at the factory and preset to an inlet pressure of 2.5 bar.

Set inlet pressure

The inlet pressure of the expansion vessel should be set prior to filling the system.

The inlet pressure is calculated from the static height ① of the system.

The static height is measured from the connection of the expansion vessel to the highest point of the system.



- ▶ Determine inlet pressure using the table and note down.
- ▶ Check inlet pressure of the expansion vessel and if necessary adjust to the value determined.

Height	5 m	10 m	15 m	20 m	25 m
Supply pressure	1.5 bar	2.0 bar	2.5 bar	3.0 bar	3.5 bar

Select 1.5 bar if the static ceiling is less than 5 metres.

A line vessel should be considered for:

- roof heating systems,
- short connection lines to the solar panels.

6 Commissioning

6.3 Commissioning

1. Fill, rinse and vent collector circuit



Danger of getting scalded when commissioning during intense sun radiation
Hot heat transfer medium can cause scalding.

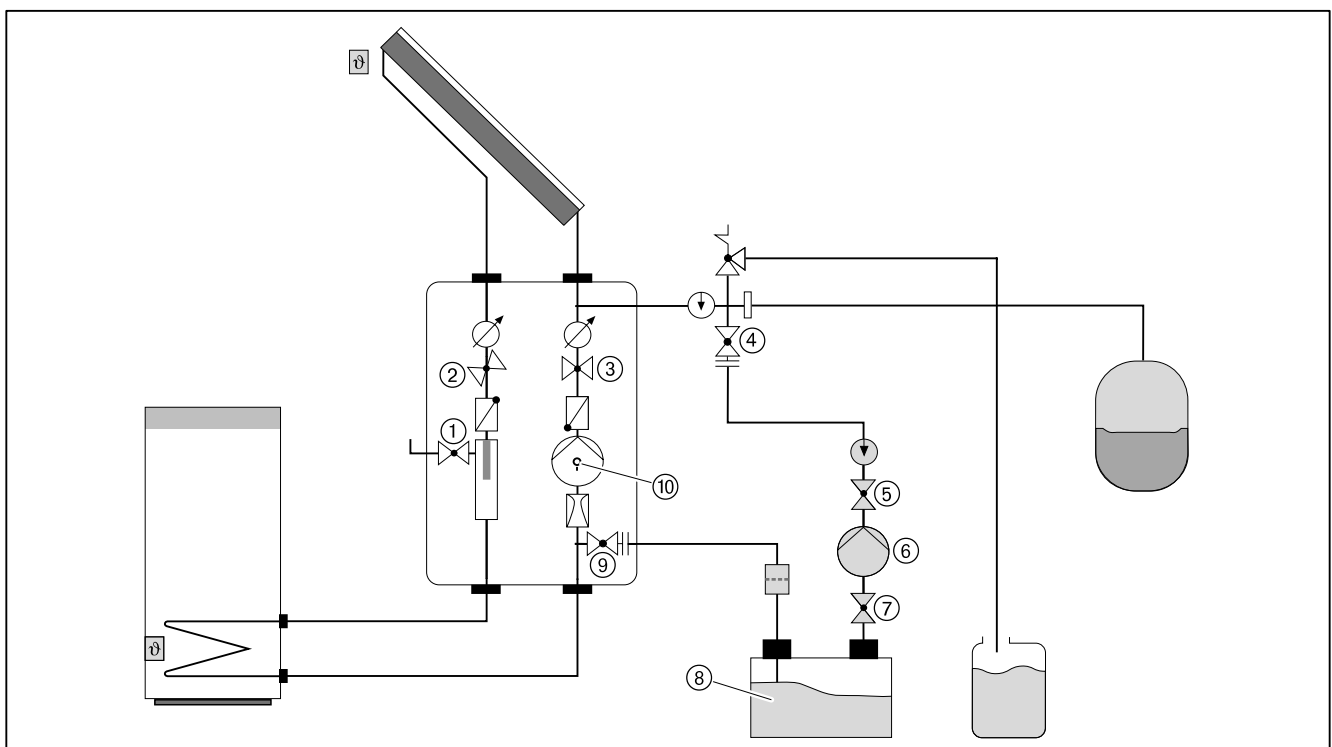
- ▶ Commissioning of the solar system should only be carried out when sun radiation is low (e. g. in the morning) or with the collectors covered.



Damage to the heat transfer medium when filling during intense sun radiation
The function of the heat transfer medium can be affected when filling at high temperatures.

- ▶ The solar system should only be filled when sun radiation is low (e. g. in the morning) or with the collectors covered.

- ▶ Connect jet pump ⑥ with full heat transfer medium canister ⑧ to tap ④ and tap ⑨.
- ▶ Open tap ⑤, ⑦ and ⑨ and set tap ② to 45°.
- ▶ Close tap ③
- ▶ Switch on jet pump.
- ▶ Briefly operate tap ⑨ and return ball valve ③ several times to increase the pressure.
- ✓ The last air bubbles are expelled.
- ✓ Flush solar system for at least 20 minutes.
- ✓ Heat transfer medium exits the drain hose without bubbles.
- ▶ Vent solar pump via vent screw ⑩.
- ▶ Vent inlet pipe via vent screw ①.
- ▶ Close tap ④ and ⑨.
- ▶ Switch off jet pump.
- ▶ Open tap ② and ③.



6 Commissioning

- ▶ Check and document frost protection content.



The frost protection content must be sufficient for the lowest temperature expected at the relevant system location.

Example

- ▶ Enter a frost protection value of 5 to 10 K higher than that of the measured frost protection content at the solar controller WRSol under *Change setting*.
- | | |
|--------------------------|--|
| Frost protection content | -30°C |
| Set parameter to | -20°C
(Presetting solar controller) |

2. Check soundness

- ▶ Check soundness of all connection points and taps.
- ▶ Do not exceed maximum operating pressure (see Ch. 3.4.6).

3. Set system pressure

- ▶ Set system pressure 0.3 bar above the selected inlet pressure of the expansion vessel.
- ▶ If pressure needs to be reduced, open outlet tap on flow meter and let heat transfer medium flow back into the canister via the outlet hose.
- ▶ Set indicator of pressure gauge to the system pressure.
- ▶ Place empty canister of heat transfer medium under the vent line.

	System height ⁽¹⁾					
	5 m	10 m	15 m	20 m	25 m	30 m
Inlet pressure of expansion vessel	1.5 bar	2.0 bar	2.5 bar	3.0 bar	3.5 bar	4.0 bar
System pressure	1.8 bar	2.3 bar	2.8 bar	3.3 bar	3.8 bar	4.3 bar

⁽¹⁾Difference between highest system point and expansion vessel

6 Commissioning

4. Set nominal volume flow

The recommended nominal volume flow should be achieved at an average heat transfer medium temperature of 50° C. Lower temperatures lead to decreased volume flow (see table).



In conjunction with speed control it is possible that the display of the flow meter pulsates in the lower pump speed range.

- ▶ Calculate average temperature:
 - calculate average value from flow and return temperature – or –
 - calculate average value from collector temperature and temperature at the bottom of the storage tank.
- ▶ Nominal volume flow see table.
- ▶ Switch on WRSol controller in manual operation, do not alter standard pump rating setting of 100 %.
- ▶ Fully open flow meter at pump assembly.
- ▶ Set pump to stage 1 and determine volume flow at flow meter.
- ▶ Increase pump stage until the nominal volume flow determined has been achieved and/or is exceeded.
- ▶ Set solar controller to automatic operation.

**K1 and K2
Number of collectors**

Average temperature	2	3	4	5	6	7	8	9
0 °C	45 l/h	68 l/h	90 l/h	113 l/h	135 l/h	158 l/h	180 l/h	203 l/h
10 °C	54 l/h	81 l/h	108 l/h	135 l/h	162 l/h	189 l/h	216 l/h	243 l/h
20 °C	63 l/h	95 l/h	126 l/h	158 l/h	189 l/h	221 l/h	252 l/h	284 l/h
30 °C	72 l/h	108 l/h	144 l/h	180 l/h	216 l/h	252 l/h	288 l/h	324 l/h
40 °C	81 l/h	122 l/h	162 l/h	203 l/h	243 l/h	284 l/h	324 l/h	365 l/h
50 °C	90 l/h	135 l/h	180 l/h	225 l/h	270 l/h	315 l/h	360 l/h	405 l/h
60 °C	99 l/h	149 l/h	198 l/h	248 l/h	297 l/h	347 l/h	396 l/h	446 l/h

**K3 and K4
Number of collectors**

Average temperature	2	3	4	5	6	7	8	9
0 °C	69 l/h	104 l/h	138 l/h	173 l/h	207 l/h	242 l/h	276 l/h	311 l/h
10 °C	83 l/h	124 l/h	166 l/h	207 l/h	248 l/h	290 l/h	331 l/h	373 l/h
20 °C	97 l/h	145 l/h	193 l/h	242 l/h	290 l/h	338 l/h	386 l/h	435 l/h
30 °C	110 l/h	166 l/h	221 l/h	276 l/h	331 l/h	386 l/h	442 l/h	497 l/h
40 °C	124 l/h	186 l/h	248 l/h	311 l/h	373 l/h	435 l/h	497 l/h	559 l/h
50 °C	138 l/h	207 l/h	276 l/h	345 l/h	414 l/h	483 l/h	552 l/h	621 l/h
60 °C	152 l/h	228 l/h	304 l/h	380 l/h	455 l/h	531 l/h	607 l/h	683 l/h

7 Shutdown

7 Shutdown



The system remains in operation during holidays and prolonged periods of absence.

- ▶ Shut down the system for service work.
- ▶ Switch off the solar pump at the solar controller.

8 Servicing

8 Servicing



Electric shock when working with voltage applied

The consequence is serious injury or death.

- ▶ Isolate unit prior to carrying out service work and protect against accidental re-connection to the mains.



Danger of scalding when servicing during intense sun radiation

Hot heat transfer medium can cause scalding.

- ▶ Servicing of the solar system should only be carried out when sun radiation is low (e. g. in the morning) or with the collectors covered.



Danger of getting burned on the unit

Hot components can lead to burns.

- ▶ Allow components to cool before touching.

The end user should ensure that the solar system is serviced at least once a year. Service work must only be carried out by qualified personnel with the relevant expertise. Depending on site conditions it may be necessary to inspect the installation more frequently.



Weishaupt recommends a service contract is entered into to ensure regular inspections.

Prior to servicing

- ▶ Inform operator.
- ▶ Switch off mains switch of installation and safeguard against accidental reactivation.

Following servicing

- ▶ Check soundness of all connection points and taps.
- ▶ Check function.

8 Servicing

8.1 Service plan

Components	Criteria	Service procedure
Heat transfer medium	No frost protection	▶ Replace
	pH value < 7	▶ Replace
	Fluffy consistency and pungent odour	▶ Replace
Collectors	Heavy soiling	▶ Clean
	Damage	▶ Replace
Substructure	Heavy soiling	▶ Clean
	Damage	▶ Replace
System pipework	Damaged/leaking heat transfer medium	▶ Make tight ▶ Replace if necessary
	Damage to insulation	▶ Repair insulation
Vent line	Leaking heat transfer medium	▶ Check expansion vessel
Thermostatic mixer valve	Temperature too low	▶ Check function. ▶ Clean ▶ If necessary replace thermostat element.
Non return valve	Heat transfer medium circulating without pump operation	▶ Replace
Safety valve	Defective	▶ Replace
Expansion vessel	Incorrect inlet pressure	▶ Adjust inlet pressure
Temperature sensor	Value not plausible	▶ Measure resistance value. ▶ Replace if necessary
Circulation pump	Defective	▶ Replace
Vent	Air in the system	▶ Vent
System pressure	Commissioning value not maintained	▶ Adjust
Nominal volume flow	Commissioning value not maintained	▶ Adjust

8.2 Replacing heat transfer medium

Observe notes on servicing (see Ch. 8).

The heat transfer medium Tyfocor L ensures frost protection of the solar system down to -30 °C. It is possible that the heat transfer medium becomes dark over time. Replacement is only necessary to the criteria in the service schedule.

- ▶ Completely drain the system.
- ▶ Fill system with new heat transfer medium (see Ch. 6.3).

9 Accessories**9 Accessories****Brush strip**

For positive alignment of ridge plate to the roof tiles.

	Order No.
Brush strip for version in roof vertical	480 020 01 33 2
Brush strip for version in roof horizontal	480 020 01 34 2

Design aperture

	Order No.
Design aperture for horizontal assembly	480 020 00 25 2
Design aperture for vertical assembly	480 020 00 24 2

Frost protection tester

	Order No.
Frost protection tester for pH measurement for Tyfo-cor L (down to -40 °C)	669 192

Jet pump

	Order No.
Jet pump for venting and pressurised filling Rating: 4000 l/h Operating pressure: 4 bar	601 648

Installation aid

	Order No.
Installation aid glass suction handle Carrying capacity 56 kg	669 169

Personal safety harness

Complete anti-fall system, corresponding to DIN EN 363, for safe and easy installation work.

	Order No.
Set	669 170

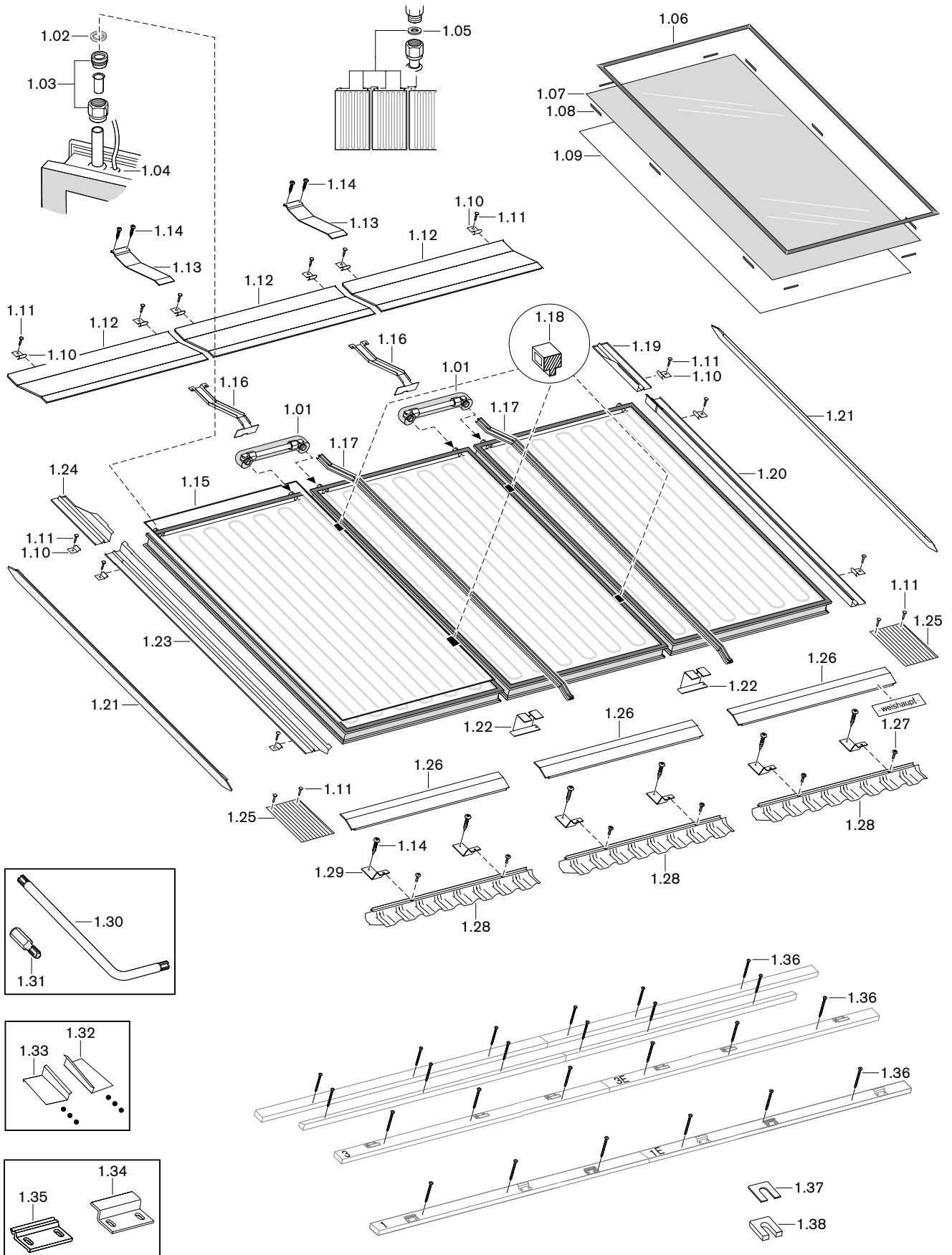
Test and top-up fitting

	Order No.
Test and top-up fitting for expansion vessel	480 010 00 41 2

10 Spares

10 Spares

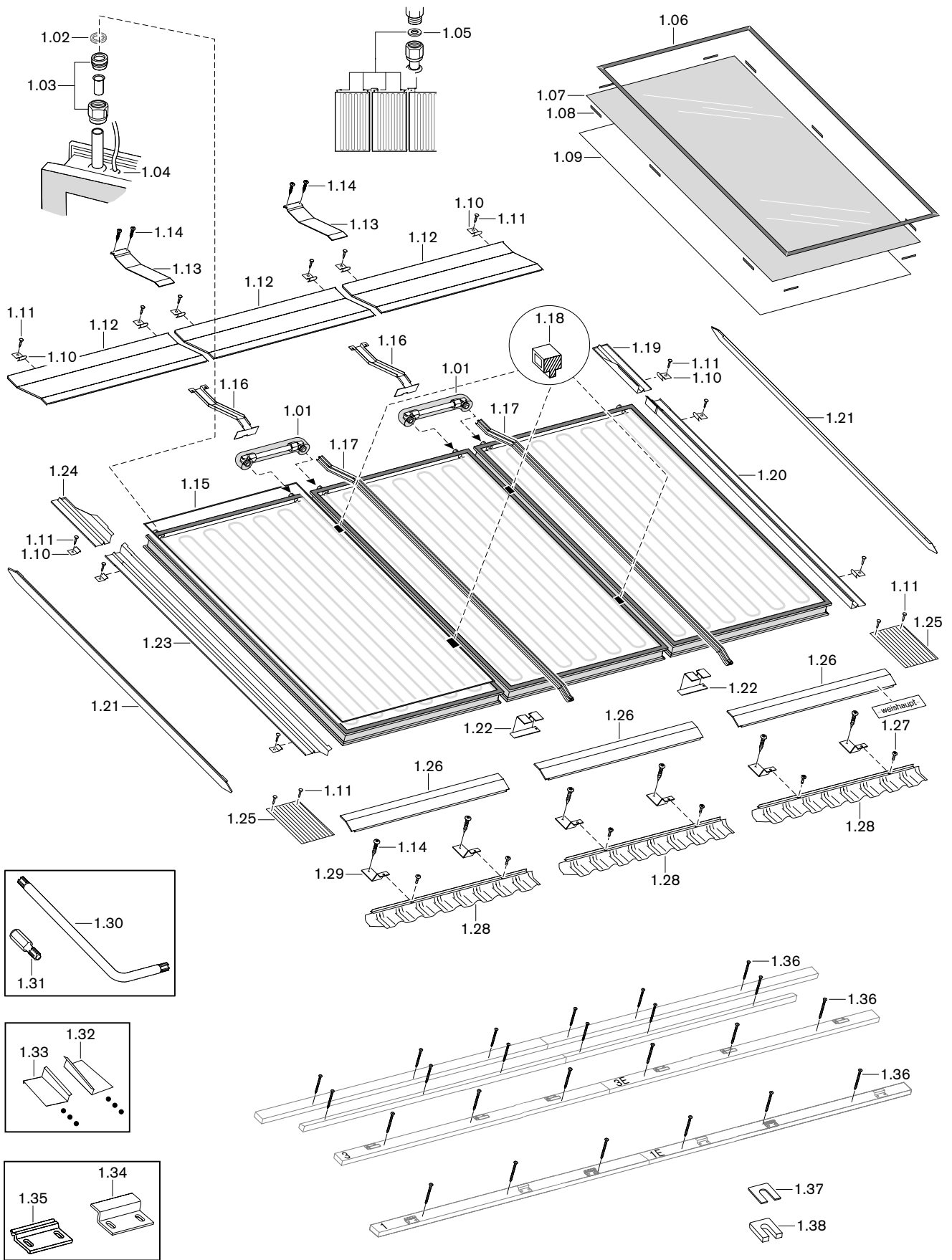
10.1 Spares In Roof Vertical



10 Spares

Pos.	Description	Order No.
1.01	Collector connection M16 x 1 x 181 with insulation	480 020 00 37 2
1.02	Repair sealing washer	on request
1.03	Clamping ring set (Serto)	480 020 00 01 2
1.04	Cable entry SNAP 5-7	480 020 00 04 7
1.05	Orifice	480 020 00 89 7
1.06	Glass securing seal for frame	480 020 00 03 7
1.07	Solar glass 2040 x 1182 x 3.2	480 010 01 35 7
1.08	Glazing block 10 x 2 x 100	480 020 00 02 7
1.09	Glass overlay seal WTS-F1 6.7 m long	480 020 00 01 7
1.10	Sheet metal clip	480 020 00 75 7
1.11	Clout nail 2.5 x 2.5 hot-dip galvanised	480 010 02 39 7
1.12	Ridge plate type V	480 020 00 54 7
	Ridge plate type V (15 ... 22° roof pitch)	480 020 01 02 7
1.13	Impact cover to ridge plate	480 020 00 55 7
	Impact cover to ridge plate (15 ... 22° roof pitch)	480 020 01 06 7
1.14	Chipboard screw Torx 6 x 30 galvanised	480 020 00 72 7
1.15	Connection seal for frame	480 020 00 80 7
1.16	Drainage plate ridge side	480 020 01 31 7
	Drainage plate ridge side (15 ... 22° roof pitch)	480 020 01 05 7
1.17	Drainage channel 1-IV	480 020 00 87 7
	Drainage channel 1-IV (15 ... 22° roof pitch)	480 020 01 10 7
1.18	Spacer WTS-F1 in roof	480 020 01 62 7
1.19	Side plate top right	480 020 00 63 7
	Side plate top right (15 ... 22° roof pitch)	480 020 01 04 7
1.20	Side plate bottom right type V	480 020 00 59 7
1.21	Cover plate single row type V	480 020 00 65 7
	Cover plate bottom left / top right type V (15 ... 22° roof pitch)	480 020 01 11 7
	Cover plate top left / bottom right type V (15 ... 22° roof pitch)	480 020 01 12 7
1.22	Drainage plate eaves side	480 020 00 79 7
1.23	Side plate bottom left type V	480 020 00 58 7
1.24	Side plate top left	480 020 00 62 7
	Side plate top left (15 ... 22° roof pitch)	480 020 01 03 7

10 Spares

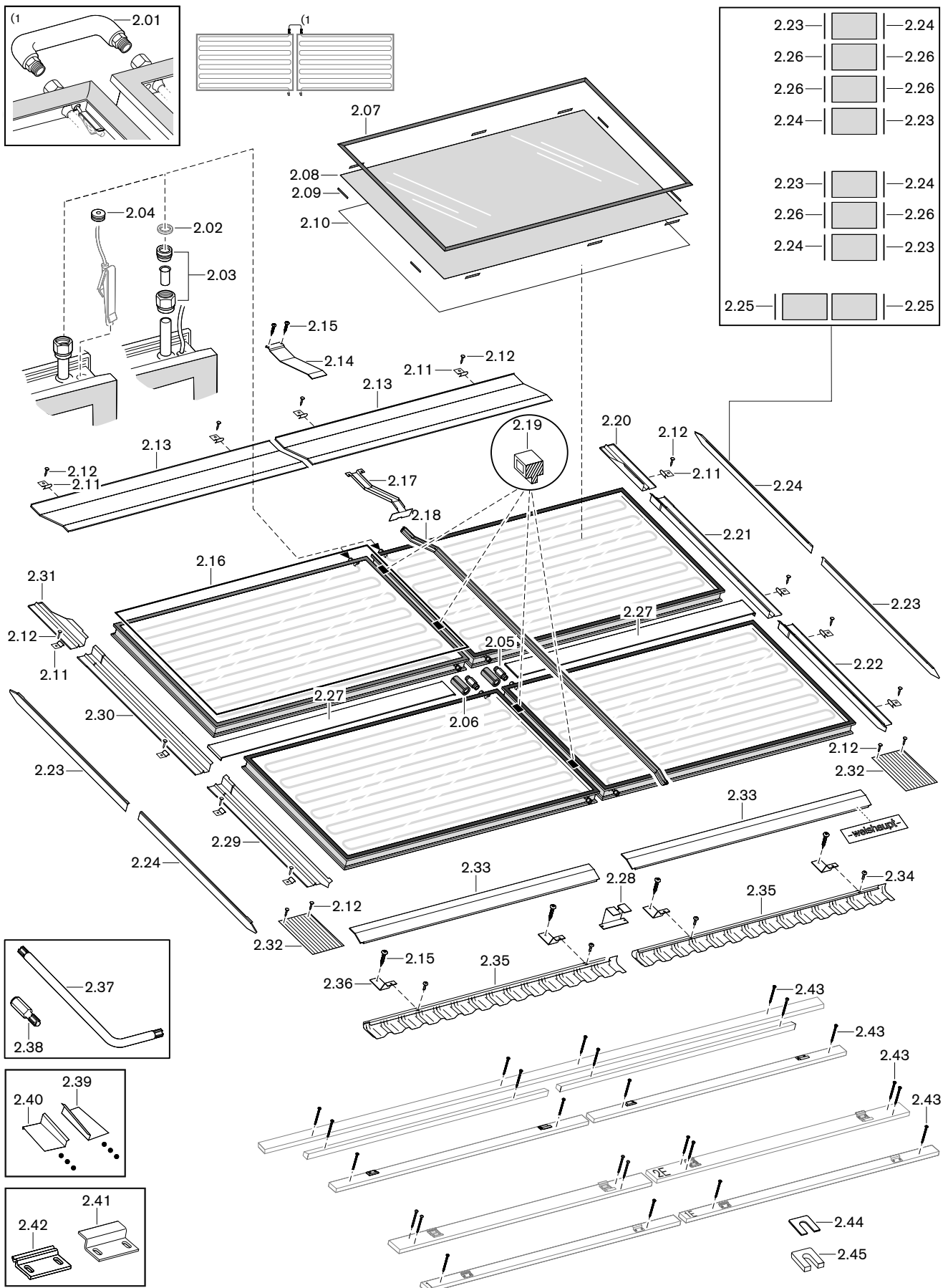


10 Spares

Pos.	Description	Order No.
1.25	Cover plate 300 x 420 red/brown	480 020 00 83 7
1.26	Eaves plate type V	480 020 00 52 7
1.27	Fillister head screw M6 x 10	480 020 00 33 7
1.28	Sealing apron type V	480 020 00 82 7
1.29	Eaves plate support	480 020 00 77 7
1.30	Pin wrench for Torx TX30, 24/120 mm	480 020 00 12 7
1.31	Torx-Bit 1/4" TX30, 25 mm	480 020 00 11 7
1.32	Bracket right (plain tiles only)	480 020 00 71 7
1.33	Bracket left (plain tiles only)	480 020 00 70 7
1.34	Sliding plate (slate only)	480 020 00 48 7
1.35	Clamping plate 70 mm (slate only)	480 020 00 49 7
1.36	Chipboard screw Torx 6 x 80 galvanised	480 020 00 74 7
1.37	Mounting base 3 mm	480 010 00 69 7
1.38	Mounting base 5 mm	480 010 00 70 7

10 Spares

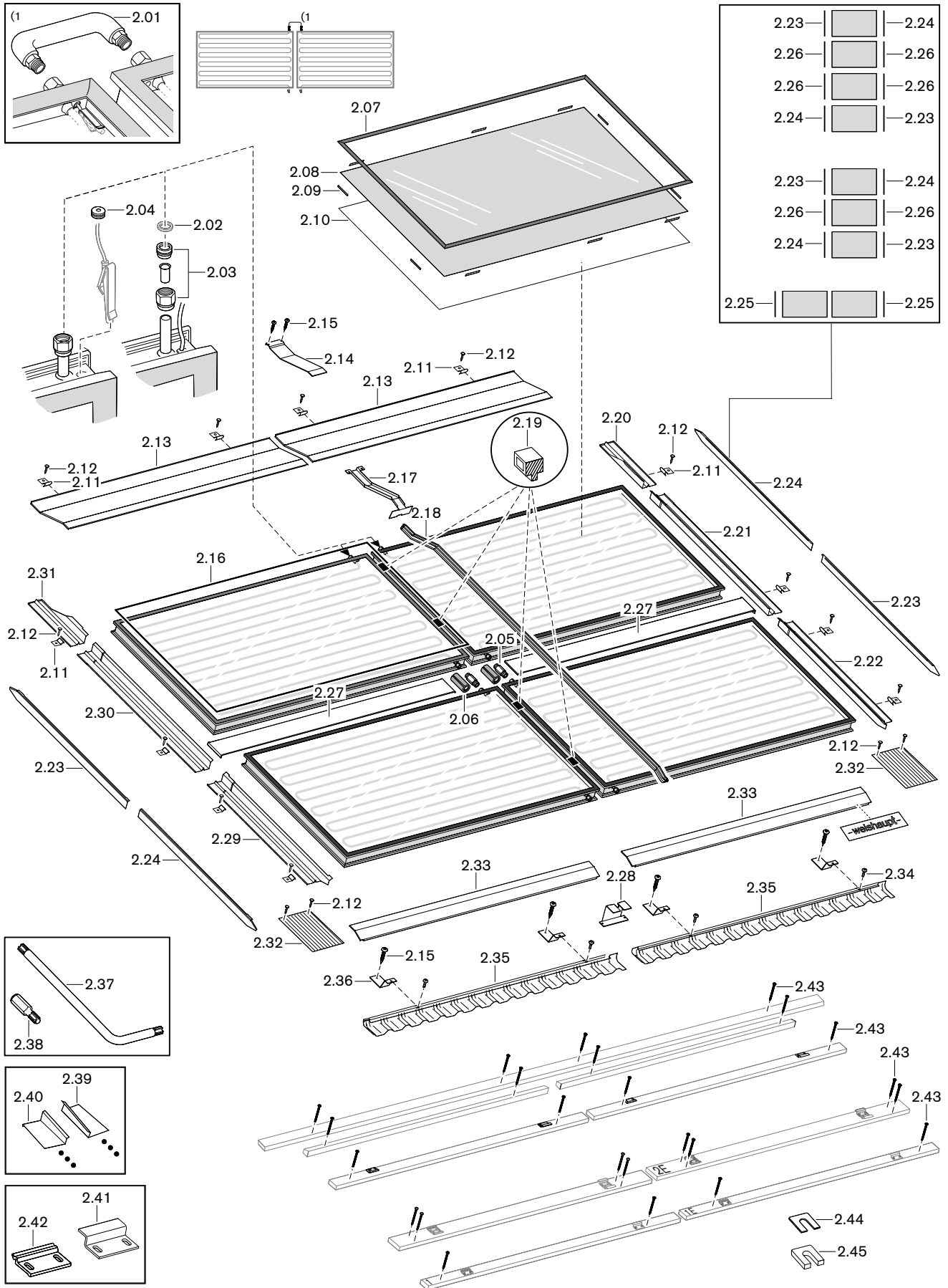
10.2 Spares In Roof Horizontal



10 Spares

Pos.	Description	Order No.
2.01	Collector connection M16 x 1 x 233 with insulation (only for 2 panel field 2x1)	480 020 00 36 2
2.02	Repair sealing washer	on request
2.03	Clamping ring set 12 (Serto)	480 020 00 01 2
2.04	Cable entry SNAP 5-7	480 020 00 04 7
2.05	Collector connection M16 x 1 x 41	480 020 00 10 7
2.06	Insulation 22/13	480 020 00 23 7
2.07	Glass securing seal for frame WTS-F1	480 020 00 03 7
2.08	Solar glass 2040 x 1182 x 3.2	480 010 01 35 7
2.09	Glazing block 10 x 2 x 100	480 020 00 02 7
2.10	Glass overlay seal WTS-F1	480 020 00 01 7
2.11	Sheet metal clip	480 020 00 75 7
2.12	Clout nail 2.5 x 2.5 hot-dip galvanised	480 010 02 39 7
2.13	Ridge plate type H Ridge plate type H 15 ... 22° roof pitch	480 020 00 53 7 480 020 01 01 7
2.14	Impact cover to ridge plate Impact cover to ridge plate (15 ... 22° roof pitch)	480 020 00 55 7 480 020 01 06 7
2.15	Chipboard screw Torx 6 x 30 galvanised	480 020 00 72 7
2.16	Connection seal for frame	480 020 00 80 7
2.17	Drainage plate ridge side Drainage plate ridge side (15 ... 22° roof pitch)	480 020 01 31 7 480 020 01 05 7
2.18	Drainage channel 1-IH Drainage channel 2-IH Drainage channel 3-IH Drainage channel 1-IH (15 ... 22° roof pitch) Drainage channel 2-IH (15 ... 22° roof pitch) Drainage channel 3-IH (15 ... 22° roof pitch)	480 020 00 84 7 480 020 00 85 7 480 020 00 86 7 480 020 01 07 7 480 020 01 08 7
		480 020 01 09 7
2.19	Spacer WTS-F1 in roof	480 020 01 62 7
2.20	Side plate top right Side plate top right (15 ... 22° roof pitch)	480 020 00 63 7 480 020 01 04 7
2.21	Side plate centre right type H	480 020 00 61 7
2.22	Side plate bottom right type H	480 020 00 57 7
2.23	Cover plate top left / bottom right type H	480 020 00 68 7
2.24	Cover plate bottom left / top right type H	480 020 00 67 7
2.25	Cover plate single row type H	480 020 00 64 7
2.26	Cover plate centre type H	480 020 00 66 7

10 Spares

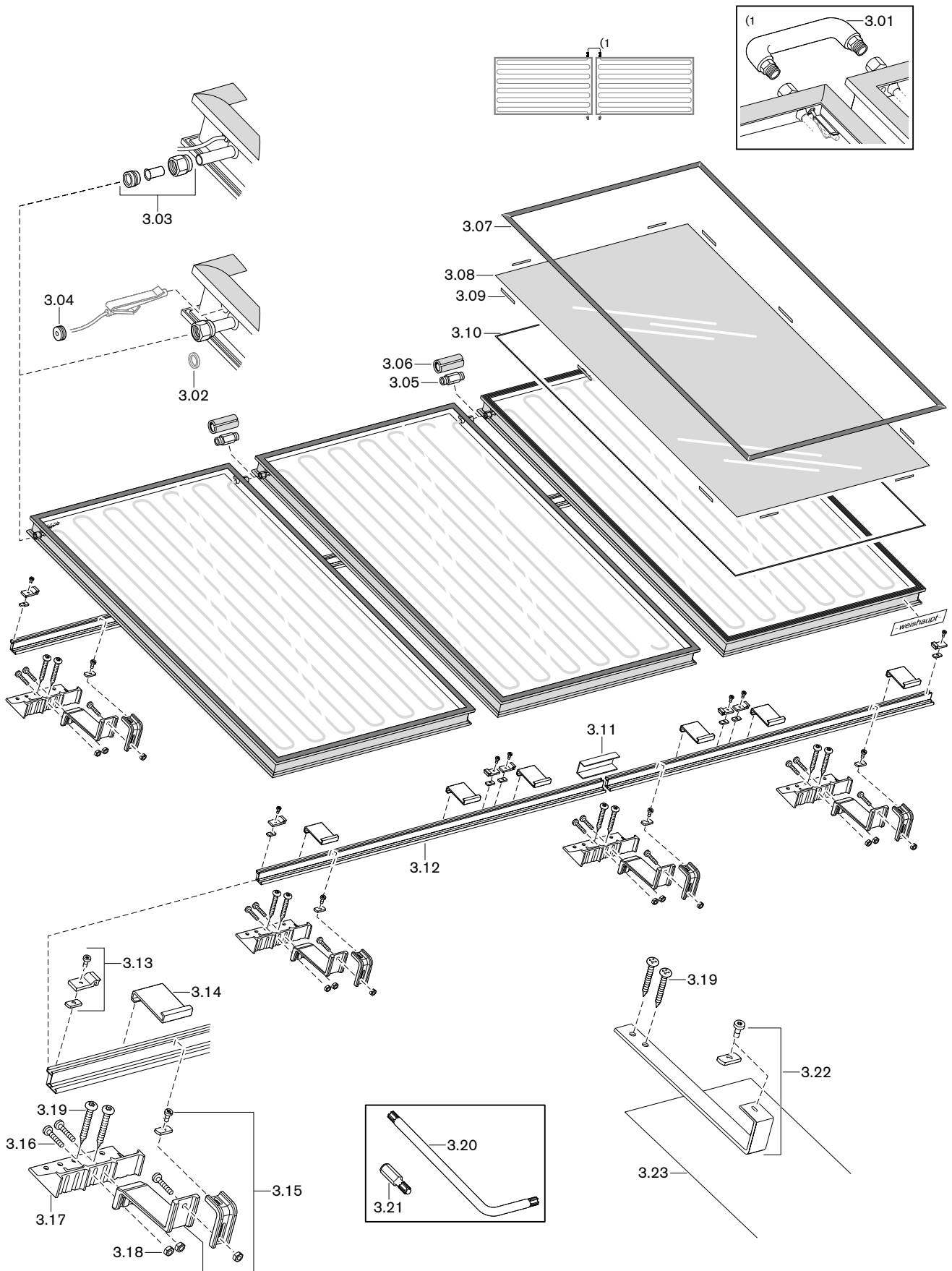


10 Spares

Pos.	Description	Order No.
2.27	Connection plate type H	480 020 00 69 7
2.28	Drainage plate eaves side	480 020 00 79 7
2.29	Side plate bottom left type H	480 020 00 56 7
2.30	Side plate centre left type H	480 020 00 60 7
2.31	Side plate top left	480 020 00 62 7
	Side plate top left (15 ... 22° roof pitch)	480 020 01 03 7
2.32	Cover plate 300 x 420 red/brown	480 020 00 83 7
2.33	Eaves plate type H	480 020 00 51 7
2.34	Fillister head screw M6 x 10	480 020 00 33 7
2.35	Sealing apron type H	480 020 00 81 7
2.36	Eaves plate support	480 020 00 77 7
2.37	Pin wrench for Torx TX30, 24/120 mm	480 020 00 12 7
2.38	Torx-Bit 1/4" TX30, 25 mm	480 020 00 11 7
2.39	Bracket right (plain tiles only)	480 020 00 71 7
2.40	Bracket left (plain tiles only)	480 020 00 70 7
2.41	Sliding plate (slate only)	480 020 00 48 7
2.42	Clamping plate 70 mm (slate only)	480 020 00 49 7
2.43	Chipboard screw Torx 6 x 80 galvanised	480 020 00 74 7
2.44	Mounting base 3 mm	480 010 00 69 7
2.45	Mounting base 5 mm	480 010 00 70 7

10 Spares

10.3 Spares On Roof

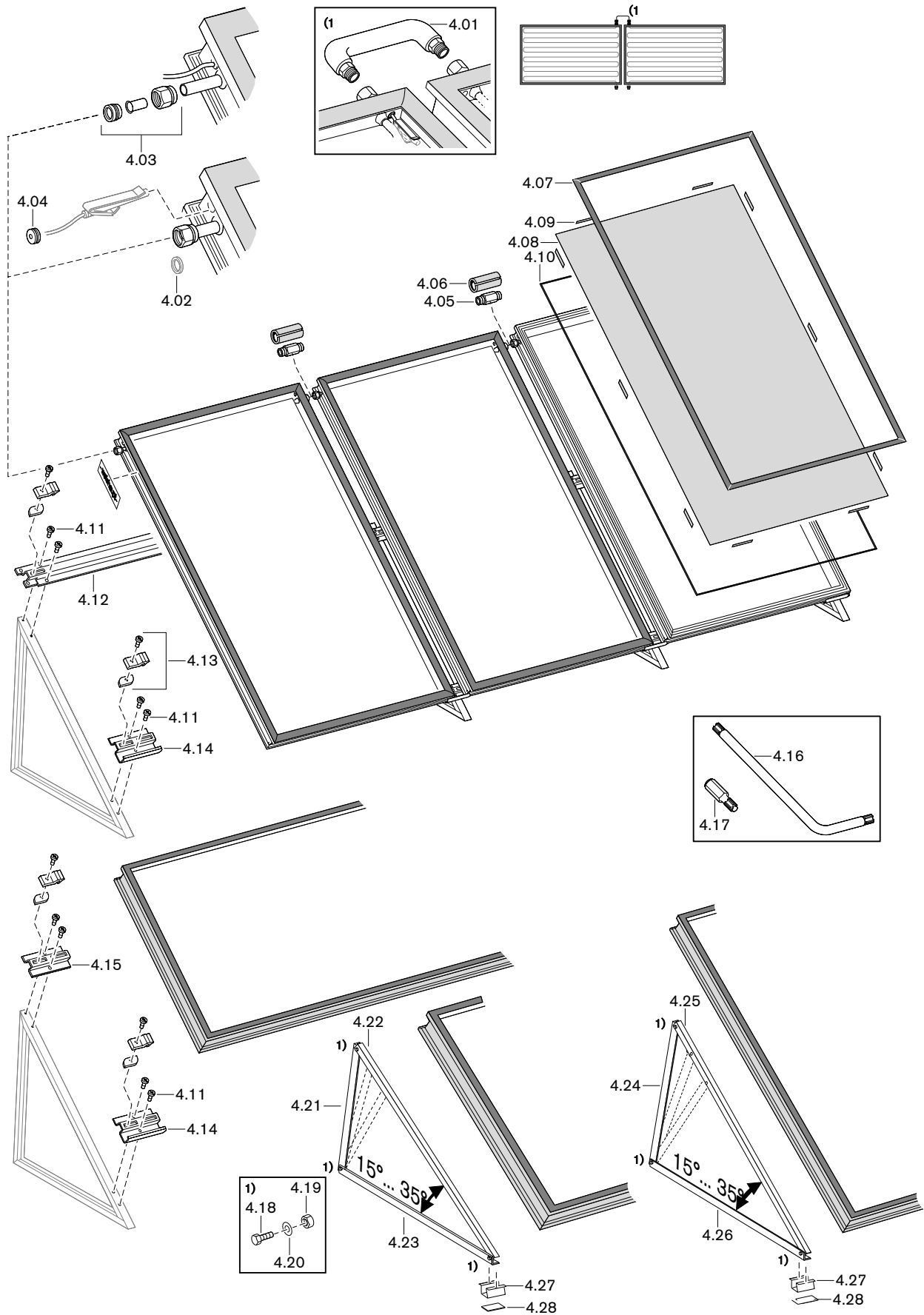


10 Spares

Pos.	Description	Order No.
3.01	Collector connection M16 x 1 x 278 with insulation	480 020 00 07 2
3.02	Repair sealing washer	on request
3.03	Clamping ring set (Serto)	480 020 00 01 2
3.04	Cable entry SNAP 5-7	480 020 00 04 7
3.05	Collector connection M16 x 1 x 41	480 020 00 10 7
3.06	Insulation 22/13, 106 mm long, for straight collector connection	480 020 00 23 7
3.07	Glass securing seal for frame	480 020 00 03 7
3.08	Solar glass 2040 x 1182 x 3.2	480 010 01 35 7
3.09	Glazing block 10 x 2 x 100	480 020 00 02 7
3.10	Glass overlay seal WTS-F1 6.70 m long	480 020 00 01 7
3.11	Rail connector on roof	480 020 00 09 7
3.12	Mounting rail 2608 mm long	480 020 00 13 7
	Mounting rail 1956 mm long	480 020 00 14 7
	Mounting rail 2162 mm long	480 020 00 15 7
3.13	Clamping plate complete	480 020 00 06 2
3.14	Fixing bracket collector	480 020 00 05 7
3.15	Bracket rafter anchor with screwed union	480 020 01 35 2
3.16	Fillister head screw M6 x 20	480 020 00 19 7
3.17	Base plate rafter anchor	480 020 01 36 7
3.18	Hexagonal nut M6	480 010 00 37 7
3.19	Chipboard screw 6 x 60	480 020 00 18 7
3.20	Pin wrench for Torx TX30, 24/120 mm	480 020 00 12 7
3.21	Torx-Bit 1/4" TX30, 25 mm	480 020 00 11 7
3.22	Rafter anchor (slate only)	480 020 00 21 2
3.23	Sealing plate (slate only)	480 020 00 22 7

10 Spares

10.4 Spares Flat Roof K1 and K2

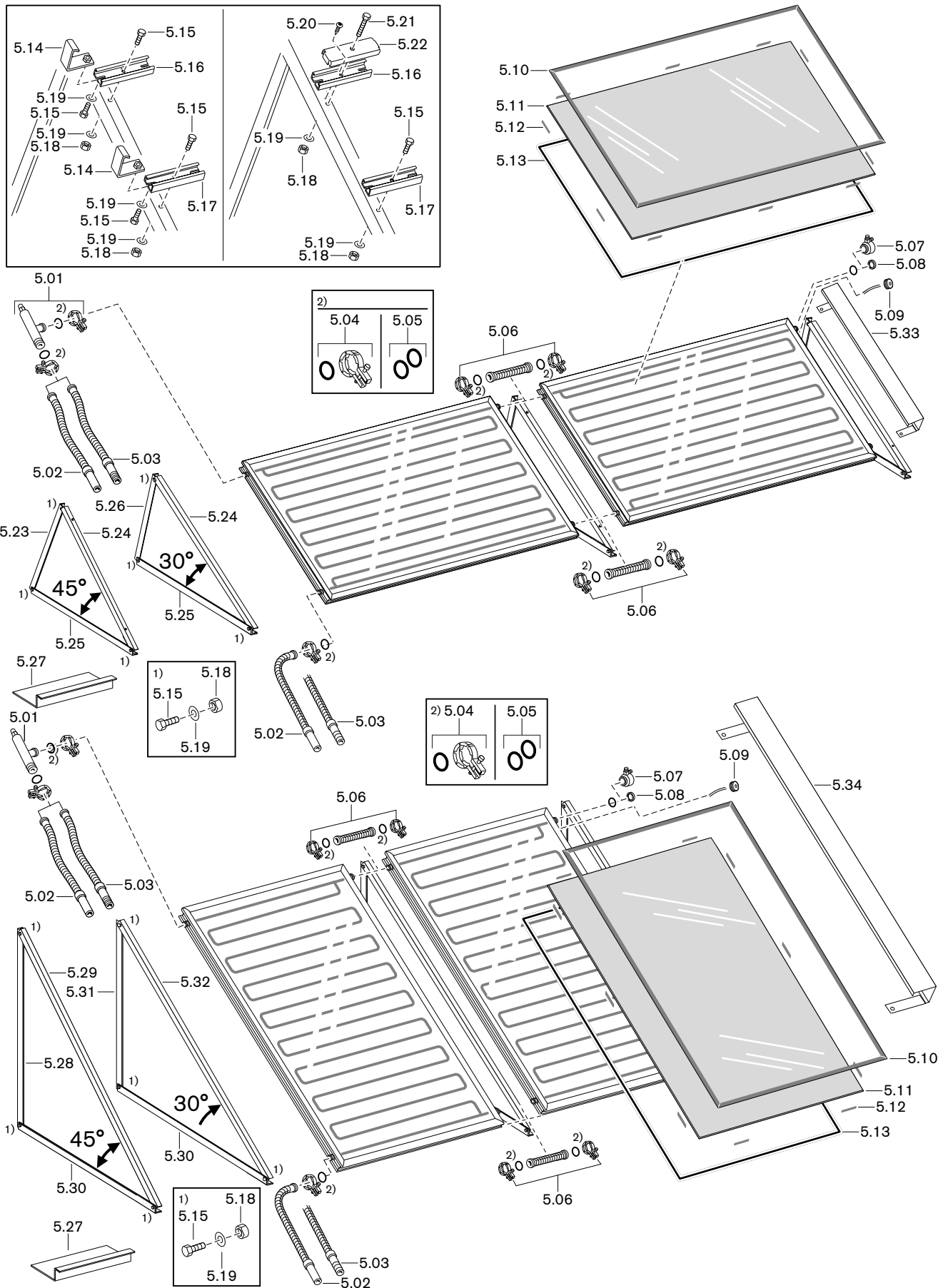


10 Spares

Pos.	Description	Order No.
4.01	Collector connection M16 x 1 x 278 with insulation	480 020 00 07 2
4.02	Repair sealing washer	on request
4.03	Clamping ring set (Serto)	480 020 00 01 2
4.04	Cable entry SNAP 5-7	480 020 00 04 7
4.05	Collector connection M16 x 1 x 41	480 020 00 10 7
4.06	Insulation 22/13, 106 mm long, for straight collector connection	480 020 00 23 7
4.07	Glass securing seal for frame	480 020 00 03 7
4.08	Solar glass 2040 x 1182 x 3.2	480 010 01 35 7
4.09	Glazing block 10 x 2 x 100	480 020 00 02 7
4.10	Glass overlay seal WTS-F1 6.70 m long	480 020 00 01 7
4.11	Fillister head screw M6 x 12	480 020 00 07 7
4.12	Bearing rail top	480 020 00 35 7
4.13	Clamping plate complete	480 020 00 06 2
4.14	Cover plate bottom	480 020 00 32 7
4.15	Cover plate top	480 020 00 31 7
4.16	Pin wrench for Torx TX30, 24/120 mm	480 020 00 12 7
4.17	Torx-Bit 1/4" TX30, 25 mm	480 020 00 11 7
4.18	Fillister head screw M6 x 20 A2 DIN 7985	480 020 00 19 7
4.19	Hexagonal nut M6 DIN 934 A2-70	480 010 00 37 7
4.20	Spring washer M6 A2 DIN 127B	480 020 00 98 7
4.21	Angle profile rear type H	480 020 00 92 7
4.22	Angle profile top type H	480 020 00 91 7
4.23	Angle profile bottom type H	480 020 00 90 7
4.24	Angle profile rear type V	480 020 00 95 7
4.25	Angle profile top type V	480 020 00 94 7
4.26	Angle profile bottom type V	480 020 00 93 7
4.27	Support front	480 020 00 96 7
4.28	Underlay 240 x 100 x 10 mm self-adhesive	480 020 00 97 7

10 Spares

10.5 Spares Flat Roof K3 and K4













10 Spares

Pos.	Description	Order No.
5.01	Air collector for flat roof collector complete	480 010 02 80 2
5.02	Corrugated hose with compressed air connection DN 22	480 010 02 81 7
5.03	Corrugated hose with screwed connection 3/4"	480 010 02 82 7
5.04	Collector coupling set (4 off)	480 010 02 78 2
5.05	O-Ring set (2 off)	480 010 02 90 2
5.06	Compensator set	480 010 02 79 2
5.07	Closing cap with vent	480 010 02 84 7
5.08	Closing cap without vent	480 010 02 83 7
5.09	Cable entry SNAP 5-7	480 020 00 04 7
5.10	Glass retaining rubber frame WTS-F1	480 020 00 03 7
5.11	Solar glass 2040 x 1182 x 3.2	480 010 01 35 7
5.12	Glazing block 3 mm green	480 010 00 17 7
5.13	Glass overlay sealing set	480 010 01 95 2
5.14	Clamping plate external	480 010 02 10 7
5.15	Screw M8 x 20 A2	480 010 02 04 7
5.16	Cover plate top	480 010 02 08 7
5.17	Cover plate bottom	480 010 02 09 7
5.18	Hexagonal nut M8 A2	480 010 01 56 7
5.19	Washer 8.4 x 16 x 1.6 A2	480 010 01 57 7
5.20	Screw KS 4.8 x 9.5 A2	480 010 02 14 7
5.21	Screw M8 x 60 A2	480 010 02 12 7
5.22	Clamping plate centre	480 010 02 77 7
5.23	Angle profile rear, type H / 45°	480 010 01 40 7
5.24	Angle profile top, type H / 45°	480 010 02 07 7
5.25	Angle profile bottom, type H / 45°	480 010 02 06 7
5.26	Angle profile rear, type H / 30°	480 010 02 70 7
5.27	Load bearing angle for concrete slabs	480 010 02 02 7
5.28	Angle profile rear, type V / 45°	480 010 02 89 7
5.29	Angle profile top, type V / 45°	480 010 02 74 7
5.30	Angle profile bottom, type V / 45°	480 010 02 72 7
5.31	Angle profile rear, type V / 30°	480 010 02 71 7
5.32	Angle profile top, type V / 30°	480 010 02 73 7
5.33	Connection cover plate FH	480 010 02 88 7
5.34	Connection cover plate FV	480 010 02 87 7

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Product		Description	Performance
	W-Burners	The compact series, proven millions of times over: Economical, reliable, fully automatic. Gas, oil and dual fuel burners for domestic and commercial applications. The purflam burner gives almost soot-free combustion of oil with greatly reduced NO _x emissions.	Up to 570 kW
	Monarch and industrial burners	The legendary industrial burner: Tried and tested, long lived, clear construction. Gas, oil and dual fuel burners for district heat provision.	Up to 11,700 kW
	multiflam® burners	Innovative Weishaupt technology for large burners: Minimal emission values particularly at ratings over one megawatt. Oil, gas and dual fuel burners with patented fuel distribution system.	Up to 17,000 kW
	WK industrial burners	Modular powerhouses: Adaptable, robust, powerful. Oil, gas and dual fuel burners for industrial plant.	Up to 22,000 kW
	Thermo Unit	The Thermo Unit heating systems from cast iron or steel: Modern, economic, reliable. For environmentally friendly heating. Fuel: Gas or oil as desired.	Up to 55 kW
	Thermo Condens	The innovative condensing boilers with the SCOT system: Efficient, low in emissions, versatile. Ideal for domestic heating. Floor standing gas condensing boiler with ratings of up to 1200 kW (cascade), for higher heat demands.	Up to 1,200 kW
	Heat pumps	The heat pump programme offers solutions for utilisation of heat from air, soil and ground water. The systems are suitable for refurbishment or new builds. It is possible to use several heat pumps in cascade operation.	Up to 130 kW
	Solar systems	Free energy from the sun: Perfectly coordinated components, innovative, proven. Pleasantly shaped flat roof collectors to support heating and of domestic water	
	Water heater / energy reservoir	The attractive domestic water heating range includes classic water heaters which are supplied through a heating system and energy reservoirs which can be fed through solar systems.	
	Control technology / building management	From control panels to complete building management systems – at Weishaupt you can find the entire spectrum of modern control technology. Future oriented, economical and flexible.	