SOLAR ENERGY

IES

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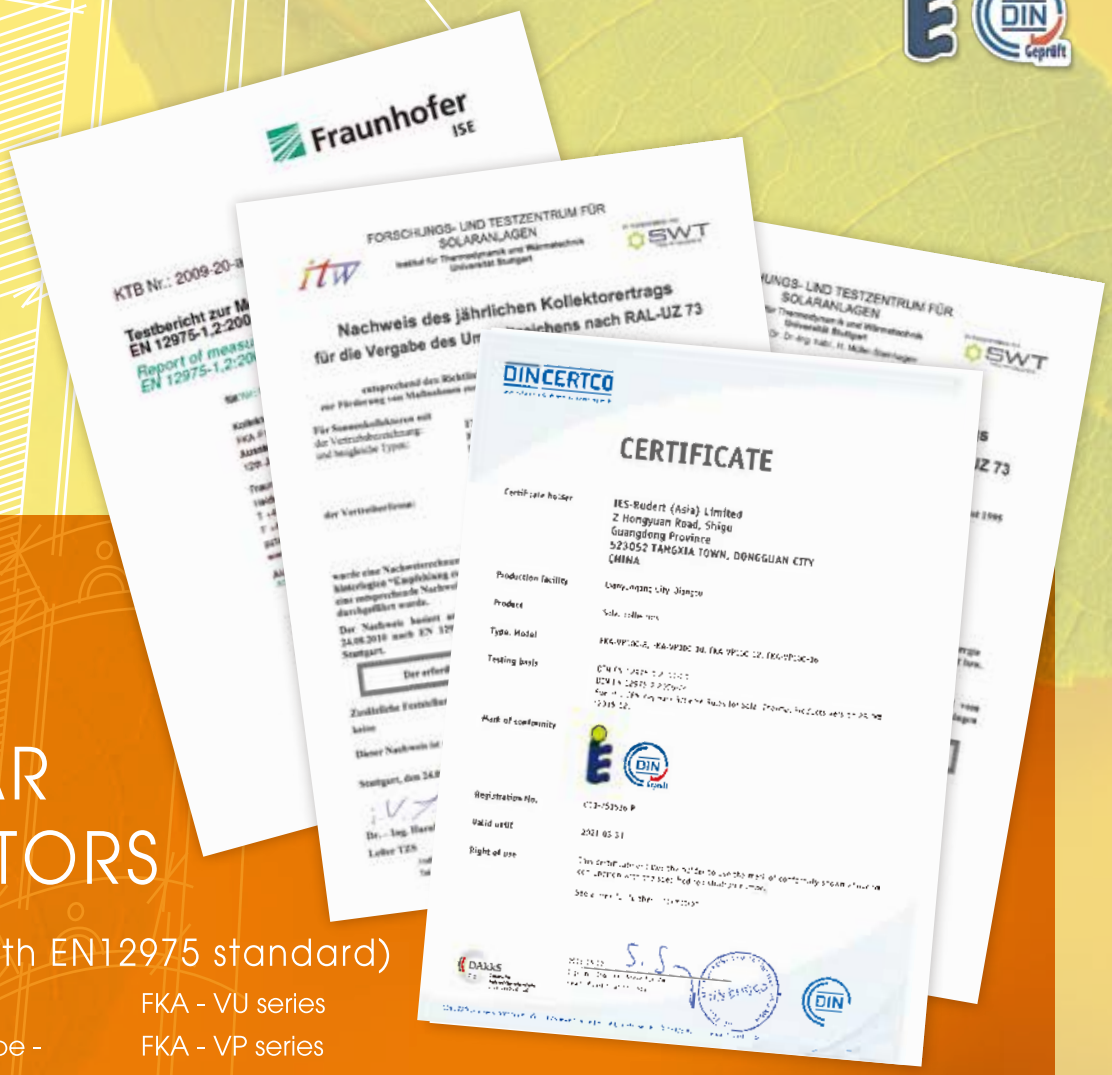
Solar energy is a renewable energy which can be used for generating electricity as well as for heating purpose. Recently, solar water heating technology has become one of the popular element for modern hot water system. With the latest development, solar water heating technology can be used for both pre-heat and booster heat for hot water supply, which can reduce the proportion of traditional heating and save energy.

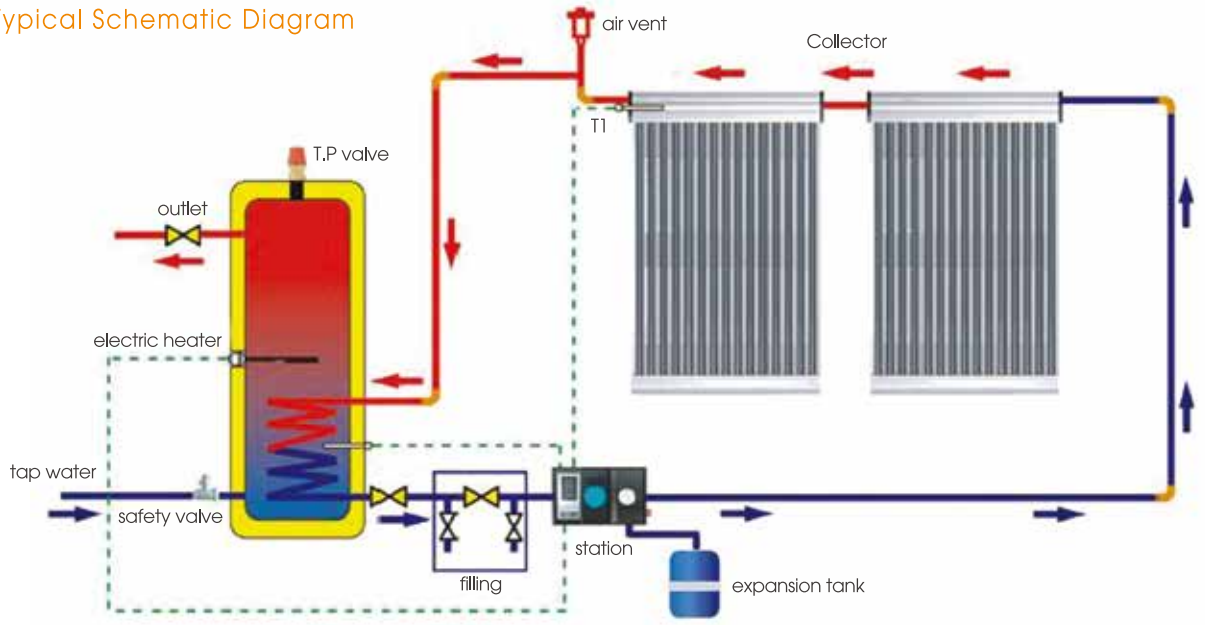


TYPE OF IES SOLAR COLLECTORS

(all complied with EN12975 standard)

U type Vacuum tube -	FKA - VU series
Heat Pipe Vacuum tube -	FKA - VP series
High efficiency Vacuum tube -	FKV - VP100 series
Water heater with Heat Pipe -	FKA - 47/1500-20C
Flat Plate -	FKA – F series

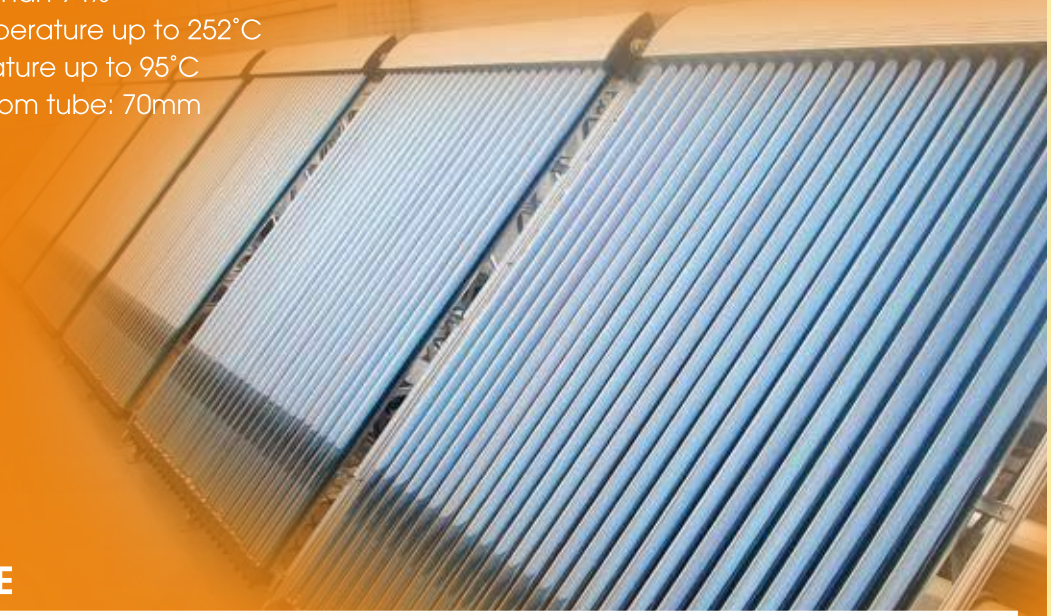
Typical Schematic Diagram



SOLAR COLLECTOR (VACUUM TUBE - U TUBE) FKA - VU SERIES

CHARACTERISTICS

- Can operate even if one tube is broken
- Can be connected easily with existing pipeline
- Work well in any installation angle (0-90˚)
- Suitable for pressurized water
- Vacuum tube: Diameter 47mm x 1500mm
- Absorption(a): More than 94%
- Max. stagnation temperature up to 252˚C
- Max. service temperature up to 95˚C
- Distance from tube from tube: 70mm



PARAMETER TABLE

Model	Aperture Area (m^2)	Volume of the fluid (L)	Vacuum tube Qty. (pcs)	Overall size L x W x H (mm)	Gross wet (kg)
FKA-VU-10	0.90	0.90	10	1642*805*150	26.7
FKA-VU-15	1.35	1.35	15	1642*1155*150	38.3
FKA-VU-20	1.80	1.80	20	1642*1505*150	50.6
FKA-VU-25	2.25	2.25	25	1642*1855*150	63.3
FKA-VU-30	2.67	2.70	30	1642*2205*150	75.0

1 Vacuum tube 2 Aluminium fin 3 Hot terminal 4 Cool terminal

VACUUM TUBE

Heat Pipe Working Principle

The heat pipe contains a very slight amount of fluid (non-toxic liquid). This fluid is easily to be vaporized under evacuated situation, and then rise to the top of the heat pipe condenser. The fluid will be cooled down in the manifold, liquefies in the condenser and then return to the bottom of the heat pipe. Repeating this process once and once again, and finally the cold water inside the manifold port will be heated up.

SOLAR COLLECTOR (VACUUM TUBE - HEAT PIPE) FKA - VP SERIES

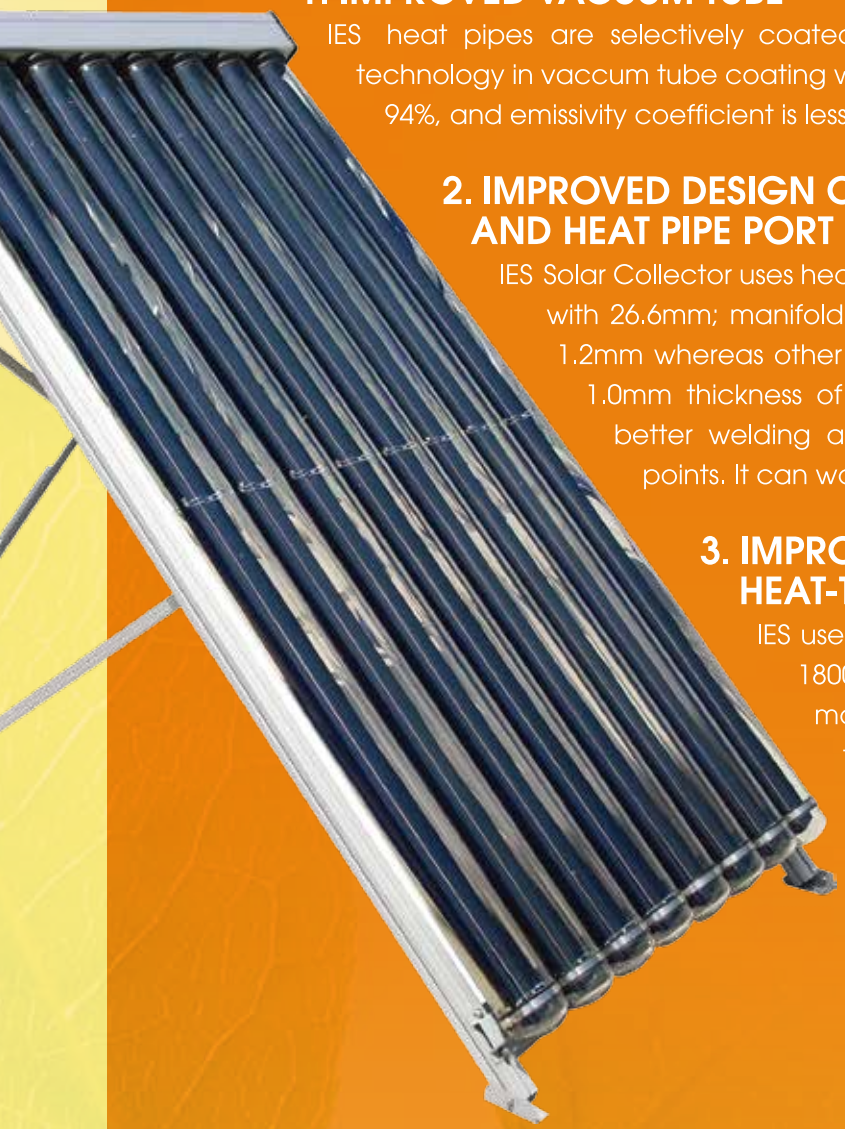
CHARACTERISTICS

- Durable heat pipe with thickness of 0.6mm
- Heat pipe made of 100% pure TU1 copper
- Heat transfer area is increased with bigger condenser
- Latest anti-freeze technology with the working temperature below -30˚C
- Max. stagnation temperature up to 200˚C
- Max. service temperature up to 95˚C
- Distance from tube to tube: 78mm
- Flow range recommendation (50-150L/m^2h)
- Operating pressure(Pa): 0.6 Mpa

PARAMETER TABLE

Specifications	Unit	Content				
Product type		FKA-VP-10	FKA-VP-15	FKA-VP-20	FKA-VP-25	FKA-VP-30
Number of vacuum tube		10	15	20	25	30
Aperture area	m^2	0.936	1.399	1.866	2.332	2.791
Specification of vacuum tube		Ø58 x 1800				
Absoroption(a)	%	More than 94%				
Emission(e)	%	Less than 7%				
Length	mm	2020				
Width	mm	852	1242	1632	2022	2412
Height	mm	155				
Volume of fuild	L	0.77	1.155	1.54	1.925	2.3
Manifol connections	inch	1				
Test pressure	Mpa	1				
Operating fluid pressure	Mpa	0.6				
Max.stagnation temperature	°C	200				
Max.service temperature	°C	95				
Insulation thickness	mm	40				
Distance from tube to tube	mm	78				
Min.collector degree	degree	15				
Max.collector degree	degree	75				
Gross weight	kg	39.9	58.3	77.1	96.1	114.1

SOME ADVANTAGES OF IES VP SERIES



1. IMPROVED VACUUM TUBE

IES heat pipes are selectively coated with ALN/SS-ALN/CU. The latest advanced technology in vaccum tube coating which provide absorption coefficient more than 94%, and emissivity coefficient is less than 7%.

2. IMPROVED DESIGN OF HEADER PIPE AND HEAT PIPE PORT

IES Solar Collector uses heat pipe with 24mm condenser; heat pipe port with 26.6mm; manifold header pipe with 37mm and thickness with 1.2 1.2mm whereas other solar collector manufacturers offer only 0.8 or 1.0mm thickness of heat pipe. Thus, thicker copper pipe allows better welding and eliminate any leakage from the welding points. It can work well in high pressure working condition.

3. IMPROVED DESIGN OF HEAT-TRANSFER SHEETS

IES uses a complete sheet with 3mm thickness and 1800mm length for heat pipe whereas other manufacturers use short sheets with 2mm thickness for each heat pipe.

Compare to the sheet of other suppliers, our heat-transfer sheet can attach heat pipe much closer, so it can transfer more energy than others.

CONSTRUCTION DETAIL FOR HEAT PIPE COLLECTOR

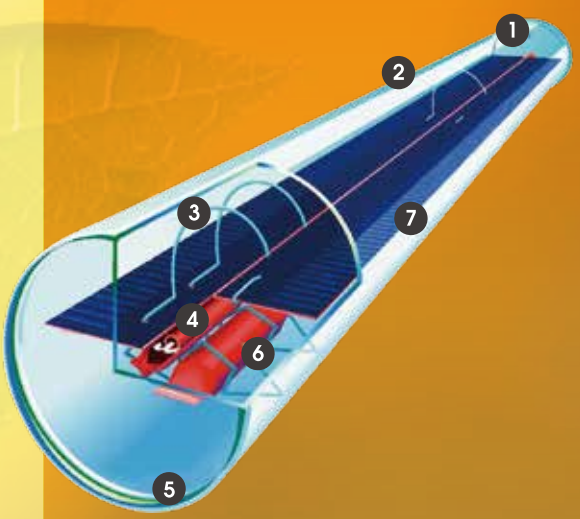
SOLAR COLLECTOR (VACUUM TUBE - HEAT PIPE) FKA - VP100 SERIES

CHARACTERISTICS

- High efficiency
- Energy saving all year long
- Advanced heat exchanger method
- Diffuse solar radiation can be effectively absorbed even in cloudy days
- Vacuum insulation minimize heat loss, and traps heat even in adverse weather condition
- The heat pipe technology ensures higher heat transfer efficiency and lower emissivity of heat

PARAMETER TABLE

Specifications	Unit	Content			
Product type		FKA-VP100-8	FKA-VP100-10	FKA-VP100-12	FKA-VP100-16
Number of vacuum tube		8	10	12	16
Aperture area	m^2	1.46	1.83	2.19	2.92
Specification of vacuum tube		Ø 102 * 2000			
Absorption (a)	%	More than 93%			
Emission(e)	%	Less than 8%			
Length	mm	2205			
Width	mm	1002	1228	1468	1959
Height	mm	175			
Manifold connections	inch	3/4			
Test pressure	Mpa	1			
Operating fluid pressure	Mpa	0.6			
Max. stagnation temperature	degree	231°C			
Max. service temperature	degree	95°C			
Insulation thickness	mm	40			
Distance from tube to tube	mm	120			
Min. collector degree	degree	15			
Max. collector degree	degree	90			
Gross weight	kg	48	59	70	91

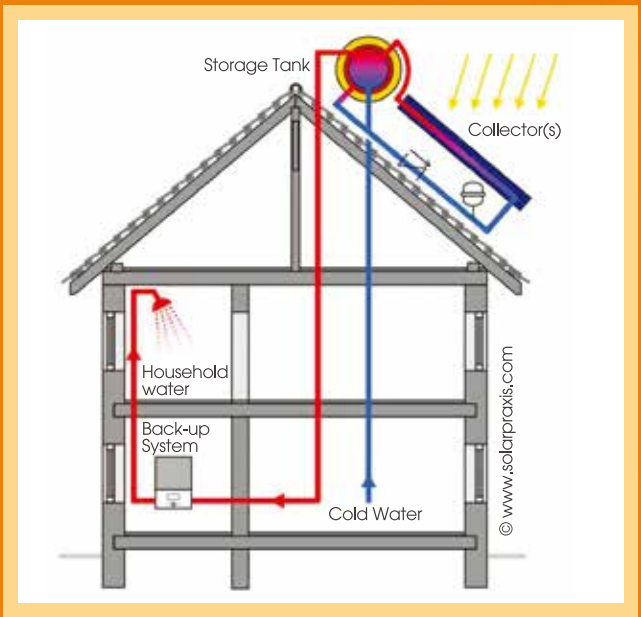


1. Vacuum -tight stainless steel lid
2. Supertransparent glass tube
3. Distance clip
4. Inlet/outlet of heat transfer medium
5. Glass bottom
6. Getter
7. Selektive absorber plate

WATER HEATER WITH HEAT PIPE
FKA-47/1500-20C

PRINCIPLE

The aluminum fin of vacuum tubes absorbs the solar energy, and transfers the heat energy to the heat pipe. The liquid medium in the heat pipe is heated by the solar energy and turns into the gas medium. The gas medium flows up to the top of the heat pipe and transfer the energy to cold water in the tank, at the same time the gas medium turns into the liquid one, and flows down. Water inside the tank is heated up by repeating this process.

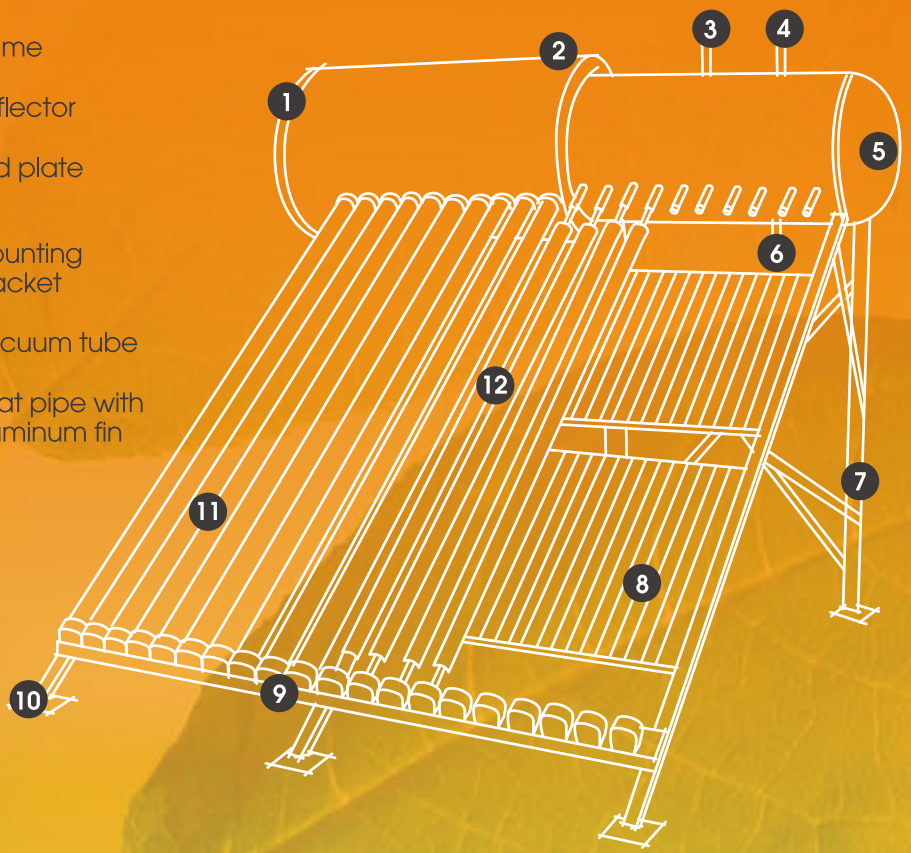


PARAMETER

- Inner tank material: 1.2mm AISI 316L
- Outer tank material: 0.4mm AISI 304 / painted steel
- Qty. of tube: 20pcs per set
- Area: 1.985 m^2; Volume: 165 liters
- Working / Test Pressure: 0.6Mpa / 1.0 Mpa
- Insulation: 50mm
- Gross weight: 65 kg

DETAIL OF STRUCTURE

1. Outer tank
2. Insulation
3. Temperature pressure relief valve
4. Auomatic air vent
5. Inner tank
6. Inlet pipe
7. Frame
8. Reflector
9. End plate
10. Mounting bracket
11. Vacuum tube
12. heat pipe with aluminum fin



FLAT PLATE COLLECTOR
FKA – F SERIES

CHARACTERISTICS

IES flat plate collector adopt German magnetic sputtering coating absorber, has high absorption rate up to 97% and emission as low as 5%. The Low-iron tempered texture glass cover allows over 92% of full-spectrum light transmission rate. The high efficiency of enhanced model allows more energy saving.

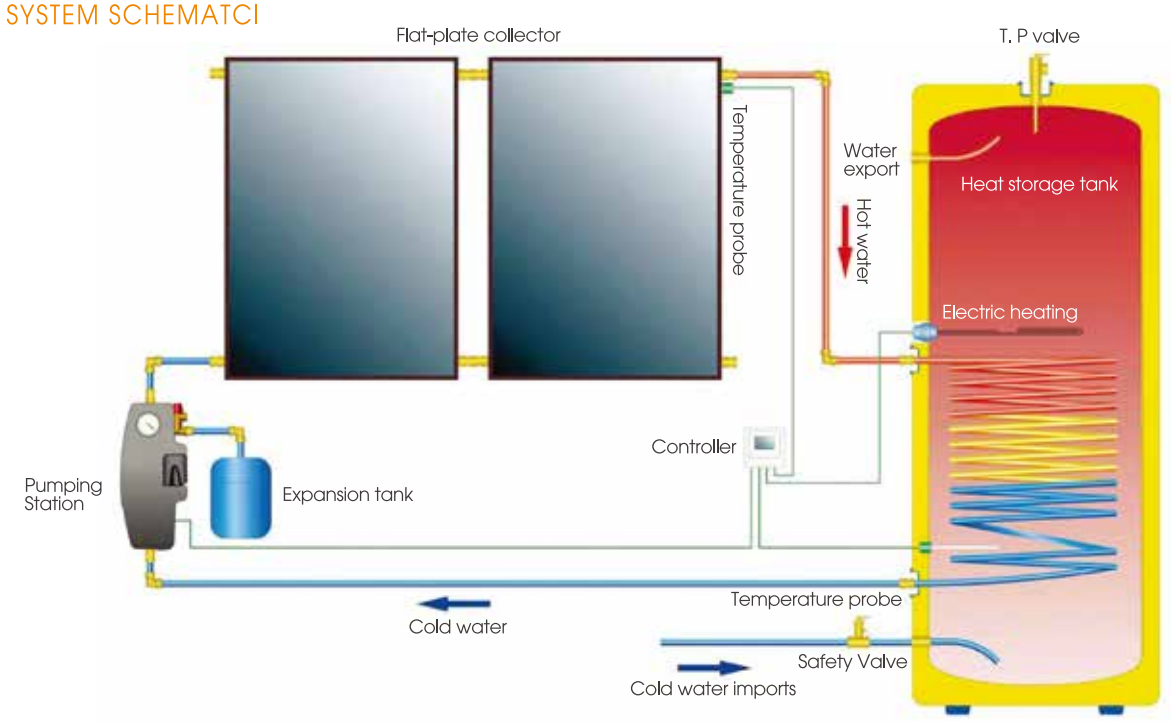
BENEFITS

- High efficiency design to maximize the heat absorption.
- High purify oxygen-free copper (TP2 cooper) flow channel, good corrosion resistance.
- Biodegradable and recyclable, pollution free until product life period ends.
- Mounting slots and waterproof grooves specially designed for building integration.

PARAMETER TABLE

Specifications	Unit	Content	
Model		FKA-F-1200	FKA-F-1200.e
Overall Size	m^2	2.01	2.0
Aperture area	m^2	1.86	1.9
Overall size	mm	2005x1003x80	2000x1000x95
Weight	Kg	32	35
Housing		Aluminum Alloy	Aluminum Alloy
Absorber		Aluminum Alloy	Aluminum
Coating		CU/Al. oxide film	Blue Selective Coating
Absorption	%	95	95
Emission	%	8	5
Transmittance	%	88	92
Insulation Material		Glass Wool	Fiber Glass
Insulation Thickness	mm	35	50
Sealing		EPDM	Silicon Glue
Max. Operating Pressure	Mpa	1.0	0.8
Test Pressure	Mpa	1.5	1.2
Min. collector angle	degree	0	0
Max. collector angle	degree	90	90

SYSTEM SCHEMATCI



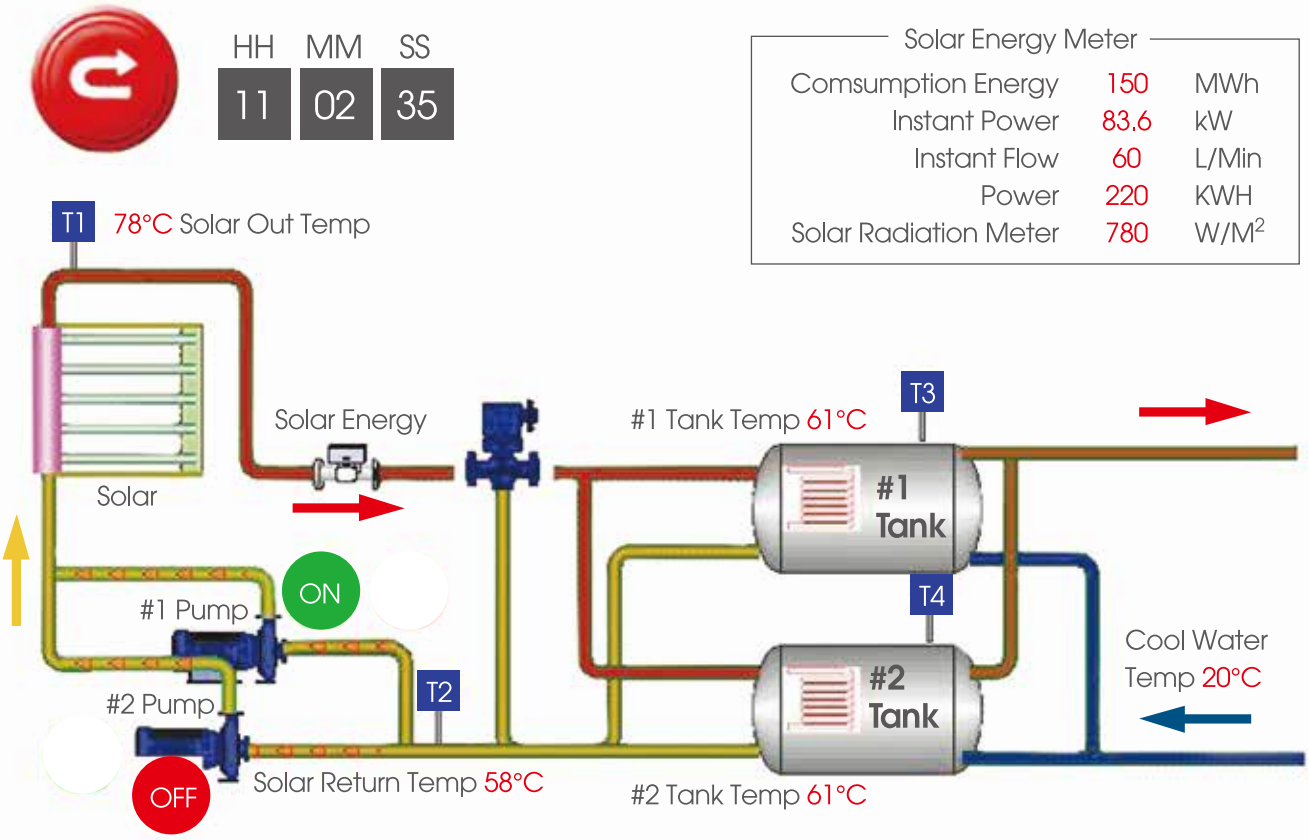
COMPONENTS

Air Vent
Thermostatic Mixing Valve
Connection Kit
Mounting Kit

Pump Station
Controller
Collector Tube
Thermal Cylinder

Expansion Vessels
Solar Radiation Sensor
Temperature Controller
Data Logging System



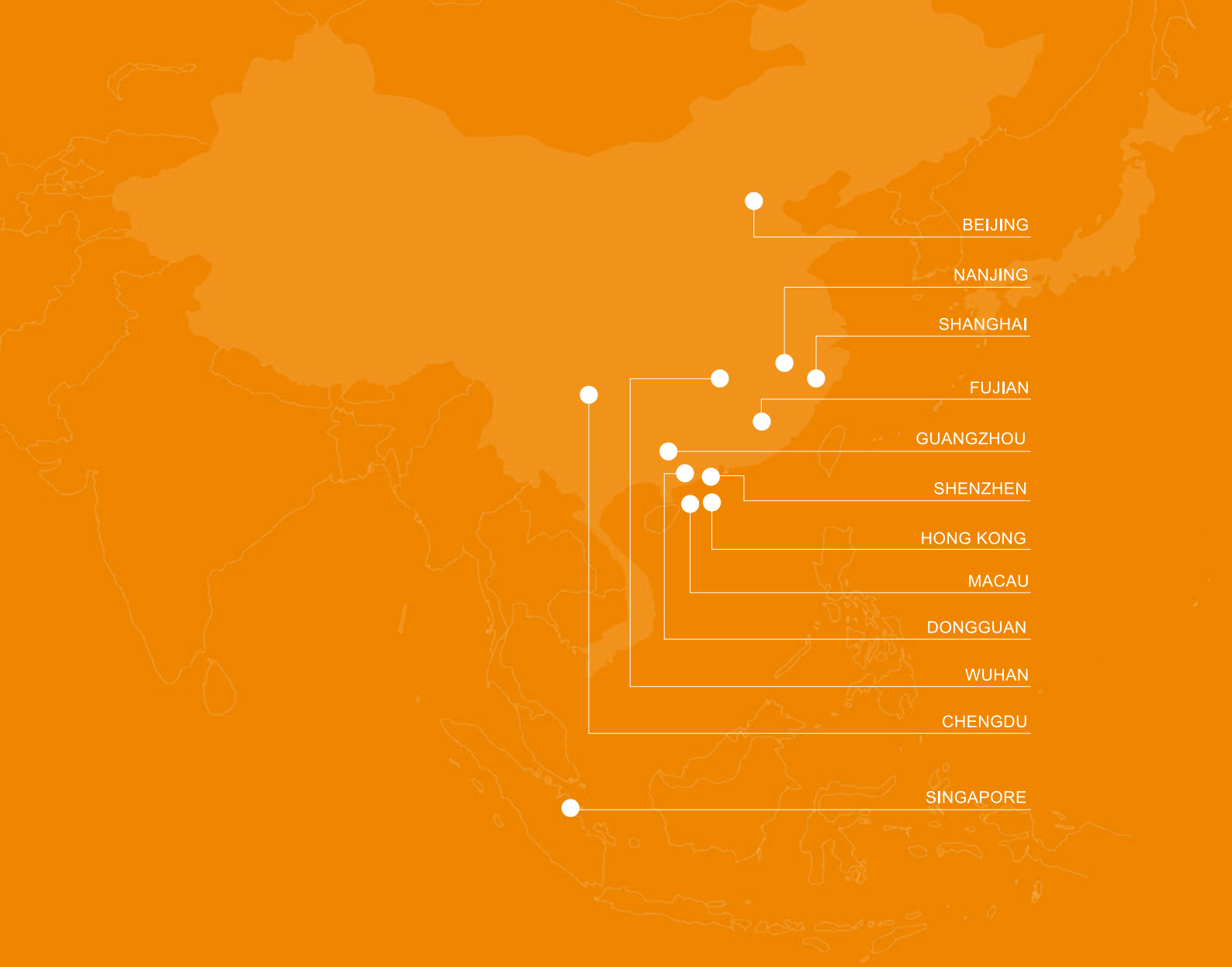
REFERENCE LIST IN HONG KONG

Kowloon Bay Fire Station
Tin Shui Wai Sports Centre and Community Hall
HABC Data Centre
Tin Shui Wai Open Space
Tamar Development
Kennedy Town Swimming Pool
Siu Sai Wan Complex
Fanling Sport Centre
Tseung Kwan O District Open Space
Lam Tin North Municipal Service Building
Man Kam To Food Inspection Facilities
Aberdeen Fire Station
Tseung Kwan O Sports Centre and Library
Caritas Medical Centre Phase 2
Hong Kong Science Park Phase 3
Tuen Mun Special School
Hong Kong University – Faculty of Medicine
Hong Kong Sport Institute
Education University of Hong Kong
Student Hostels of Chinese University of Hong Kong
Community College of City University
Baptist University Campus
Singapore International School
Mei Ho House

KENNEDY TOWN Swimming Pool

SIU SAI WAN Complex

HONG KONG Institute of Education



IES Engineering (Hong Kong) Limited

Unit 1, 1/F, Precision Manufacturing Centre, 3 Dai Hei Street, Tai Po Industrial Estate, Tai Po, New Territories, Hong Kong

Tel: 852 2992 0830 Fax: 852 2992 0860
E-mail: info@ies-group.com.hk

REPRESENTATIVE OFFICE

MACAU
Tel : 853 2830 0112 E-mail : sales@ies-group.com.mo

SINGAPORE
Tel : 65 6338 4613 E-mail : sales@ies-group.com.sg

GUANGZHOU
Tel : 86 20 8381 1745 E-mail : sales@ies-group.com.cn