

### Codes

E13240-T1000DDE

E13320-T1000DDE

**Fegen Solar Modules SM series** are All-in-One, Plug & Play, Outdoor, Scalable enclosures that incorporate all solar thermal and solar electric distribution gear for buildings in one device.

- No need of a conventional indoor boiler room
- No on-site labor cost
- Immediate start-up
- No responsibility conflicts
- Easy control and maintenance
- Scalable for infinite combinations

- **Tight double door dimensions**
- **1000 liters water storage**
- **Integrated heating element**
- **Simple twin DC pump design**
- **Solar back up system for redundancy**
- **Defrost system for reliability**
- **Solar pool gC option (P extension coded)**
- **Cost efficient mounted outdoors 3ph 24-32kWdC inverter**

### CABIN GENERAL CHARACTERISTICS

	Thermal Part
Type	RITTAL TS 8
External dimensions W x H x D (front view)	1200 x 2000 x 800 mm / 47,24 x 78,74 x 31,50 inch
Mounting plate	Width: 1099 mm, Height: 1896 mm
Weight/pack	203 kg
Material	Sheet steel
Cold / Hot Supply - Brass	1 ¼ inch
Color	RAL 7035
Protection category IP to IEC 60 529	IP 55
Doors	2
Light	Auto door power On/Off - 600 lumens
Scalability	Unlimited
Protection	Over-temperature, Anti-freeze control
Approvals	Bureau Veritas, CSA, TÜV, DNV-GL, Lloyds Register of Shipping, Russian Maritime Register of Shipping, UL + C-UL
Certificates	EAC,IK-Code, Protection category
Declarations	Declaration of conformity, Manufacturer's declaration
Certification	SRCC, Solar Keymark, CE

### CABIN LIGHTING SYSTEM-TECHNICAL SPECIFICATIONS

	General Data
Type	RITTAL LED system light
Material	Light body: Extruded aluminium Light cover: Polycarbonate (halogen-free) Light ends: PC-ABS (halogen-free)
Color	Enclosure: RAL 7016
Protection category IP to IEC 60 529	IP 20
Dimensions	Width: 337 mm, Height: 55 mm, Depth: 23 mm
Rated operating voltage	100 V - 240 V, 1~, 50 Hz/60 Hz
Operating temperature	Operation (environment): -20°C...+55°C
Power consumption	7 W
Luminous flux	600 lm
Light colour	4000 K (neutral white)
Protection category	II (all-insulated)
Weight/pack	0.35 kg
Approvals	CCC, ENEC
Certificates	EAC

## SOLAR TANK CHARACTERISTICS

### General Data

Type	TESY EV
Solar tank capacity	500 lt / 132 gal
External dimensions W x H x D	750 x 1674 mm / 29,5 x 66 inch
Weight	145 kg / 320 lb
Number of boilers	2
Max pressure primary circuit	8 bar
Max pressure secondary circuit	6 bar
Electric Resistance	1.50 – 4.00 KW (UL Ready) - not included
Anti-corrosion protection	2 x magnesium anodes
Certification	Solar Keymark, CE

## DC CIRCULATION PUMP

### General Data

Type	DC Solar Pump
Power	10 W (6-24 Vdc)
Max Capacities	22 Lpm / 6 Gpm
Max heads	3,2 m / 10,5 ft
Suitable fluids	Water / Glycol
Maximum working temperature	110 °C / 230 °F
Max. working pressure	10 bar
Number of DC Pumps	2
Protection	Over-temperature, overload, Over voltage, dry running protection

### Temperature Sensors

Platinum RTD type	1,000 ohm
Collector sensor working range	-58 - 355 °F (-50 - 180 °C)
Tank sensor working range	15 - 175 °F (-10 - 80 °C)
Length of collector black cable	60 in (1.5 m)
Length of tank sensor gray cable	95 in (2.5 m)

### Glycol (recommended type)

Type	DOWFROST HD
Recommended temperature range	-46°C..163°C
Freezing Point	-33.5 °C
Boiling Point @ 1 bar	105.6 °C
Freeze protection temperature	-51 °C
Burst protection temperature	-73 °C
Weight % Propylene Glycol	94
Weight % performance additives	6
Specific gravity (15 °C)	1.053 - 1.062
pH of Solution	9.5 - 10.5
Reserve alkalinity	15.0 ml

## TECHNICAL DATA AND TYPES

### Fimer type code

### TRIO-20.0-TL-OUTD

### TRIO-27.6-TL-OUTD

#### Input side

Absolute maximum DC input voltage ( $V_{max,abs}$ )	1000 V	
Start-up DC input voltage ( $V_{start}$ )	430 V (adj. 250...500 V)	
Operating DC input voltage range ( $V_{dcrmin}...V_{dcrmax}$ )	0.7 x $V_{start}$ ...950 V (min 200 V)	
Rated DC input voltage ( $V_{dcr}$ )	620 V	
Rated DC input power ( $P_{dcr}$ )	20750 W	28600 W
Number of independent MPPT	2	
Maximum DC input power for each MPPT ( $P_{MPPTmax}$ )	12000 W	16000 W
DC input voltage range with parallel configuration of MPPT at $P_{acr}$	440...800 V	500...800 V
DC power limitation with parallel configuration of MPPT	Linear derating from max to null [800 V ≤ VMPPT ≤ 950 V]	
DC power limitation for each MPPT with independent configuration of MPPT at $P_{acr}$ max unbalance example	12000 W [480 V ≤ VMPPT ≤ 800 V] the other channel: $P_{dcr}$ -12000 W [350 V ≤ VMPPT ≤ 800 V]	16000 W [500 V ≤ VMPPT ≤ 800 V] the other channel: $P_{dcr}$ -16000 W [400 V ≤ VMPPT ≤ 800 V]
Maximum DC input current ( $I_{dcrmax}$ ) / for each MPPT ( $I_{MPPTmax}$ )	50.0 A / 25.0 A	64.0 A / 32.0 A
Maximum input short circuit current for each MPPT	30.0 A	40.0 A
Number of DC input pairs for each MPPT	1 (4 in -S2X, -S2F, -S1J, -S2J versions)	1 (5 in -S2X and -S2F versions, 4 in -S1J and -S2J)
DC connection type	PV quick fit connector <sup>1)</sup> / Screw terminal block on Standard and -S2 versions	

#### Input protection

Reverse polarity protection	Yes, from limited current source	
Input over voltage protection for each MPPT-varistor	Yes, 4	
Input over voltage protection for each MPPT - plug In modular surge arrester (-S2X, -S1J and -S2J versions)	-S2X: Type 2; -S1J, -S1J: Type 1+2	
Photovoltaic array isolation control	According to local standard	
DC switch rating for each MPPT (version with DC switch)	40 A / 1000 V	
Fuse rating (versions with fuses)	15 A / 1000 V	

#### Output side

AC grid connection type	Three-phase 3W+PE or 4W+PE	
Rated AC power ( $P_{acr}$ @ $\cos\phi=1$ )	20000 W	27600 W
Maximum AC power ( $P_{acmax}$ @ $\cos\phi=1$ )	22000 W <sup>2)</sup>	30000 W <sup>3)</sup>
Maximum apparent power ( $S_{max}$ )	22200 VA <sup>4)</sup>	30670 VA <sup>4)</sup>
Rated AC grid voltage ( $V_{acr}$ )	400 V	
AC voltage range <sup>2)</sup>	320...480 V <sup>5)</sup>	
Maximum AC output current ( $I_{ac,max}$ )	33.0 A	45.0 A
Contributory fault current	35.0 A	46.0 A
Rated output frequency ( $f$ ) <sup>3)</sup>	50/60 Hz	
Output frequency range ( $f_{min}...f_{max}$ ) <sup>3)</sup>	47...53 Hz / 57...63 Hz <sup>6)</sup>	
Nominal power factor and adjustable range	> 0.995, adj. ± 0.9 with $P_{acr} = 20.0$ kW, ± 0.8 with max 22.2 kVA	> 0.995, adj. ± 0.9 with $P_{acr} = 27.6$ kW, ± 0.8 with max 30 kVA
Total current harmonic distortion	< 3%	
AC connection type	Screw terminal block, cable gland PG36	

#### Output protection

Anti-islanding protection	According to local standard	
Maximum external AC overcurrent protection	50 A	63 A
Output overvoltage protection - varistor	4	
Output overvoltage protection - plug in modular surge arrester (-S2X version)	4 (Type 2)	

## User interface

### Fimer Type code

TRIO-20.0-TL-OUTD

TRIO-27.6-TL-OUTD

### Operating performance

Maximum efficiency ( $\eta_{max}$ )	98.2%
Weighted efficiency (EURO/CEC)	98.0% / 98.0%
Feed in power threshold	40 W
Night consumption	< 0.6 W

### Communication

Wired local monitoring	PVI-USB-RS232_485 (opt.)
Remote monitoring	VSN300 Wifi Logger Card (opt.), VSN700 Data Logger (opt.)
Wireless local monitoring	VSN300 Wifi Logger Card (opt.)
User interface	Graphic display

### Environmental

Ambient temperature range	-25...+60°C / -13...140°F with derating above 45°C/113°F
Relative humidity	0...100 % condensing
Sound pressure level, typical	50 dBA @ 1 m
Maximum operating altitude without derating	2000 m / 6560 ft

### Physical

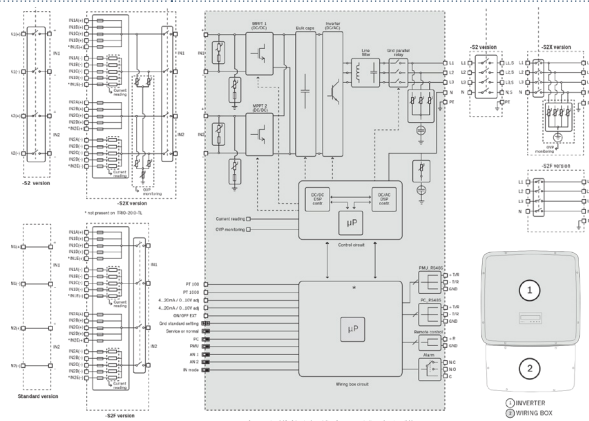
Environmental protection rating	IP 65
Cooling	Natural
Dimension (H x W x D)	1061 mm x 702 mm x 292 mm / 41.7" x 27.6" x 11.5"
Weight	< 70.0 kg / 154.3 lbs (Standard version)      < 75.0 kg / 165.4 lbs (Standard version)
Mounting system	Wall bracket

### Safety

Isolation level	Transformerless
Marking	CE (50 Hz only), RCM
Safety and EMC standard	EN 50178, IEC/EN 62109-1, IEC/EN 62109-2, AS/NZS 3100, AS/NZS 60950.1, EN 61000-6-2, EN 61000-6-3, EN 61000-3-11, EN 61000-3-12
Grid standard (check your sales channel for availability)	CEI 0-21, CEI 0-16, DIN V VDE V 0126-1-1, VDE-AR-N 4105, G59/3, C10/11, EN 50438 (not for all national appendices), RD 1699, RD 413, RD 661, P.O. 12.3, AS 4777, BDEW, NRS-097-2-1, MEA, IEC 61727, IEC 62116, Ordinul 30/2013, VFR 2014

### Available products variants

Standard	TRIO-20.0-TL-OUTD-400	TRIO-27.6-TL-OUTD-400
With DC+AC switch	TRIO-20.0-TL-OUTD-S2-400	TRIO-27.6-TL-OUTD-S2-400
With DC+AC switch and fuse	TRIO-20.0-TL-OUTD-S2F-400	TRIO-27.6-TL-OUTD-S2F-400
With DC+AC switch, fuse and surge arrester	TRIO-20.0-TL-OUTD-S2X-400	TRIO-27.6-TL-OUTD-S2X-400
With DC+AC switch, fuse and 1 DC surge arrester Type 1 + 2	TRIO-20.0-TL-OUTD-S1J-400	TRIO-27.6-TL-OUTD-S1J-400
With DC+AC switch, fuse and 2 DC surge arrester Type 1 + 2	TRIO-20.0-TL-OUTD-S2J-400	TRIO-27.6-TL-OUTD-S2J-400



**TRIO-20.0/27.6-TL-OUTD string inverter block diagram**

Models using other branded solar thermal or solar electric gear upon demand.