



Codes			
E1306I-T160DSE	E1306I-T200DSE	E1306I-T300DSE	E1306I-T500DSE
E1308I-T160DSE	E1308I-T200DSE	E1308I-T300DSE	E1308I-T500DSE
E1309I-T160DSE	E1309I-T200DSE	E1309I-T300DSE	E1309I-T500DSE

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**
- **160-500 liters water storage**
- **Integrated heating element**
- **Robust AC pump design**
- **Solar back up system for redundancy**
- **Defrost system for reliability**
- **Solar pool gear option (P extension coded)**
- **Robust protected-ventilated 3ph 6-9kWdC inverter**

CABIN GENERAL CHARACTERISTICS

	Thermal Part	Electrical Part
Type		RITTAL TS 8
External dimensions W x H x D (front view)	800 x 2000 x 800 mm 31,50 x 78,74 x 31,50 inch	400 x 2000 x 800 mm 15,75 x 78,74 x 31,5 inch
Mounting plate W x H	699 x 1896 mm / 27,5 x 74,65 inches	699 x 1896 mm / 27,5 x 74,65 inches
Weight/pack	203 kg	124 kg
Material		Sheet steel
Cold / Hot Supply - Brass	1 ¼ inch	
Color		RAL 7035
Protection category IP to IEC 60 529		IP 55
Doors	1	1
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

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

VENTILATION - TECHNICAL SPECIFICATIONS

	Fan	Thermostat
Type	RITTAL TopTherm	RITTAL internal thermostat
Color	RAL 7035	RAL 7035
Protection category IP to IEC 60 529	IP 54 with standard filter and additional fine filter mat: IP 55 with standard filter and hose-proof hood: IP 56	
Protection category NEMA	with standard filter: Type 12 with standard filter and additional fine filter mat: Type 12 with standard filter and hose-proof hood: Type 3, 3R, 4, 4X	
Air throughput (unimpeded air flow):	At 50 Hz: 230 m ³ /h At 60 Hz: 250 m ³ /h	
Air throughput with outlet filter including standard filter mat (output 50/60 Hz)	203/230 m ³ /h	
Rated operating voltage:	115 V, 1~, 50 Hz/60 Hz	24 V - 230 V, 1~24 V - 60 V (DC)
Dimensions	Width: 255 mm Height: 255 mm	Width: 71 mm Height: 71 mm Depth: 33.5 mm
Build depth		25 mm
Installation depth		107 mm
Temperature range:	Bearing: -30°C...+70°C Operation (environment): -30°C...+55°C	Setting range: +5°C...+60°C
Power consumption		At 50 Hz: 40 W, At 60 Hz: 42 W
Rated current (max.)		At 50 Hz: 0.52 A, At 60 Hz: 0.48 A
Miniature circuit breaker/ fuse		4 A
Noise level		At 50 Hz: 54 dB(A), At 60 Hz: 56 dB(A)
Diagonal fan		Diagonal, self-starting shaded pole motor
Weight/pack	2.26 kg	0.1 kg
Approvals	Approval overview CSA UL + C-UL - FTTA UR + C-UR	UL + C-UL VDE
Certificates	EAC	EAC
Declarations	Declaration of conformity	Declaration of conformity

SOLAR TANK CHARACTERISTICS	T160	T200	T300	T500
General Data				
Type	Sammler SV			TESY EV
Solar tank capacity	160 lt / 40 gal	200 lt / 50 gal	300 lt / 80 gal	500 lt / 132 gal
External dimensions W x H	580 x 1058 mm 22,83 x 41,6 inch	580 x 1292 mm 22,83 x 50,9 inch	580 x 1735 mm 22,83 x 68,3 inch	580 x 1674 mm 22,83 x 66 inch
Weight	67 kg / 235 lb	82 kg / 235 lb	107 kg / 235 lb	145 kg / 320 lb
Number of boilers	1			
Max pressure primary circuit	3 bar			8 bar
Max pressure secondary circuit	3 bar			6 bar
Electric Resistance	1.50 – 4.00 KW (UL Ready) - not included			
Anti-corrosion protection	2 x magnesium anodes			
Certification	SRCC, Solar Keymark, CE			Solar Keymark, CE

SOLAR PUMP STATION

General Data	
Type	Caleffi 279 series
Dimensions	Height (with controller extension): 381 mm Width (with insulation) : 203,2 mm
Suitable fluids	water, glycol solution
Max. percentage of glycol	50%
Maximum working temperature	air separator side supply: 320°F (160°C), pump side return: 230°F (110°C)
Max. working pressure	145 psi (10 bar)
Safety relief valve working temperature range	-20 to 320°F (-30–160°C)
Safety relief valve setting	90 psi (6 bar)
Check valve min. opening pressure (Dp)	1/4 psi (2 kPa)
Shut-off and check valves working temperature range	-20 to 320°F (-30–160°C)
Flow meter working temperature range	15 to 230°F (-10–110°C)
Flow rate adjustment range	2 to 8 gpm
Flow rate indicator accuracy	±10%
Pressure gauge scale	0 to 145 psi (0–10 bar)
Temperature gauge scale	32 to 320°F (0–160°C)
Connections	3/4" female straight thread
Hose connection	3/4"
Fill/drain connections	with hose connection 9/16" OD (15 mm)

Materials	
Shut-off valve body	Brass
Check valve	Brass
Temperature gauge	steel/aluminum
Air Separator body	Brass
Instrument holder fitting body	Brass
Instrument holder fitting sealing gaskets	EPDM
Instrument holder fitting O-Ring seal elements	EPDM
Flow meter body	Brass
Flow meter transparent level gauge	PS
Flow meter flow indicator	Brass
Insulation material	PP
Insulation average thickness	20 mm
Insulation density	45 kg/m3
Insulation working temperature	-5...120°C
Insulation thermal conductivity	0.263 BTU·in/hr·ft ² ·°F 0.037 W/(m·K) at 50°F (10°C)
Insulation reaction to fire (UL94)	class HBF

CONTROLLER

General Data

Type	Caleffi iSolar
Dimensions	Width: 171.45 mm, Height: 111.1 mm, Depth: 50.8 mm
Weight	0.4 kg
Housing	PC-ABS
Protection type	Indoor
Display	LCD
Interface	Three soft push buttons
Inputs	4 temperature sensors
Outputs	1 or 2 triac or standard relays
Switching Capacities	1 A - 115 VAC
Power Supply	12V - 24V
Power Consumption	1W, 1.5VA
Data Connection	V-Bus

Performance

ΔT adjustment range	2-40° ΔT (1-20 °K)
Min. temperature differential	2° ΔT (1 °K)
Hysteresis	2° $\Delta T \pm 1^\circ \Delta T$ (1 °K $\pm 5^\circ \Delta T$)
Max. tank temperature range	210 - 375 °F (100 - 190 °C)
Emergency shut down of the collector	230 - 395 °F (110 - 200 °C)
Min. collector temperature option	50 - 195 0F (10 - 90 °C)
Antifreeze temperature option	15 - 50 °F (-10 - 10 °C)
kWh (BTU) flow input	0 - 5 gpm (0 - 20 lpm)
Agency approvals	cTUVus

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-5.8-TL-OUTD	TRIO-7.5-TL-OUTD	TRIO-8.5-TL-OUTD
Input side			
Absolute maximum DC input voltage ($V_{max,abs}$)		1000 V	
Start-up DC input voltage (V_{start})		350 V (adj. 200...500 V)	
Operating DC input voltage range ($V_{dcr,min} \dots V_{dcr,max}$)		0.7 x $V_{start} \dots 0.950$ V (min 200 V)	
Rated DC input voltage (V_{dcr})		620 V	
Rated DC input power (P_{dcr})	5950 W	7650 W	8700 W
Number of independent MPPT	1	2	2
Maximum DC input power for each MPPT ($P_{MPPT,max}$)	6050 W Linear derating from max to null [800 V ≤ V_{MPPT} ≤ 950 V]	4800 W	4800 W
DC input voltage range with parallel configuration of MPPT at P_{acr}	-	320...800 V	320...800 V
DC power limitation with parallel configuration of MPPT		Linear derating from max to null [800 V ≤ V_{MPPT} ≤ 950 V]	
DC power limitation for each MPPT with independent configuration of MPPT at P_{acr} max unbalance example	-	4800 W [320 V ≤ V_{MPPT} ≤ 800 V] the other channel: P_{dcr} = 4800 W [215 V ≤ V_{MPPT} ≤ 800 V]	4800 W [320 V ≤ V_{MPPT} ≤ 800 V] the other channel: P_{dcr} = 4800 W [290 V ≤ V_{MPPT} ≤ 800 V]
Maximum DC input current ($I_{dcr,max}$) / for each MPPT ($I_{MPPT,max}$)	18.9 A	30.0 A / 15.0 A	30.0 A / 15.0 A
Maximum input short circuit current for each MPPT	24 A	20 A	20 A
Number of DC input pairs for each MPPT		2 (-S version)	
DC connection type ¹⁾	PV quick fit connector 1) on -S version / Screw terminal block on standard version		
Input protection			
Reverse polarity protection		Yes, from limited current source	
Input over voltage protection for each MPPT-varistor		Yes, 4	
Photovoltaic array isolation control		According to local standard	
DC switch rating for each MPPT (version with DC switch)		16 A / 1000 V, 25 A / 800 V	
Output side			
AC grid connection type		Three-phase 3W+PE or 4W+PE	
Rated AC power (P_{acr} @ $\cos\phi=1$)	5800 W	7500 W	8500 W
Maximum apparent power (S_{max})	5800 VA	7500 VA	8500 VA
Rated AC grid voltage (V_{acr})		400 V	
AC voltage range ²⁾		320...480 V ²⁾	
Maximum AC output current ($I_{acr,max}$)	10.0 A	12.5 A	14.5 A
Contributory fault current	12.0 A	14.5 A	16.5 A
Rated output frequency (f_r) ³⁾		50/60 Hz	
Output frequency range ($f_{min} \dots f_{max}$) ³⁾		47...53 Hz / 57...63 Hz ³⁾	
Nominal power factor and adjustable range	> 0.995, adj. ± 0.9 with P_{acr} = 5.22 kW, ± 0.8 with max 5.8 kVA	> 0.995, adj. ± 0.9 with P_{acr} = 6.75 kW, ± 0.8 with max 7.5 kVA	> 0.995, adj. ± 0.9 with P_{acr} = 7.65 kW, ± 0.8 with max 8.5 kVA
Total current harmonic distortion		< 2%	
AC connection type		Screw terminal block, cable gland M32	
Output protection			
Anti-islanding protection		According to local standard	
Maximum external AC overcurrent protection	16.0 A	16.0 A	20.0 A
Output overvoltage protection - varistor		4 plus gas arrester	
Operating performance			
Maximum efficiency (η_{max})		98.0%	
Weighted efficiency (EURO/CEC)	97.4% / -	97.5% / -	97.5% / -
Feed in power threshold	32 W	36 W	36 W
Night consumption		< 3 W	

User interface

Fimer Type code

TRIO-5.8-TL-OUTD

TRIO-7.5-TL-OUTD

TRIO-8.5-TL-OUTD

Communication

Wired local monitoring

Ethernet card with webserver (opt.), PVI-USB-RS232_485 (opt.)

Remote monitoring

Ethernet card (opt.), 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 50°C/122°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)

641mm x 429 mm x 220 mm / 25.2" x 16.9" x 8.7"
(855 mm x 429 mm x 237 mm / 33.7" x 16.9" x 9.3" with open front cover)

Weight

25.0 kg / 55.1 lbs

28.0 kg / 61.7 lbs

28.0 kg / 61.7 lbs

Mounting system

Wall bracket

Safety

Isolation level

transformerless

Marking

CE (50 Hz only), RCM

Safety and EMC standard

EN 62109-1, EN 62109-2, AS/NZS3100, EN 61000-6-2, EN 61000-6-3, EN 61000-3-2, EN 61000-3-3

Grid standard

(check your sales channel for availability) 5)

CEI 0-21, CEI 0-16, DIN V VDE V 0126-1-1, VDE-AR-N 4105, G83/2, G59/3, RD 1699, RD 413, NRS-097-2-1, AS 4777, IEC 61727, IEC 62116, VFR 2014

Available products variants

Standard

TRIO-5.8-TL-OUTD-400

TRIO-7.5-TL-OUTD-400

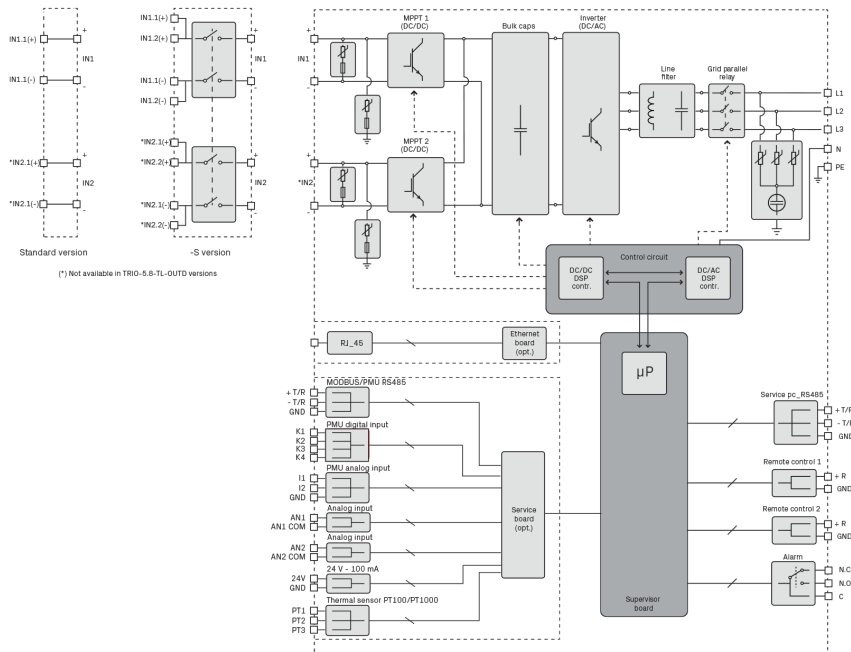
TRIO-8.5-TL-OUTD-400

With DC switch

TRIO-5.8-TL-OUTD-S-400

TRIO-7.5-TL-OUTD-S-400

TRIO-8.5-TL-OUTD-S-400



TRIO-5.8/7.5/8.5-TL-OUTD string inverter block diagram

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