

REFU*sol* 40K/46K

String Inverter for large PV systems

- UltraEta® Topology
- Natural convection cooling
- Cloud-based monitoring

Performance and reliability are what counts in large PV systems. The second generation of the string inverter REFU*sol* 40K/46K offers both. With up to 46 kVA output power for medium voltage feed-in and its patented 5 level UltraEta® topology, it generates the best possible energy yield at every irradiation level. The inverter design with passive cooling without external fan eliminates costly maintenance works.

The new DC and AC terminals using latest Phoenix Contact T-LOX technology allow fast connection of aluminum and copper wires up to cross sections of 50 mm². Thanks to the reduction to one single DC input, the inverter offers multiple options on the DC external combiner box.

Each solar inverter can be connected to our cloud-based monitoring portal REFUlog using Ethernet or RS485 connections, offering professional monitoring functionality.



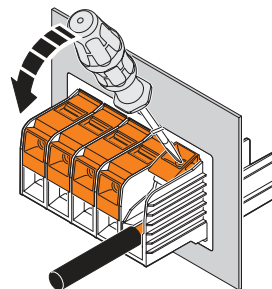
Available as 40 kVA (400 V)
or 46 kVA (460 V)

TECHNICAL DATA

Art. No.	REFU ^{sol} 40K 842P040.010	REFU ^{sol} 46K-MV 842P046.010
DC DATA		
Max. recommended PV power (kWp)	60	70
MPPT range (V)	250 ... 900	
MPPT range at nominal power (V)	490 ... 850	575 ... 850
Max. voltage DC (V)	1,000	
DC wake-up voltage (V)	200	
DC start voltage feed-in (V)	350	
Max. operational current DC (A)	84	82
Max. short circuit current ISC of PV system (A)	160	
MPP trackers	1	
Number of DC inputs	1 × Plus, 1 × Minus	
DC input terminal	Phoenix Contact T-LOX knee lever connection TW50	
DC input cables	10 ... 50 mm ² (aluminum / copper)	

AC DATA		
AC nominal power (kW)	40 *)	46
Max. apparent power (kVA)	40	46
AC grid connection / Feed-in phases	L1, L2, L3, N, PE	
Nominal power factor / Range	1 / 0,8i ... 0,8c	
Nominal voltage AC (V)	400	460
Voltage range AC (V)	320 ... 480	368 ... 529
Nominal frequency / Frequency range (Hz)	50, 60 / 45 ... 65	
Max. AC current (A)	3 × 59	
Max. THD (%)	< 3	
Max. AC protection (A)	80	
AC circuit breaker	external	
Max. efficiency (%)	98.2	98.3
European efficiency (%)	97.8	98.1
Feed-in from (W)	40	
Self consumption night (W)	< 0.5	
AC terminal	Phoenix Contact T-LOX knee lever connection TW50	
AC cables	10 ... 50 mm ² (aluminum / copper)	

*) 38.8 kW / kVA at 380 V grid voltage



Fast and safe connection of AC and DC cables thanks to the new Phoenix Contact connection technology.

AMBIENT CONDITIONS

Cooling	natural convection
Ambient temperature at nominal power [°C]	- 25 ... + 45
Ambient temperature [°C]	- 25 ... + 60
Storage temperature [°C]	- 25 ... + 60
Rel. air humidity [%]	4 ... 100
Elevation (m above sea level)	4,000 *)
Noise (dBA)	< 45
Environment classification (IEC 721-3-4)	4K4H
Pollution degree (IEC 62109-6-3)	3
Type of protection (IEC 60529)	IP65

SAFETY AND PROTECTION FUNCTIONS

DC circuit breaker	integrated
Isolation monitoring	yes
Overload behaviour	DC working point adjustment
String fuses	external
Grid monitoring	Voltage, Frequency, Anti Islanding, DC injection
Residual Current Monitoring (RCD)	yes
Protection class (IEC 62103)	I
Overvoltage category (EN 60664-1)	DC: II, AC: III

GENERAL DATA FUNCTIONS

Interfaces	Ethernet, RS485, temperature and irradiation sensor / external stop signal
Dimensions W × H × D (mm)	755 × 820 × 300
Weight (kg)	75.6
Certification	You can find the latest certificates at www.refu-sol.com

ACCESSORIES

922001	REFU ^{sol} 08 K ... 46 K RS485 Connector Set	For RS485 wiring of REFU ^{sol} inverter, contains 2 connectors (IN / OUT)
922002	REFU ^{sol} 08 K ... 46 K Ethernet Connector	For Ethernet wiring of REFU ^{sol} inverter
924002 - 924007	REFU ^{control}	Ethernet or RS485 data-gateway, power control and individual park control features
925001 - 925005	Combiner Box	DC Combiner Box with 10 string inputs and different options like fuses and surge protection
922013	PV-Fuse 10×38 1,000 V 15 A	PV fuses for the Combiner Boxes
922009	Temperature and irradiation sensor	Measurement of irradiation and module temperature. Can be directly connected to any REFU ^{sol} inverter
922010	REFU ^{sol} 08 K ... 46 K connector for sensor input	Connector to connect the irradiation sensor to REFU ^{sol} inverter 08 K ... 46 K

*] The derating of the maximum open circuit voltage depends on the installation altitude:

Altitude above Sea Level	Max. DC voltage
up to 2,600 m	1,000 V
up to 3,000 m	950 V
up to 3,500 m	900 V
up to 4,000 m	850 V

SYSTEM PLANNING WITH THE REFU_{sol} 40K/46K

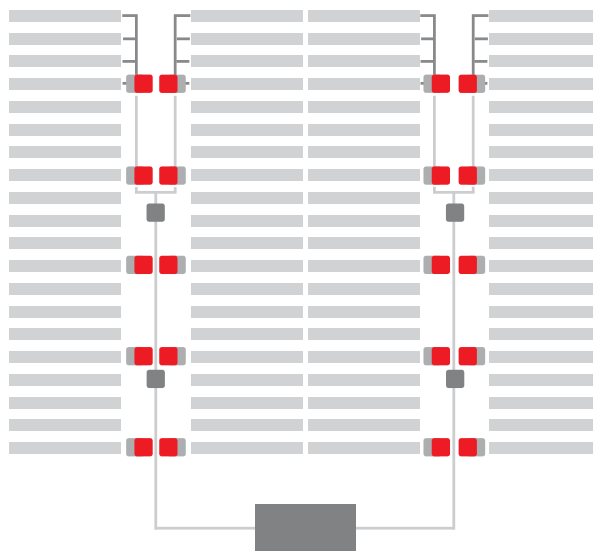
MODULAR LARGE SYSTEM ARCHITECTURE

The REFU_{sol} 40K/46K with its highly precise MPP-tracker and central string input gives maximum flexibility for the system planning. The devices can be placed close to the module strings or grouped centrally close to the transformer – an outdoor positioning is no problem thanks to IP 65 protection class.

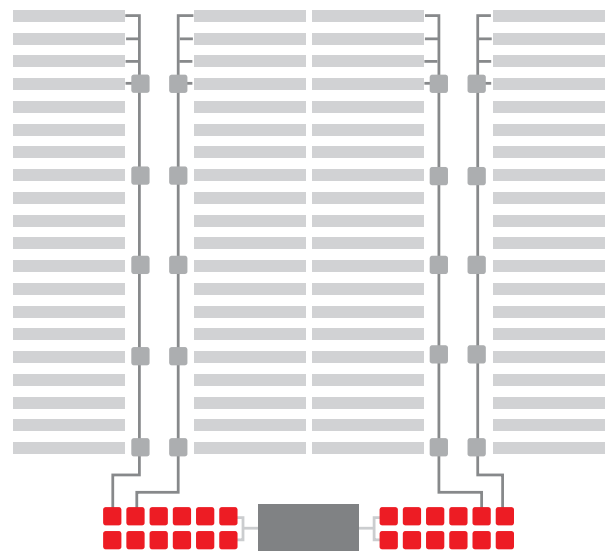
CENTRALIZED STRING CONCEPT

The centralized positioning of the inverters close to the transformer provides several benefits. Besides lower losses on the DC-side and less costs due to reduced AC cabling, it also simplifies the ethernet connection needed for monitoring.

GROUND MOUNTED SYSTEMS

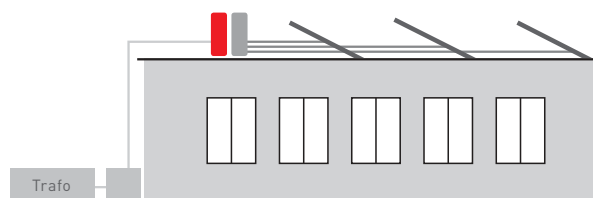


Decentralized system

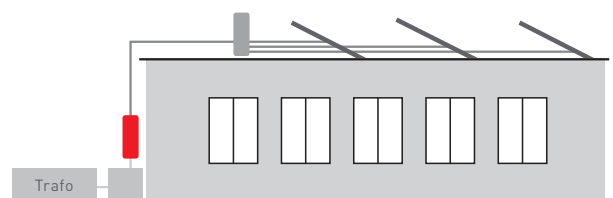


Centralized system

ROOFTOP SYSTEMS



Decentralized system



Centralized system

- REFU_{sol} inverter
- DC combiner box
- AC combiner
- DC cable
- AC cable