

# ***Solar Inverters***

***Emerson Network Power***



# Product Portfolio – (Off-Grid and Bidirectional)

Transformer Based  
Central Inverters



Liebert ESU  
1/2/3/4/5/6/10 kW  
1-phase

Bidirectional



Liebert ESU  
10/20/30/50/100 kW  
3-Phase

Bidirectional

1-100kVA

Transformer Less  
Central Inverters



LiebertESU+  
1/3/5 kVA

Off-Grid



Liebert ESU+ IN  
3/5 kW



Liebert ESU+ IN  
10 kW (3-ph)

Bidirectional

# Liebert ESU+ IN 3/5 kW (Bi-Directional)

- Hybrid / Bi-Directional inverter
- User-adjustable battery charging current suits different types of batteries
- Programmable multiple operations modes: Grid tie, Off grid, and grid-tie with backup
- Built-in timer for various mode of on/off operation



MODEL	Liebert ESU+IN 3KW	Liebert ESU+IN 5KW
Max. PV Array Power	4000W	6000W
Rated Output Power	3000W	5000W
Maximum PV Array Open Circuit Voltage	145 VDC	145 VDC
MPPT Range @ Operating Voltage	60 VDC ~ 115 VDC	60 VDC ~ 115 VDC
Number	1	2
<b>GRID-TIE OPERATION</b>		
<b>GRID OUTPUT (AC)</b>		
Nominal Output Voltage	220/230/240 VAC	
Output Voltage Range	184 - 264.5 VAC	
Nominal Output Current	13 A	21.7 A
Power Factor	> 0.99	
<b>EFFICIENCY</b>		
Maximum Conversion Efficiency (DC/AC)	90%	
<b>OFF-GRID, HYBRID OPERATION</b>		
<b>GRID INPUT</b>		
AC Start-up Voltage / Auto Restart Voltage	120-140 VAC / 180 VAC	
Acceptable Input Voltage Range	170 -280 VAC	
Maximum AC Input Current	30A	40A
<b>BATTERY MODE OUTPUT (AC)</b>		
Nominal Output Voltage	202/208/220/230/240 VAC	
Output Waveform	Pure sine wave	
Efficiency (DC to AC)	93%	
<b>BATTERY &amp; CHARGER</b>		
Nominal DC Voltage	48 VDC	48 VDC
Maximum Solar Charge Current	80 A	120 A
Maximum AC Charge Current	60 A	
Maximum Charge Current	140 A	180 A
<b>GENERAL</b>		
<b>PHYSICAL</b>		
Dimension, D x W x H (mm)	120 x 295 x 468	194 x 295 x 455
Net Weight (kgs)	11	16
<b>INTERFACE</b>		
Parallel Function	Yes	Yes
External Safety Box (Optional)	Yes	
Communication	USB/Dry contact	
<b>ENVIRONMENT</b>		
Humidity	0 ~ 90% RH (No condensing)	
Operating Temperature	0 to 50°C	

# Liebert ESU+ IN 10 kW

- Hybrid / Bi-Directional inverter
- User-adjustable battery charging current suits different types of batteries
- Programmable multiple operations modes: Grid tie, Off grid, and grid-tie with backup
- Built-in timer for various mode of on/off operation



Technical Characteristics	
MODEL	ESU+ IN Three Phase 10KW
PHASE	3-phase in / 3-phase out
RATED OUTPUT POWER	10000W
MAXIMUM CHARGING POWER	9600W
<b>GRID-TIE OPERATION</b>	
<b>PV INPUT (DC)</b>	
Maximum PV Input Power	14850W
Nominal DC Voltage / Maximum DC Voltage	720VDC / 900VDC
Start-up Voltage / Initial Feeding Voltage	320VDC / 350VDC
MPP Voltage Range	350VDC ~ 850VDC / 400VDC ~ 800VDC
Number of MPP Trackers / Maximum Input Current	2 / 2x 18.6 A
<b>GRID OUTPUT (AC)</b>	
Nominal Output Voltage	230 VAC (P-N) / 400 VAC (P-P)
Output Voltage Range	184 - 265 VAC per phase
Nominal Output Current	14.5 A per phase
Power Factor	> 0.99
<b>EFFICIENCY</b>	
Maximum Conversion Efficiency (DC/AC)	96%
European Efficiency@ Vnominal	95%
<b>OFF-GRID OPERATION</b>	
<b>AC INPUT</b>	
AC Start-up Voltage/Auto Restart Voltage	120 - 140 VAC per phase / 180 VAC per phase
Acceptable Input Voltage Range	170 - 280 VAC per phase
Maximum AC Input Current	40 A
<b>PV INPUT (DC)</b>	
Maximum DC Voltage	900 VDC
MPP Voltage Range	350VDC ~ 850VDC / 400VDC ~ 800VDC
Number of MPP Trackers / Maximum Input Current	2 / 2x 18.6A
<b>BATTERY MODE OUTPUT (AC)</b>	
Nominal Output Voltage	230 VAC (P-N) / 400 VAC (P-P)
Output Waveform	Pure Sinewave
Efficiency (DC to AC)	91%
<b>HYBRID OPERATION</b>	
<b>PV INPUT (DC)</b>	
Nominal DC Voltage / Maximum DC Voltage	720VDC / 900VDC
Start-up Voltage / Initial Feeding Voltage	320VDC / 350VDC
MPP Voltage Range	350VDC ~ 850VDC / 400VDC ~ 800VDC
Number of MPP Trackers / Maximum Input Current	2 / 2x 18.6 A
<b>GRID OUTPUT (AC)</b>	
Nominal Output Voltage	230 VAC (P-N) / 400 VAC (P-P)
Output Voltage Range	184 - 265 VAC per phase
Nominal Output Current	14.5 A per phase
<b>AC INPUT</b>	
AC Start-up Voltage/Auto Restart Voltage	120 - 140 VAC per phase / 180 VAC per phase
Acceptable Input Voltage Range	170 - 280 VAC per phase
Maximum AC Input Current	40 A
<b>BATTERY MODE OUTPUT (AC)</b>	
Nominal Output Voltage	230 VAC (P-N) / 400 VAC (P-P)
Efficiency (DC to AC)	91%
<b>BATTERY &amp; CHARGER</b>	
Nominal DC Voltage	48 VDC
Maximum Charging Current	Default 60A, 10A - 200A (Adjustable)
<b>GENERAL</b>	
<b>PHYSICAL</b>	
Dimension, D X W X H (mm)	550 x 438 x 120
Net Weight (kgs)	16
<b>INTERFACE</b>	
Communication Port	RS-232/USB
Intelligent Slot	Optional SNMP, Modbus, and AS-400 cards available
<b>ENVIRONMENT</b>	
Humidity	0 ~ 90% RH (No condensing)
Operating Temperature	-10 to 55°C
Altitude	0 ~ 1000 m*

# Liebert ESU+ 1/3/5 kVA (Off-Grid)



- Selectable Input Voltage Range
- Modulized Design
- Smart Battery charger
- Configurable AC/Solar Input
- Auto-start when AC recovers
- Cold Start function



MODEL	ESU+ 1kVA	ESU+ 3kVA	ESU+ 5kVA
Rated Power	1000VA/1000W	3000VA/2400W	5000VA/4000W
<b>INPUT</b>			
Voltage	230 VAC		
Selectable Voltage Range	170-280 VAC (For Personal Computers) 90-280 VAC (For Home Appliances)		
Frequency Range	50 Hz/60 Hz (Auto sensing)		
<b>OUTPUT</b>			
AC Voltage Regulation (Batt.	230VAC ± 5%		
Surge Power	2000VA	6000VA	10000VA
Efficiency (Peak)	90% - 93%	93%	
Transfer Time	10 ms (For Personal Computers) 20 ms (For Home Appliances)		
Waveform	Pure sine wave		
<b>BATTERY &amp; AC CHARGER</b>			
Battery Voltage	48 VDC	48 VDC	48 VDC
Floating Charge Voltage	54 VDC	54 VDC	54 VDC
Overcharge Protection	62 VDC	62 VDC	60 VDC
Maximum Charge Current	10 A or 10 A / 15 A*	10 A or 15 A	20 A or 30 A
<b>SOLAR CHARGER</b>			
Maximum PV Array Power	900 W	900 W	3000 W
MPPT Range @ Operating Voltage	60VDC ~ 88VDC	60VDC ~ 88VDC	60VDC
Maximum PV Array Open Circuit Voltage	102 VDC	102 VDC	145 VDC
Maximum Charging Current	20A	18A	60A
Maximum Efficiency	98%		
Standby Power Consumption	2 W		
<b>PHYSICAL</b>			
Dimension, D x W x H (mm)	128 x 272 x 355		140 x 295 x 540
Net Weight (kgs)	7.4	8	13.5
<b>OPERATING ENVIRONMENT</b>			
Humidity	5% to 95% Relative Humidity(Non-condensing)		
Operating Temperature	0°C - 55°C		
Storage Temperature	-15°C - 60°C		

# Product Portfolio – (On-Grid)

Transformer Based  
Central Inverters



Liebert EEU  
1/2/3/4/5/6/10 kVA

1-phase



Liebert EEU  
10/20/30/50/100/250 kVA

3-Phase

1-1000 kVA

Transformer Less  
String Inverters



String SM  
2 kVA



String DM  
3/5 kVA



String TM  
10/20/30/50 kVA



Central  
500/1000 kVA

# String SM Series 2 kVA (On-Grid)



- Efficiency upto 96.9%
- IP65
- Mimic LCD Display
- Versatile Communication
- Optional DC Switch

MODEL	String SM-2kW	
<b>INPUT</b>		
Max. DC input power	2400W	
Max. DC input voltage	500Vdc	
MPPT tracking voltage range	150 ~450Vdc (Rated voltage 360Vdc)	
Number of MPPT tracking	1	
Max. input current for each tracking	11A	
<b>OUTPUT</b>		
Rated output power	2000W	
Max. AC output power	2 200W	
Rated output voltage	230Vac	
Output voltage range	184 ~276Vac	
Grid frequency range	50/60Hz(±5Hz), (adjustable )	
Rated output current	8.7A	
Max. output current	11A	
Power factor (cosΦ)	1	
Total harmonic current distortion (THDi)	<3%	
<b>SYSTEM FEATURES</b>		
Max. efficiency	> 96.9%	
Euro efficiency	> 96.0%	
MPPT efficiency	>99.9%	
Standby (night time) losses	<0.2 W	
DC switch	Optional	
Communication interface	RS485 standard, external WiFi or Ethernet (optional)	
<b>ENVIRONMENTAL</b>		
Operating temperature	-20° C~60° C	
Humidity range	0~95% (non-condensing)	
Altitude	2000m	
Noise level	<25dB (1 meter from surface)	
Protection rating	IP65	
<b>PHYSICAL</b>		
Dimension W×D×H (mm)	335×170×580	
Shipping weight (kg)	15.8	18.2
<b>STANDARDS</b>		
	IEC/EN62109-1, IEC/EN62109-2, VDE0126-1-1, VDE AR N	
Safety		
EMC	EN61000-6-2, EN61000-6-3, et c	

# String DM Series 3/5 kVA (On-Grid)



## DM series: 3,5 kW

- Efficiency upto 97.5%
- High input PV voltage
- Reactive Power controller

MODEL	3K-DM	5K-DM
<b>INPUT</b>		
Max. DC input power	3300W	5500W
Max. DC input voltage	600Vdc	
MPPT tracking voltage range	150 ~500Vdc (Rated voltage 360Vdc)	
Number of MPPT tracking	2	
Max. input current for each tracking	9A×2	15A×2
<b>OUTPUT</b>		
Rated output power	3000W	5000W
Max. AC output power	3100W	5100W
Rated output voltage	230Vac	
Output voltage range	184 ~276Vac	
Grid frequency range	50/60Hz(±5Hz), (adjustable)	
Rated output current	13A	21.7A
Max. output current	15A	24A
Power factor (cosΦ)	0.9 leading-0.9 lagging	
Total harmonic current distortion(THDi)	<3%	
<b>SYSTEM FEATURES</b>		
Max. efficiency	>97.4%	> 97.6%
Euro efficiency	>96.6%	> 96.8%
MPPT efficiency	>99.9%	
Standby (night time) losses	<0.2 W	
DC switch	Optional	
Communication interface	RS485 standard, external WiFi or Ethernet (optional)	
<b>ENVIRONMENTAL</b>		
Operating temperature	-20° C~60° C	
Humidity range	0~95% (non-condensing)	
Altitude	2000m	
Noise level	<25dB (1 meter from surface)	
Protection rating	IP65	
<b>PHYSICAL</b>		
Dimension W×D×H (mm)	39 5×180 ×637	



# String TM Series 10/20 kVA (On-Grid)



TM series: 10,20 kW

- Efficiency upto 98%
- High input PV voltage
- Reactive Power controller

Model	String TM-10KW	String TM-20kW
<b>INPUT</b>		
Max. DC input power	12KW	22KW
Max. DC input voltage	900Vdc	
MPPT tracking voltage range	250~850Vdc	
Number of MPPT tracking	3	
Max. input current for each	12A × 3	17A × 3
<b>OUTPUT</b>		
Rated output power	10KW	20KW
Max. AC output power	10.5KW	20.5KW
Rated output voltage	400 V a c	
Output voltage range	400V±20% (adjustable )	
AC output topology	3Ph+N+PE, Transformer-less	
Grid frequency range	50/60Hz (±5Hz), (adjustable )	
Rated output current	14.5A	29A
Max. output current	17A	30A
Power factor (cosΦ)	0.9 leading 0.9 lagging	
Total harmonic current distortion (THDi)	<3 %	
<b>SYSTEM FEATURES</b>		
Max. efficiency	>98.0%	> 98.2%
Euro efficiency	>97.5%	> 97.7%
MPPT efficiency	99.90%	
Standby (night time) losses	<0.2 W	
Cooling	Forced air cooling	
DC switch	Optional	
Communication interface	RS485 standard, external WiFi or Ethernet (optional)	
<b>ENVIRONMENTAL</b>		
Operating temperature	- 20° C~60°C	
Humidity range	0~95% (non-condensing)	
Altitude	2000m	
Noise level	<40dB (1 meter from surface)	
Protection rating	IP65	
<b>PHYSICAL</b>		
Dimension W × D × H (mm)	506 × 210 × 695	522 × 210 × 720
Shipping weight (kg)	46.5	50
<b>STANDARDS</b>		
	IEC/EN62109-1, IEC/EN62109-2, VDE0126-1-1, VDE AR N4105, G83/59/EEG2012, AS3100/4777, CEI 0-21, , NB/T 32004-2013, etc	
Safety		
EMC	EN61000-6-2, EN61000-6-3, EN61000-3-11, EN61000-3-12, et c	

# String TM Series 30/50 kVA (On-Grid)



- Efficiency upto 98%
- High input PV voltage
- Reactive Power controller

Model	String TM-30kW	String TM-50kW
<b>INPUT</b>		
Max. DC input power	33KW	60KW
Max. DC input voltage	1000Vdc	
MPPT tracking voltage range	250~850Vdc	
Number of MPPT tracking	3	
Max. input current for each tracking	26A × 3	36A × 3
<b>OUTPUT</b>		
Rated output power	30KW	50KW
Max. AC output power	30.5KW	51KW
Rated output voltage	400 Va c	
Output voltage range	400V±20% (adjustable )	
AC output topology	3 Ph+N+PE, Transformer-less	
Grid frequency range	50/60Hz (±5Hz), (adjustable )	
Rated output current	44A	72A
Max. output current	48A	75A
Power factor (cosΦ)	0.9 leadin g ~ 0.9 lagging	
Total harmonic current distortion (THDi)	<3 %	
<b>SYSTEM FEATURES</b>		
Max. efficiency	>98.3%	> 98.6%
Euro efficiency	>98%	> 98.2%
MPPT efficiency	99.9%	
Standby (night time) losses	2W	
Cooling	Natural cooling	Forced air cooling
DC switch	Optional	
Communication interface	RS485 standard, external WiFi or Ethernet (optional)	
<b>ENVIRONMENTAL</b>		
Operating temperature	-25 °C ~ 60 °C	
Humidity range	0 ~ 95% (non-condensing)	
Altitude	3000m	
Noise level	<40dB	< 60dB
Protection rating	IP65	
<b>PHYSICAL</b>		
Dimension W × D × H (mm)	636 × 257 × 896	636 × 257 × 896
Shipping weight (kg)	60	65
<b>STANDARDS</b>		
Safety	IEC/EN62109-1, IEC/EN62109-2, VDE0126-1-1, VDE AR N4105, G83/59/EEG2012, AS3100/4777, CEI 0-21, NB/T 32004-2013, etc	
EMC	EN61000-6-2, EN61000-6-3, EN61000-3-11, EN61000-3-12, etc	

# Central 500kW, 1000kW On-Grid for Utility Scale

- Efficiency 98.7%
- Reactive power compensation, LVRT function
- Plant Monitoring
- IP54 protection
- Perfect protection Functions
- Easy to extend



Central  
500kVA / 1000kVA

Model	Central 500kW	Central 1000kW
<b>INPUT</b>		
Max. DC input power	550KW	1100KW
Max.DC input voltage	1000Vdc	
MPPT tracking voltage range	450~850Vdc	
Number of DC input tracking	8 (8~12 optional)	16
Max. input current	1200A	2400A
<b>OUTPUT</b>		
Rated output power	500KW	1000KW
Rated output voltage	270 / 315Vac	315Vac
AC output topology	3Ph+PE	
Output voltage range	(1±15%) x Normal AC Voltage (adjustable ±5%,±10%,±15%,±20%)	
Gird frequency range	50/60Hz(±4.5Hz), (adjustable)	
Rated AC output current	1070 / 916A	1836A
Max. AC output current	1124 / 1007A	2014A
Power factor (cosΦ)	1 ( 0.9 leading – 0.9 lagging) (adjustable)	
Total harmonic current distortion ( THDi )	<3%	
<b>SYSTEM FEATURES</b>		
Max. efficiency	98.70%	98.70%
Euro efficiency	98.40%	98.50%
MPPT efficiency	>99%	
Standby(night time) losses	<10W	
Cooling	Forced air cooling	
Communication interface	RS485, external Ethernet (optional)	
<b>ENVIRONMENTAL</b>		
Operating temperature	-40 to 60 deg Cel (more than 55 deg derating)	
Humidity range	0~95% (non-condensing)	
Altitude	3000m	
Noise level	<70dB	<65dB
Protection rating	IP54	
<b>PHYSICAL</b>		
Dimension W×D×H (mm)		3200×2800×3000
Net Weight (t)	3.5	6
<b>STANDARDS</b>		
CQC	CNCA/CTS0004-2009A, CNCA/CTS0006-2010, NB/T 32004-2013	
CE	IEC62109-1, IEC62109-2	
TUV	IEC62109-1, IEC62109-2, IEC/EN61000-6-2, IEC/EN61000-6-4, etc	

***Thank You !***