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## ABOUT LIVGUARD

Livguard Energy Technologies Pvt. Ltd. (LETPL) one of India's leading providers for power energy solutions is poised to transform the world with its cutting edge technology, in solar solutions, power back-up, automotive solutions, & e-rickshaw batteries. Livguard was founded in the year 2014 and is a part of the SAR Group which has been serving the nation for the past three decades. With our technologically advanced toolkit and trained technicians we have achieved the customer's trust and faith in our products and services. This has helped us reach the 4,000 crore company milestone in a short period of time.

## LIVGUARD SOLAR PRODUCT RANGE

### SOLAR PANEL

40 WATT - 545 WATT



### SOLAR MANAGEMENT UNIT

30 A - 50 A



### SOLAR CHARGE CONTROLLER

10 A - 50 A



### SOLAR BATTERY

40 AH - 240 AH



### SOLAR UPS

700 VA - 2200 VA



### PWM POWER CONDITIONING UNIT

3.5 KVA - 10 KVA



### SOLAR UPS MPPT

1000 VA - 2500 VA



### MPPT POWER CONDITIONING UNIT

3 KVA - 15 KVA



### GRID INTERACTIVE HYBRID

- 1-PHASE : 3KVA - 5KVA
- 3-PHASE : 10KVA - 30KVA





# GIH INVERTER - 1 PHASE

Grid Interactive Hybrid Inverters are also known as GIH inverters. With a wide operating temperature range and suitable for operation in harsh environments, these machines are a perfect fit for low maintenance, off-grid/ hybrid installations of industrial and residential nature both.



### Priority/Non-Priority Solar operation

- Use Solar Power for both type of Loads.
- Connect Upto 20Kva Load on Non-Priority.



### Scheduled Grid Usage

- Manage start/stop battery charging from grid/solar effectively
- Limit Import Power from Grid



### 3-Stage Battery Charging

- Float, Bulk & Equalization
- Ensure long life of the battery



### In-Built Zero Export

- No separate device required.
- Use Solar On-Grid without Net Metering.



### MPPT-Based Solar Charge Controller

- Highly Efficient MPPT technology for maximum solar utilization.



**10 ms**

### Seamless Switching <10ms

- Switch between inverter/mains without any interruptions.

## GRID INTERACTIVE HYBRID INVERTER - 1 PHASE

| Model Name | LS 103GIHT | LS 105GIHT |
|------------|------------|------------|
| Capacity   | 3KVA       | 5KVA       |

### MAINS INPUT MODE

|                            |  |          |
|----------------------------|--|----------|
| Mains AC Low Cut           | 170 ± 5V                               | 170 ± 5V |
| Mains AC Low Cut Recovery  | 10V Hysteresis from > Low Cut Voltage  |          |
| Mains AC High Cut          | 265 ± 5V                               | 265 ± 5V |
| Mains AC High Cut Recovery | 10V Hysteresis from < High Cut Voltage |          |
| Input Frequency Range      | 47-53Hz                                |          |

### MAINS EXPORT MODE

|   |  |       |
|---|--|-------|
| Inverter output voltage in Grid export mode | Same as Mains Voltage  |       |
| Full Scale Export Power                     | 2400W  | 4000W |
| Export Power Control                        | Can be Done from Front Panel by using Load Following Mode<br>Load Following ON: Zero Export Activated, Load Following OFF: Export Mode Activated |       |

### BATTERY

|  |                                     |              |
|--|-------------------------------------|--------------|
| Battery Type                                       | TUBULAR/FLAT/VRLA                   |              |
| DC Input Voltage (Nominal)                         | 48V                                 |              |
| Battery Quantity (12V 100Ah to 220Ah)              | 4                                   |              |
| Float Charging Voltage (Tubular/ VRLA/ Flat Plate) | 13.2/13.5/13.4 (per Battery ) ± .5V |              |
| Bulk Charging Voltage(Tubular/ VRLA/ Flat Plate)   | 14.5/13.8/13.7 (per Battery ) ± .5V |              |
| Battery Deep Discharge Recovery                    | YES                                 |              |
| Default Charging Current By Grid                   | Half of Solar Charging Current      |              |
| Max Charging Current By PV                         | 60.0 ± 1.0A                         | 100.0 ± 1.0A |

### BACKUP MODE

|                            |                             |                 |
|----------------------------|-----------------------------|-----------------|
| Output Voltage             | 230 ± 2% V                  |                 |
| Output Frequency           | 50 ± 0.5 Hz                 |                 |
| Output Waveform            | PURE SINE WAVE              |                 |
| Maximum No Load losses     | <100W                       | <150W           |
| Max Nominal output current | 10.5 A± 1 Amp.              | 17.5 A ± 1 Amp. |
| Low Battery Warning        | 11.1V (per Battery ) ± 0.2V |                 |
| Low Battery Cut            | 10.8V (per Battery ) ± 0.2V |                 |
| Change Over Time           | ≤ 10 msec                   | ≤ 10msec        |

### PROTECTIONS

Overload in Backup Mode, Short Circuit (Backup/Mains), Over Temperature, Reverse battery, MOV for Grid/Load/PV Surge

### SOLAR CHARGE CONTROLLER

|  |             |           |
|--|-------------|-----------|
| Solar Charge Controller Type                 | MPPT        |           |
| Max Panel Wattage That Can Be Connected      | 3300W       | 5500W     |
| No. of Input Channel                         | 1           | 1         |
| Max. input Current per Channel (Maximum Isc) | ( 30 ± 1)A  | (50 ± 1)A |
| Maximum PV Voltage Voc                       | ( 190 ± 5)V |           |
| Minimum PV Voltage Vmp                       | 70V         |           |
| Maximum PV Voltage Vmp                       | ( 160 ± 5)V |           |
| Maximum Battery Current                      | 60A         | 100A      |
| MPPT Charger Efficiency (Peak)               | 94%         |           |
| Reverse PV Protection                        | YES         |           |
| Reverse Current Flow to PV                   | NO          |           |
| Switching Element(MPPT Charger )             | IGBT        |           |

### MODES OF OPERATIONS

Modes Available (User Settable) i). Hybrid with Export ii). Hybrid with Zero Export iii). Stand alone (Similar to MPPT)

### DISPLAY AND ALARMS

Battery Voltage & Current, PV Voltage, Solar Charger O/P Current, Solar KWH, Total KWH, Mains Voltage, Power, Frequency, Load Power, Current & Frequency, Battery Charging Status, Time, Date

### LCD FAULT/PROTECTION STATUS DISPLAY

Overload, Over Current, Battery Over/Under Voltage, Mains Over/Under Voltage, System Over Temperature

### ENVIRONMENT

|                             |                       |
|-----------------------------|-----------------------|
| Operating Temperature       | 0°C to 50°C           |
| Operating Relative Humidity | 5-95% (Non-condensed) |

### DIMENSIONS

|                         |               |
|-------------------------|---------------|
| Dimensions in mm(LXWXH) | 625X300X475MM |
| Weight in Kg            | 55kgs         |

NOTE: Specifications are subject to change without prior notice



# GRID INTERACTIVE HYBRID INVERTER - 3PHASE



**Battery Less  
Operation**

**2 Years  
Warranty**

Grid Interactive Hybrid Solar Inverter - Three phase in-Three Phase out inverter gives maximum performance and reliability to run your heavy duty appliances. This inverter enables you to have the flexibility to be used as a On-Grid, Off-Grid or Hybrid Inverter as per your convenience

## FEATURES

### Redundant Power Supply (Grid & DG):

- Twin Power supply to improve the power availability for the operation of PCU



### Graphical Display with Real-Time Operational Graph:

- Realtime SLD logic for easy understanding for the system operations.



### NO Break Changeover:

- No time delay during changeover from Solar to Battery or Grid and vice-versa.



### In-built safety for High Temp, Smoke and Reverse Polarity

- PCU will shut down in case of fire/smoke and protects the connected loads and the system.



### Unbalanced Load Operation

- Prevents system trip during in the unbalancing load condition
- 100% Single phase, 50-50 unbalance, 33-33-33, equal balance



### Minimized Internal Losses

- High performance and efficient controller
- Eliminate input current harmonics



## GRID INTERACTIVE HYBRID INVERTER - 3PHASE

| Model Name                     | LS 310GIH | LS 312GIH | LS 315GIH | LS 320GIH | LS 325GIH | LS 330GIH |
|--------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| <b>INVERTER CAPACITY (kVA)</b> | 10        | 12.5      | 15        | 20        | 25        | 30        |

### GRID

|   |                                    |
|---|------------------------------------|
| <b>Input Wiring</b>                         | 3Ph five wire (3 PH + N + E)       |
| <b>Input Neutral Requirement</b>            | YES                                |
| <b>Nominal Voltage</b>                      | 330V to 450V FOR 3Ph               |
| <b>Grid Frequency Sync Range</b>            | 50 Hz (± 6%)                       |
| <b>Unity power Factor for grid charging</b> | Near to Unity                      |
| <b>Operating condition</b>                  | Continuous                         |
| <b>Input Fault Level</b>                    | >=10 kA                            |
| <b>Self-Consumption</b>                     | up to 4%                           |
| <b>Charger Peak Efficiency</b>              | upto 95%                           |
| <b>DG Compatibility</b>                     | YES ( Double of Inverter Capacity) |
| <b>Grid Compatibility</b>                   | YES SAME AS INVERTER CAPACITY      |
| <b>Grid Charger capacity</b>                | 50 % of KVA rating                 |

### SOLAR

|                                  |           |           |  |   |   |   |
|----------------------------------|-----------|-----------|--|---|---|---|
| <b>Charger Type</b>              | MPPT      |           |  |   |   |   |
| <b>Max PV Connection in kWP</b>  | 11        | 13.8      | 16.5                                       | 22  | 27.5  | 33  |
| <b>Max PV Voltage (VOC)</b>      | 300V      | 300V      | 300/500 V                                  | 500V  | 500V  | 500/600V                                    |
| <b>MPPT Voltage Range (Vmp)</b>  | 165-250V  | 165-250V  | 165-250V for 120VDC / 300-450V for 240VDC  | 300-450V for 240VDC / 450-600V for 360VDC   |   |   |
| <b>Max Input current (Isc)</b>   | 60 A      | 75 A      | 90 A for 120VDC and 50A for 240VDC         | 66 A for 240VDC and 44 A for 360VDC         | 83 A for 240VDC and 55 A for 360VDC         | 100A for 240VDC and 66 A for 360VDC         |
| <b>String Combination @335Wp</b> | S: 5 P: 6 | S: 6 P: 6 | S: 5 P: 9 (@120vdc)<br>S: 9 P: 5 (@240vdc) | S:10 P: 6 (@240vdc)<br>S: 12 P: 5 (@360vdc) | S: 9 P: 8 (@240vdc)<br>S: 12 P: 6 (@360vdc) | S:10 P: 9 (@240vdc)<br>S: 13 P: 7 (@360vdc) |
| <b>No of MPPT Channel</b>        | 1         |           |  |   |   |   |
| <b>Panel Reverse Protection</b>  | Yes       |           |  |   |   |   |
| <b>Solar Charger Efficiency</b>  | up to 95% |           |  |   |   |   |

### BATTERY

|   |                                       |     |         |     |         |  |
|---|---------------------------------------|-----|---------|-----|---------|--|
| <b>Nominal Battery Voltage (VDC)</b>    | 120                                   | 120 | 120/240 | 240 | 240/360 |  |
| <b>Battery Buffer Setting</b>           | DC Voltage Selectable Through Key pad |     |         |     |         |  |
| <b>Grid Charging Current</b>            | SETTABLE THROUGH Key PAD              |     |         |     |         |  |
| <b>Temperature Compensated Charging</b> | YES                                   |     |         |     |         |  |
| <b>Battery Charging Voltage</b>         | Selectable from LCD Display           |     |         |     |         |  |
| <b>Type &amp; No. of cells</b>          | Lead Acid / VRLA / Ni-Cd/ Lithium Ion |     |         |     |         |  |
| <b>BMS compatible</b>                   | YES                                   |     |         |     |         |  |

### OUTPUT

|   |   |    |    |    |    |     |
|---|---|----|----|----|----|-----|
| <b>Output Current (Amp) Total</b>           | 34  | 43 | 54 | 69 | 86 | 104 |
| <b>Output Voltage (Inverter Mode)</b>       | 415V AC ± 2 %                                     |    |    |    |    |     |
| <b>Output Frequency (Free Running)</b>      | 50 Hz ± 1%  |    |    |    |    |     |
| <b>Output Waveform</b>                      | Pure Sine wave                                    |    |    |    |    |     |
| <b>Peak Inverter Efficiency (Full Load)</b> | upto 90 %   |    |    |    |    |     |
| <b>Total Harmonic Distortion</b>            | upto 3% at Linear Load                            |    |    |    |    |     |
| <b>Overload Capacity</b>                    | 125% for 60Sec, 150% for 5 Sec                    |    |    |    |    |     |
| <b>Changeover Time (Full load)</b>          | No Break Change Over Time                         |    |    |    |    |     |
| <b>DC to AC Galvanic Isolation</b>          | In built Isolation Transformer at Inverter Output |    |    |    |    |     |
| <b>Anti Islanding Function</b>              | In Compliance with IEC 62116                      |    |    |    |    |     |
| <b>Auto Bypass feature</b>                  | YES   |    |    |    |    |     |
| <b>Unbalance load handling capacity</b>     | YES   |    |    |    |    |     |

## CONFIGURATION

|                               |                                     |
|-------------------------------|-------------------------------------|
| <b>Modes Available</b>        | Grid saving, Battery backup, Export |
| <b>power Export to Grid</b>   | Enable / Disable option Available   |
| <b>power import from Grid</b> | Enable / Disable option Available   |

## ENVIRONMENTAL

|                                      |   |
|--------------------------------------|---|
| <b>Acoustic Noise Level from 1 m</b> | ≤ 65 dB   |
| <b>Operating Temperature</b>         | 0 to 40 Deg C(Dust free cooled and dry environment) |
| <b>Storage Temperature</b>           | -10 Deg C to 60 Deg C                               |
| <b>Relative Humidity</b>             | Up to 95 % (Non Condensing)                         |
| <b>Altitude</b>                      | < 1000 meter above sea level                        |
| <b>Sysmic Requirement</b>            | upto 0.5g   |

## PHYSICAL

|                                   |            |
|-----------------------------------|------------|
| <b>Enclosure Protection Grade</b> | IP 20      |
| <b>Cooling</b>                    | Forced Air |
| <b>Cable Entry</b>                | Bottom     |

## PARAMETERS DISPLAYED ON LCD

|                       |  |
|-----------------------|--|
| <b>Input Group</b>    | 1. Voltage, 2.Current, 3. Frequency, 4. kW, 5. kVA, 6. Import kWh , 7. Export kWh, 8. Power Factor |
| <b>Inverter Group</b> | 1. Voltage, 2. Current, 3. Frequency, 4. kVA   |
| <b>Output Group</b>   | 1. Voltage, 2. Frequency   |
| <b>Output Group</b>   | 1. Solar Voltage , 2. Solar Current, 3. Power( kW), 4. Solar Energy (kWh)                          |
| <b>Battery Group</b>  | 1. Voltage, 2.Current 3. Charging Status   |

## PROTECTIONS

|                               |                          |
|-------------------------------|--------------------------|
| <b>ELECTRICAL PROTECTIONS</b> | CIRCUIT BREAKER and Fuse |
|-------------------------------|--------------------------|

## ELECTRONIC PROTECTIONS

|                       |  |
|-----------------------|--|
| <b>Alarms</b>         | Alarms are provided for all important protections.   |
| <b>Inverter Group</b> | 1.Input Under Voltage, 2.Input Over Voltage, 3. Charger Over Voltage, 4. Under /Over Frequency                   |
| <b>Inverter Group</b> | 1. Output Under Voltage,2.Output Over Voltage 3. Overload, 4. Output short Circuit, 5. Inverter Over Temperature |
| <b>Solar Group</b>    | 1. Surge Protection , 2. Reverse PV Panel protection   |
| <b>Battery Group</b>  | 1. Battery low , 2. Battery Over charge 3.,Battery Charging Current limit  |

## CONNECTIVITY

|   |  |   |
|---|--|---|
| <b>Communication</b>                                      | RS 232 or RS 485                           |   |
| <b>Protocol</b>   | MODBUS RTU                                 |   |
| <b>LCD with backlight &amp; Tactile Key pad Interface</b> | YES  |   |
| <b>Safety Factor</b>                                      | 1 for electronic devices, 1 for electrical |   |
| <b>Earthing Connection (Ref. IS-3043)</b>                 | Earth terminal block                       | 25- 40 kVA : 3 x 25 mm GI (Earth bus bar running along the panel) |

## PANEL COMBINATION

|                            |   |      |     |     |     |      |
|----------------------------|---|------|-----|-----|-----|------|
|                            | Please discuss with Technical team for Battery less Panel combination |      |     |     |     |      |
| <b>Dimensions (in mm)</b>  |   |      |     |     |     |      |
| <b>KVA Rating</b>          | 10  | 12.5 | 15  | 20  | 25  | 30   |
| <b>Width (W)</b>           | 450   | 450  | 450 | 450 | 450 | 600  |
| <b>Depth (D)</b>           | 800   | 800  | 800 | 800 | 950 | 1000 |
| <b>Height (H)</b>          | 800   | 800  | 800 | 800 | 800 | 1300 |
| <b>Weight (Kg) APPROX.</b> | 150   | 150  | 150 | 300 | 350 | 600  |

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- ◆ Solar Panel, UPS, PCU, SCC & SMU: Customer End
- ◆ Battery: CSC location



**40+** Service centre locations Pan India



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