



India : Toll Free No. 1800 103 5555

Other Countries : +91-7292 410500

SHAKTI PUMPS (INDIA) LIMITED

Plot No. 401, 402, & 413, Industrial Area, Sector - 3, Pithampur - 454774,
Dist. - Dhar, (M.P.) - INDIA, E-mail: info@shaktipumps.com,
Visit us at : www.shaktipumps.com

28 Oct 2023 / R3
Oct./2023-24/L1/L00
VC : 0000
SAP No. : 2000020889



INSTALLATION & OPERATING INSTRUCTIONS

KALPAVRIKSHA GRID-TIE 2.0 INVERTER



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CHAPTER 1 : SAFETY INSTRUCTIONS

⚠ WARNING! Ignoring the following instructions can cause physical injury or damage to the equipment or death.

1.1 Pre-Installation Safety Measures

1. Before using the unit, read all instructions and cautionary markings on the unit and all the sections of this manual.
2. The gross weight of the equipment is close to 25-30 Kg. Kindly lift the hybrid controller carefully to avoid any physical injury.
3. Please check the package for any sign of damage to ensure personal safety. Don't use the damaged or incomplete Grid Tie Inverter.
4. Customers are NOT authorized to open the Grid Tie Inverter or to do any kind of modification, or repair; otherwise, there is a danger of shock and loss of warranty.
5. To store the Grid Tie Inverter, kindly follow instructions given in Chapter 2 "INTRODUCTION".

1.2 Installation Safety Measures

1. Installation should be done in presence of a professional technician. Safety equipment like safety shoes, helmets, and gloves should be used by the technician. Only licensed person, who has been trained in design, installation, commissioning, and operation of hybrid controller, is permitted to operate this equipment.
2. To prevent risk of shock during installation and maintenance, please make sure that all AC and DC terminals are plugged out.
3. Installation of the Grid Tie Inverter should be carried out on a solar structure with proper ground clearance & specified nuts & bolts.
4. Install the Grid Tie Inverter on metal or other non-flammable material, and keep it away from any combustible material.
5. The Grid Tie Inverter should not be installed inside a closed chamber. Ventilation is required to ensure proper heat dissipation. Ignoring this will result in malfunctioning of the unit and loss of warranty.
6. Before starting wiring and connections make sure that PV panels, Grid Tie Inverter, motor, grid, and all other accessories are properly fitted on their designated place.

7. Ensure that the Grid Tie Inverter, motor, and adjoining equipment are properly earthed to reduce electromagnetic emission and interference.
8. Unit must be earthed using appropriate wire size diameter and its diameter should be equal to or higher than that input power supply wires (refer regional safety standard specific to your location).
9. Make sure that the voltage grade of the power supply is consistent with the Grid Tie Inverter voltage. Also, note that all PV panels are connected in series or parallel as per systems requirement in order to have required voltage fed to the drive.
10. There must not be any loose connection. Make sure that all insulations are proper in order to prevent any damage/injury. Also periodically inspect insulation in case of a bad weather.
11. Check whether the wiring is correct and firm, there should not be any short circuit in the peripheral equipment as circuit.
12. Ensure that the output of the Grid Tie Inverter is turned off while setting all the required parameters.
13. Ensure that no unauthorized filter is connected to the output of the Grid Tie Inverter. It may cause loss of warranty.

1.3 Safety during Operation

1. Make sure that the ratings of the pump, motor, PV panels, grid, and Grid Tie Inverter comply with each other.
2. The heat sink should not be touched otherwise there is a danger of getting burnt.
3. Do not operate or touch the Grid Tie Inverter with the wet hand.
4. Do not put any of your belongings like mobile etc. on the Grid Tie Inverter
5. Disconnect PV power from the Grid Tie Inverter under the supervision or presence of a trained electrician.
6. Before opening the housing, the Grid Tie Inverter must be disconnected from all the energy sources like Grid and PV.
7. After the input is disconnected from the Grid Tie Inverter, wait for at least five minutes so as to allow the internal capacitors to get discharged for the safety of operation.
8. Ensure polarity, tightness and wire size are correct, before energizing the Grid Tie Inverter.

9. At over 2,000 metres altitude, the Grid tie inverter as heat dissipation function deteriorates, therefore, use proper derating.
10. Untrained workers are banned to check the signals in the running stage.
11. Remove the PV power supply only after the electric machine stops running.

Attention

1. The DC connection terminals PV+ and PV- carry a dangerous DC voltage of up to 800V.
2. At the Grid tie inverter input, the photovoltaic cells generate DC voltage even at low intensity of sunlight.
3. While cabling, make sure that it does not come in the path of any other work e.g. harvesting or digging.
4. If there is any abnormality contact customer care.
5. Grid Tie Inverter and its heat sink may be relatively at high temperature than the atmosphere.
6. Improper wiring and utilization or unauthorized alteration may result in damage to hybrid controller and other equipments. Users will be responsible for the cause and there will be a loss of warranty.
7. The Kalpvriksha Grid Tie product is not recommended for elevators, emergency operation, medical products etc.

CHAPTER 2 : INTRODUCTION

2.1 Product Overview

The KALPAVRIKSHA Grid Tie 2.0 transformer less Inverter is designed to extract maximum direct current power from Solar PV panel and convert to AC power to feed into utility grid. This unique inverter plays a vital role in optimizing energy production, ensuring grid synchronization, and enhancing safety. This product is designed and developed in India and comes with an IP65 ingress protection. Their efficient performance leads to cost savings, reduces environmental impact, and contributes to a sustainable energy in the future. The plug and play installation and electrically safe user handling are the additional attraction of this product.

2.2 Storage Instructions

The Kalpavriksha Grid Tie 2.0 should be stored properly in the original shipping package or crate when not in use especially for extended period of time to retain warranty.

Measures to be taken for Kalpavriksha Grid Tie 2.0 storage

- ✓ Storage area should be clean, dry, and free from direct sunlight or corrosive fumes.
- ✓ Storage area has an ambient temperature range of -20 fiC to 60 fiC.
- ✓ Storage area has a relative humidity range of 0%to 90%and non-condensing environment.
- ✓ Storage area has an air pressure range of 85kPa to 107kPa.

DO NOT store

- ✗ In an area with the rapid change in temperature (condensation and frost may be caused).
- ✗ In a place with significant water leakage.
- ✗ In a place which has a high risk of fire ignition.

NOTE: If storage of drive is for more than 3 months then ensure that temperature should not be more than 30° C. Storage for more than a year may reduce the lifespan of the product.

2.3 Receiving and Inspection

The Kalpavriksha Grid Tie 2.0 has gone through rigorous quality control tests before shipment. After receiving the drive, please check if the part no. indicated on the name plate corresponds with part no. of your order.

● Serial Number Explanation from Left to Right

Model Number	69	Digits	Description
Serial Number & Barcode	69-0001-0-04-10-19 	69	Model number
		0001	Serial number for the batch
		0	Batch number
		04	Date of manufacturing
		10	Month of manufacturing
		19	Year of manufacturing
Software Version	MAINKLP_X.XX		

CHAPTER 3 : PACKAGE CONTENTS

Inspection

Note: Never install or operate any unit which is damaged or has missing components. Doing so can result in injury.

Check the following items when unpacking the Inverter:

1. Inspect the entire exterior of the Inverter to see if there are any scratches or other damage resulting from shipping.
2. Ensure there is operation manual & warranty card in the packing box.
3. Ensure the nameplate is correct as ordered.
4. Ensure the optional parts are as per order, if ordered.
5. Contact the customer care if there is any damage to the unit or the optional parts.

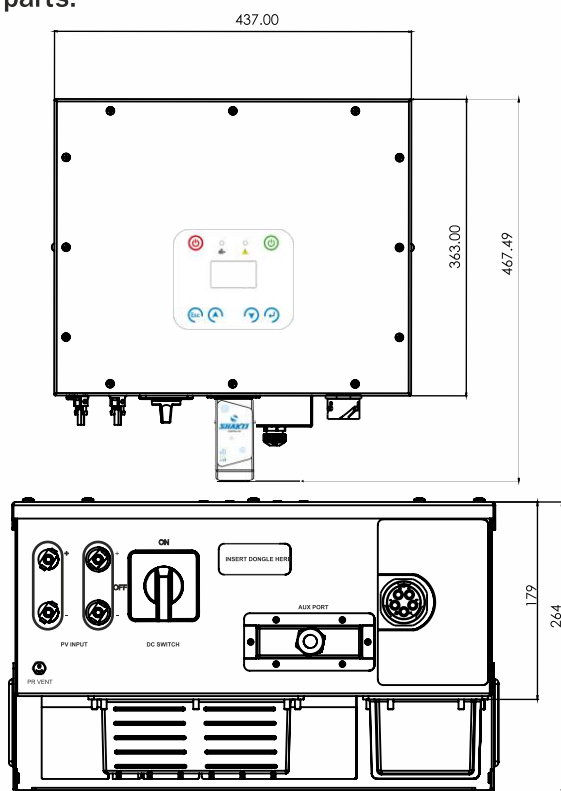


Fig. 3.1 Kalpavriksha Grid Tie 2.0 (KLPGT)

Following is the list of items in the packaging.

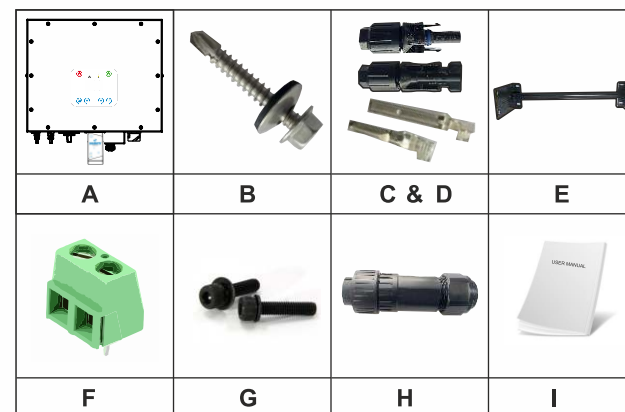


Fig. 3.2 Images of list of Items in Kalpavriksha Packaging
Table 3.1 List of Items

S.no.	Description	Qty.	Unit
A	Kalpavriksha Unit	1	Set
B	Hex Head Screw M5.5x35 Self Tap+grip	4	EA
C	PV Connector Mc4 Female With Terminal	2	EA
D	PV Connector Mc4 Male With Terminal	2	EA
E	Entire Assembly Shtmet Pc Klp2.0	1	EA
F	H H Bolt M8x12 Ss304 (57)	4	EA
G	Pan Head Philips Screw M4x10 Ss304	2	EA
H	AC Connector	1	EA
I	User Manual	1	EA

CHAPTER 4 : SPECIFICATIONS

Parameters	KLPGT 2.0			
	3-5 Kw		7.5-10 kW	
PV INPUT				
PV Voltage Range	220-770 VDC			
Max PV Current	13A		26A	
MPPT Range	250-650 VDC			
Nominal PV Voltage	600 VDC			
Number of PV Inputs	1		2	
Max Power	5000W		10000W	
PV Start Voltage	200VDC			
GRID TIE OUTPUT				
Voltage Range	337- 440 V _L AC			
Topology	Transformer less 3 leg inverter			
Max.current	8.5 A		16 A	
Rated AC Power(230V, 50Hz)	3kW	5kW	7.5kW	10kW
Rated AC Current	5A	7.5A	10.5A	14A
Nominal Frequency	50Hz		50Hz	
Power Factor , adjustable	0.8 leading – 0.8 lagging			
Peak MPPT accuracy	>99.5%			
Feed-in Grid	3L+N+PE			
Total Harmonic Distortion	< 5%(at nominal power)			
Peak Efficiency	>96%			
Protection	Anti islanding, Grid monitoring, Short circuit, Over voltage, Over temperature, Overload etc.			
DISPLAY & COMMUNICATION				
Display type	Graphical LCD			
Status Indicator	LEDs			
Serial Communication	RS232 (MODBUS)			
Remote monitoring	YES(Optional)			
Wi-Fi	YES(Optional)			
PHYSICAL				
L X W X H	357 x 431 x 263 mm3			
Net wt. / Gross wt.	25kg / 27 kg			
OTHER INFO				
Pollution Degree	PD3			
Over Voltage Category	Category II			
Protection Class	Class I			
Operating Temperature	-10 TO 60 °C			
Relative Humidity	0-95% RH(Non-condensing)			
Altitude	3000 m (>2000m power derating)			
IP Degree of Protection	IP 65 (Indoor & Outdoor Installation)			
Cooling	Natural Convection			

CHAPTER 5 : INSTALLATION

Mounting Method, Installation Position and Mounting Procedure of the Grid Tie Inverter is illustrated as follows:

5.1. Mounting Method

1. The equipment employs natural convection cooling, and it can be installed indoor or outdoor.
2. Please install the equipment under the guidance of Figure 5.1. Vertical installation on floor level is recommended. Mount vertically or tilted backwards by max. 15°. Never install the Grid Tie Inverter tilted forwards, sideways, horizontally or upside down.
3. Install the Grid Tie Inverter at eye level for convenience when checking the LCD display and possible maintenance activities.
4. When mounting the Grid Tie Inverter please consider that disassembly for service work may be required.

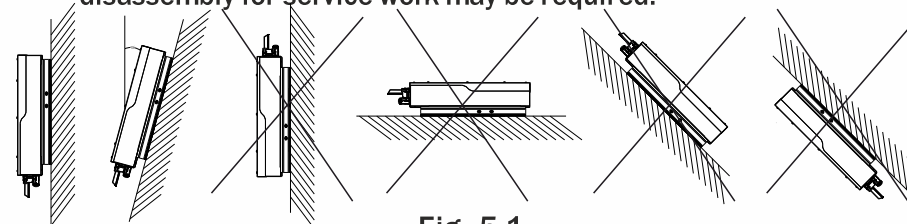


Fig. 5.1

5.2. Installation Position

Do not expose the Grid Tie Inverter to direct solar irradiation as this could cause power derating due to overheating. The ambient temperature should be between -25fiC ~ 60fiC (-13fiF ~ 140fiF) to ensure optimum operation.

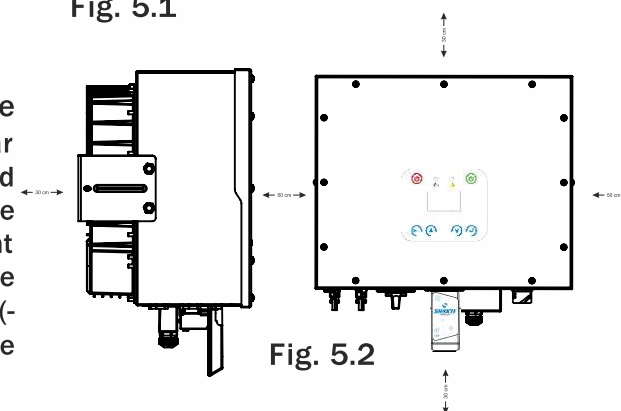


Fig. 5.2

Choose locations with sufficient air exchange. Ensure additional ventilation, when necessary. To make sure the installation spot is suitably ventilated, if multiple grid-tie solar inverter units are installed in same area, the following safety clearance shall be followed for proper ventilation conditions.

5.3. Mounting Procedure for Kalpavriksha

This section provides the mounting procedure and drawings for Kalpavriksha unit.

1. Connect the mounting plate strip to the mounting brackets and then mark the Positions of the Drill Holes of the wall mount bracket. The mounting position should be marked as shown in Figure 5.3 & 5.6

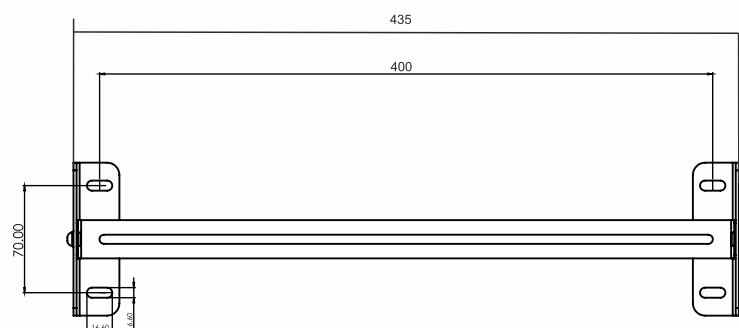


Fig. 5.3 Mounting Brackets for KLP GT

2. Drill Holes and Place the Expansion Tubes

According to the guides, drill 4 holes in the wall (in conformity with position marked in Figure 5.4 & 5.7) and then place expansion tubes.

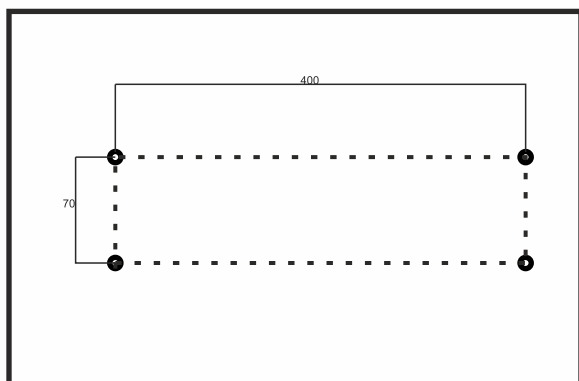


Fig. 5.4 Drilling drawing for KLP GT

3. Mount the Kalpavriksha

Carefully mount the Kalpavriksha to the mounting bracket following the steps shown in figure 5.5 & 5.8 Make sure that the rear part of the equipment is closely mounted to the mounting bracket .

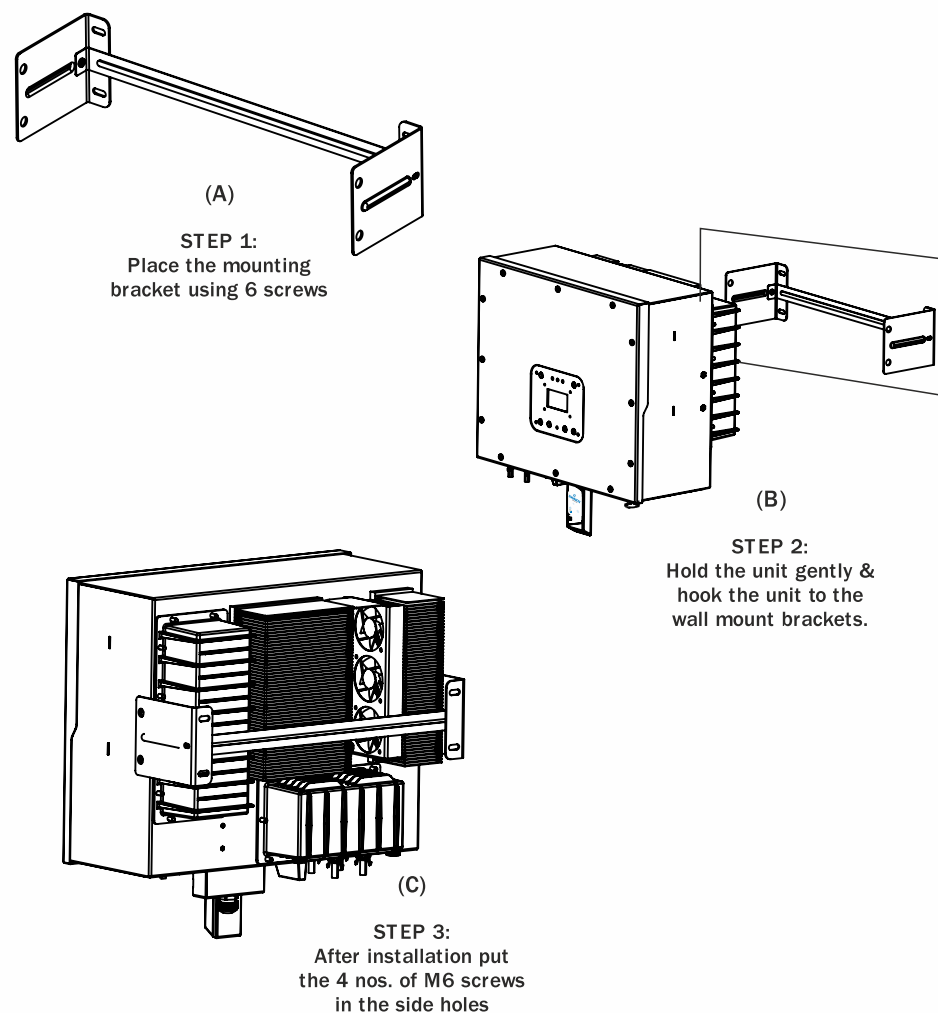


Fig. 5.5 Mounting Procedures for KLP GT

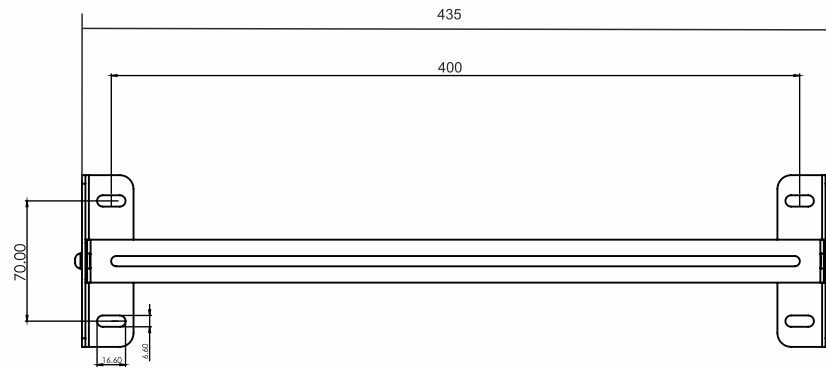


Fig. 5.6 Mounting Brackets for KLPGT-H

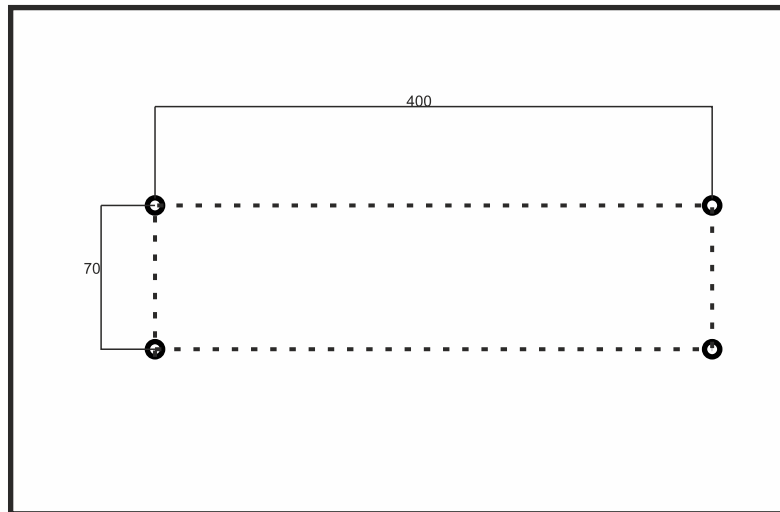
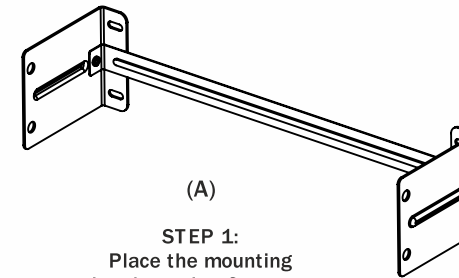
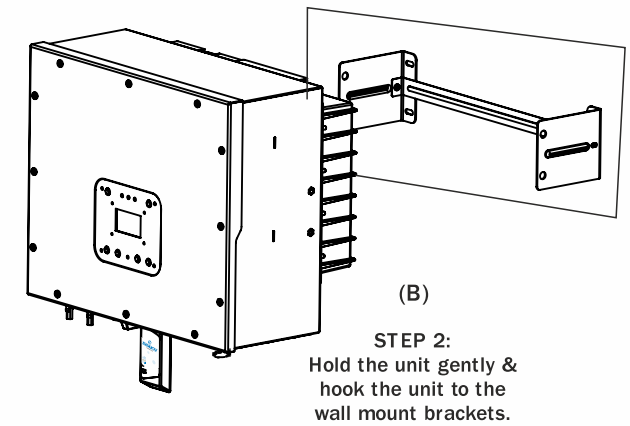


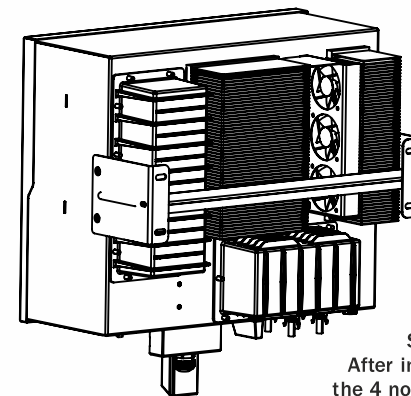
Fig. 5.7 Drilling drawing for KLPGT-H



(A)
STEP 1:
Place the mounting
bracket using 6 screws



(B)
STEP 2:
Hold the unit gently &
hook the unit to the
wall mount brackets.



(C)
STEP 3:
After installation put
the 4 nos. of M6 screws
in the side holes

Fig. 5.8 Mounting Procedures for KLPGT-H

CHAPTER 6 : CONNECTIONS & CONNECTING PROCEDURE

6.1. Rear Panel
Rear Panel view with Aux covers

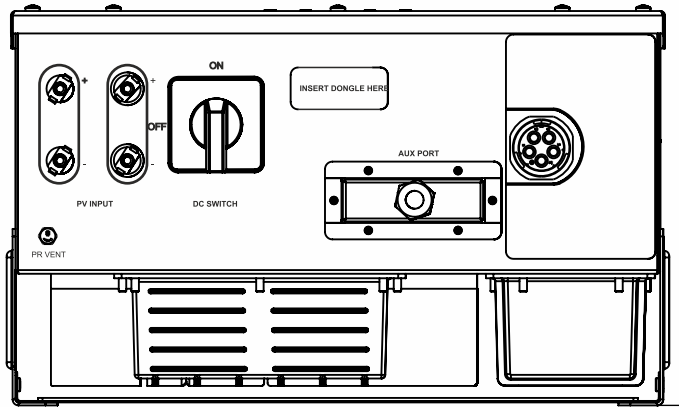


Fig. 6.1

Rear Panel view with Aux cover & Dongle Connected

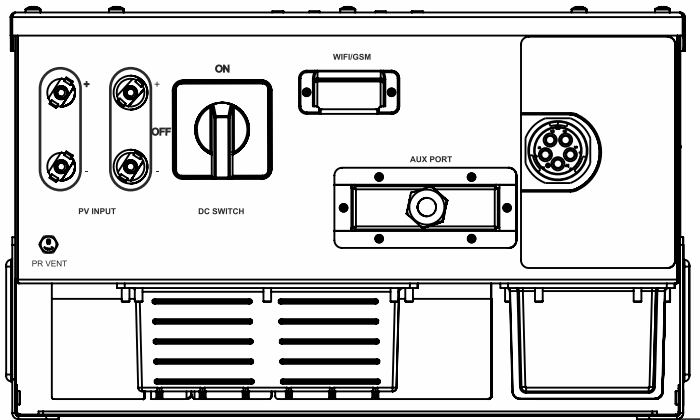


Fig. 6.2

Rear Panel view without Aux and dongle cover

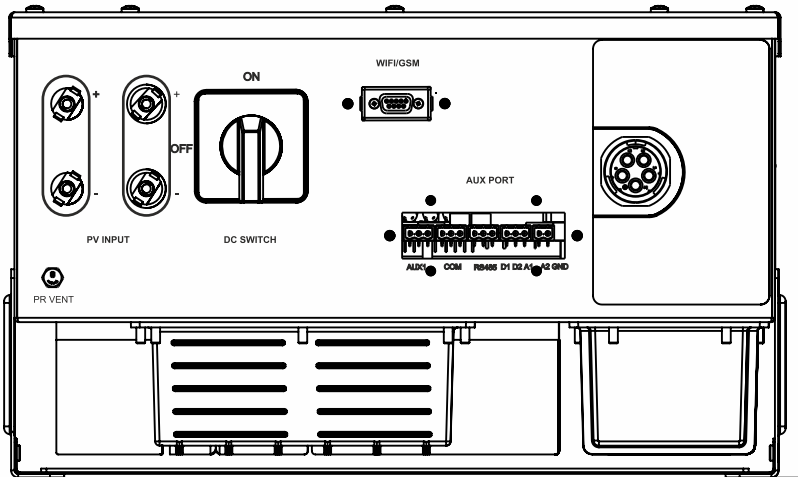


Fig. 6.3

Table 6.1

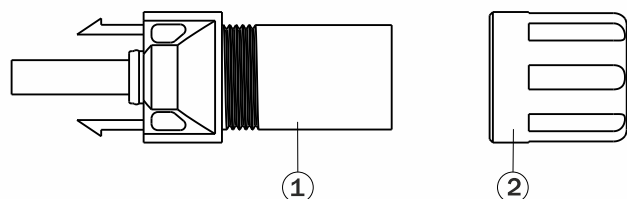
Marking	Description
1	PV Input Connectors
2	PV DC Disconnect Switch
3	WIFI/GPRS DB9 Connector
4	5 pin AC Connector
5	Pressure Relief Vent
6	Aux Input/ Output Connectors

6.1.1 PV Input Connectors

Table 6.2

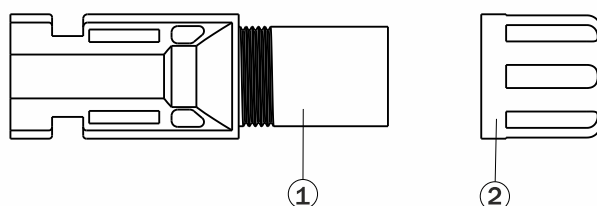
Cross - Sectional Area of Cables (mm ²)		Outside Diameter of the Cables (mm)
Scope	Recommended Value	
4.0-6.0	4.0	4.2 ~5.3

DC connector is made up of a positive connector and a negative connector as shown in figure 6.4 & 6.5



1. Insulated Enclosure 2. Lock Screw

Fig. 6.4 Positive Connector



1. Insulated Enclosure 2. Lock Screw

Fig. 6.5 Negative Connector

Connecting Procedure

1. Tighten the lock screws on positive and cathode connector.
2. Use specified strip tool to strip the insulated enclosure of the positive and cathode cables with appropriate length.

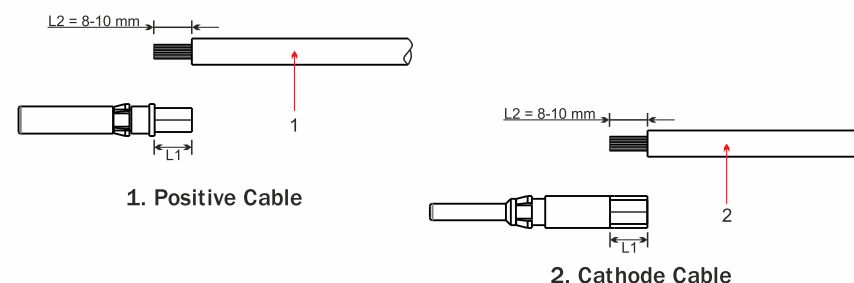
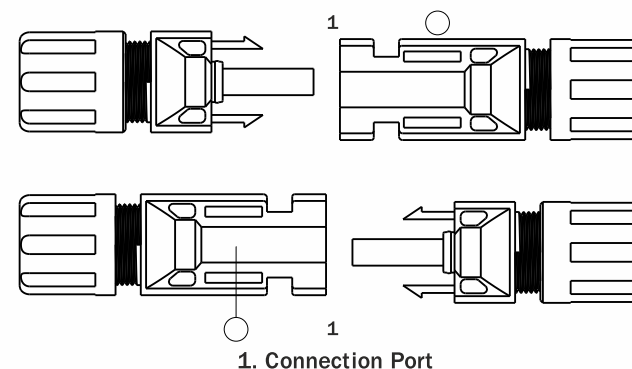


Fig. 6.6 Connecting Cables

3. Feed the positive and cathode cables into corresponding lock screws.
4. Put the metal positive and cathode terminals into positive cable and cathode cable whose insulated enclosure has been stripped, and crimp them tightly with a wire crimper. Make sure that the withdrawal force of the pressed cable is bigger than 400N.
5. Plug the pressed positive and cathode cables into relevant insulated enclosure, a "click" should be heard or felt when the contact cable assembly is seated correctly.
6. Fasten the lock screws on positive and negative connectors into respondent insulated enclosure and make them tight.
7. Connect the positive and cathode connectors into positive and negative DC input terminals of the inverter, a "click" should be heard or felt when the contact cable assembly is seated correctly.



1. Connection Port

Fig. 6.7

6.1.2 PV DC Disconnect switch

This switch is provided to isolate the PV DC input from the hybrid controller during servicing of the inverter or any other maintenance work on the PV panels.

6.1.3 WIFI/GPRS DB9 Connector

Connect IoT dongle or RS 232 to USB converter cable to this port for recording and observing data from the hybrid controller on online portal. When the dongle is connected it sends recorded data of all the parameters used in operation of the unit. But if some specific parameter is required to be observed RS 232 to USB converter cable can be connected and data corresponding to a particular address according to the table 6.2 can be accessed.

NOTE: The Pins 1 & 5 of the DB9 Connector are the source pins of 5 V at few milliamperes current. These pins cannot be used as sink even for a single milliampere current.

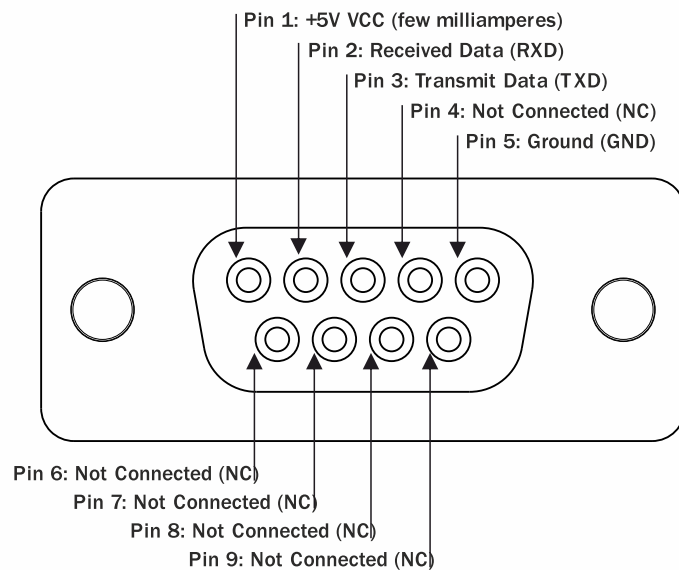


Figure 6.8 RS232 Connector

6.1.4 SHAKTI RMS/IoT DONGLE

Remote Monitoring and Control
 In-built Data Logger & RTC
 Compatible with GSM, WiFi & Bluetooth

1. Product Appearance

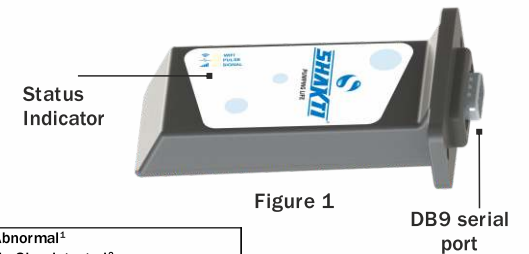


Figure 1

Status Indicator:

Pulse LED (GREEN)	Constant ON/OFF Blink 1time in 2sec Blink in every second Blink 2 times in 1sec Blink 4 times in 1 sec	Abnormal ¹ No Sim detected ² Normal ¹ /No Internet ² Internet connected ¹ Data transfer in process ²
Signal LED (RED) ¹ GPS (RED) ²	ON Blink in every second OFF	Normal ¹ / GPS location fixed ² Getting GPS location ² Abnormal(Signal low)/ GPS off ²
NETWORK LED (GREEN) ²	Constant ON Constant OFF	4G Connectivity ² 2G Connectivity ²
Wi-Fi LED (YELLOW) ¹	ON/Blink OFF	Normal ¹ No WiFi Network ¹

here 1 and 2 indicates 2G and 4G dongle respectively.

2. Installation and Connection:

For installing the SHAKTI IoT dongle.
 Follow these steps :

Step1: Remove the cover and take out the motherboard.

Step2:
 Insert SIM card as per the correct direction marked.

Step3:
 Put the motherboard back into the enclosure.

Step 4:
 Insert the dongle into DB9 port and use two M3x10 screws to fix the dongle along with gasket.

3. Configuration

Step1: Connect the "Shakti IoT dongle" to the main device and check the "pulse LED" (green) blinking in every second.

Step2:
 If the sim card is present in the "Shakti lot dongle" and 2G or 4G network is available in that area, the Signal LED (RED)¹ will be ON for 2G dongle and Pulse LED (GREEN)² will blink in every second for 4G dongle.

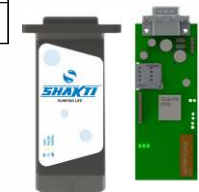


Figure 2

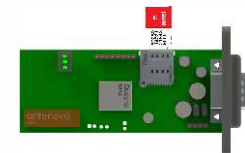


Figure 3



Figure 4

Step3:

To configure the Wi-Fi follow these steps:3.1)

Turn ON Wi-Fi on your Mobile and select "SHAKTI_DONGLE" and connect it with the password "shakti123".

An HTML page will open in your browser otherwise browse <http://192.168.4.1>. You will get the HTML page like this:



Figure 6

3.2) Now "Configure Wi-Fi" now new page will open like this:



Figure 7

3.3) Select your preferred WiFi with proper password and then save. In case your WiFi network is not visible in the list scan again.

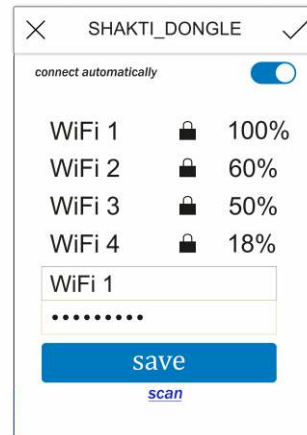


Figure 8

On successful configuration, WiFi LED (yellow) will be ON.

NOTE

- Shakti IoT Dongle is designed to work with GSM on priority, Wi-Fi is always secondary.
- For using Wi-Fi remove SIM card then connect shakti dongle.
- On successful TCP connection Wi-Fi yellow LED will blink in every second.

4. Troubleshooting

- If Pulse LED is constantly ON/OFF, check main device power supply or restart the device.
- If signal LED not glowing, check sim card / signal strength.
- If Wi-Fi LED not glowing, check Wi-Fi network / reconfigure Wi-Fi settings.

5. Contact Shakti to integrate IoT Dongle to other products & solutions.

Table 6.2 MODBUS Address

S.No.	Cumulative Data On Server	MODBUS ADDRESS(DEC)	OFFSET	DVT Factor	Min	Max	Default	Unit	Cumulative Data On Server
1	MAX_PV_POWER_VFD	15	4	1	1000	10000	9600	W	MAX_PV_POWER_VFD
2	MAX_PV_POWER_GSC	16	4	1	1000	11200	9600	W	MAX_PV_POWER_GSC
3	SWITCHING_FREQ	17	4	1	1600	16000	3200	Hz	SWITCHING_FREQ

S.No.	Configuration Parameters	MODBUS ADDRESS(DEC)	OFFSET	DVT Factor	Min	Max	Default	Unit	Configuration Parameters
1	FACTORY MODE	256	1	1	0	1	1	NA	FACTORY_MODE
2	LANGUAGE	257	1	1	0	0	0	NA	LANGUAGE_SELECTED
3	EEPROM ERASE	258	1	1	0	1	1	NA	EEPROM_ERASE_FLAG
4	INSTALL DATE	259	1	1	1	31	1	NA	INST_DATE
5	INSTALL MONTH	260	1	1	1	12	1	NA	INST_MONTH
6	INSTALL YEAR	261	1	1	18	99	20	NA	INST_YEAR
7	LCD CONTRAST	262	1	1	27	39	33	%	LCD_CONTRAST
8	PVGFD	263	1	1	0	1	1	NA	PVGFD_ENABLE
9	ELCFD	264	1	1	0	1	1	NA	ELCFD_ENABLE
10	MASTER_ON_OFF_GSC	265	1	1	0	1	1	NA	MASTER_ON_OFF_GSC
11	ENERGY_ERASE_FLAG	266	1	1	1	2	2	NA	ENERGY_ERASE_FLAG
12	ON_HOUR_MOTOR	267	1	1	1	12	1	NA	ON_HOUR_MOTOR
13	ON_MINUTE_MOTOR	268	1	1	0	59	1	NA	ON_MINUTE_MOTOR
14	OFF_HOUR_MOTOR	269	1	1	1	12	1	NA	OFF_HOUR_MOTOR
15	OFF_MINUTE_MOTOR	270	1	1	0	59	1	NA	OFF_MINUTE_MOTOR
16	RS232 BAUD RATE	271	1	1	1	6	2	NA	RS232_BAUD_RATE
17	RS485 BAUD RATE	272	1	1	1	6	2	NA	RS485_BAUD_RATE
18	GRID_POWER_DRAWN_RESTRICT	273	1	1	0	1	1	NA	GRID_POWER_DRAWN_RESTRICT
19	AUTOROLL ENABLE	274	1	1	1	2	1	NA	ROLLING_PAGE_ENABLE
20	MODBUS ADD RS232	275	2	1	1	99	1	NA	MODBUS_ADD_RS232
21	MODBUS ADD RS485	277	2	1	1	99	1	NA	MODBUS_ADD_RS485
22	RUN FROM SS	281	1	1	0	1	0	NA	RUNFROMSS_ENABLE
23	DISPLAY MODE	282	1	1	1	2	1	NA	DISPLAY_MODE_FLAG
24	PRIMARY HEALTH CHECK	283	1	1	1	2	1	NA	HC_ENABLE_FLAG
25	TZ ENABLE	284	1	1	1	2	2	NA	TZ_ENABLE_FLAG
26	FAULT_ADDRESS_POINTER	285	1	1	0	255	0	NA	FAULT_ADDRESS_POINTER
27	Logger Date	286	1	1	1	31	1	NA	Logger Date
28	Logger Month	287	1	1	1	12	1	NA	Logger Month
29	Logger Year	288	1	1	1	99	1	NA	Logger Year
30	FLAG PARK	289	1	1	0	1	1	NA	FLAG_PARK_EEPROM
31	DISPLAY LOCK	290	1	1	1	2	2	NA	DISPLAY_LOCK_ENABLE
32	DISPLAY LOCK PASSWORD	291	2	1	0	999	345	NA	DISPLAY_PASSWORD_CHECK
33	IND VS STD	293	1	1	1	2	2	NA	IND_VS_STD
34	NEUTRAL CONNECTED	294	1	1	0	1	1	NA	NEUTRAL_CONNECTED
35	Night Mode Select EEPROM	295	1	1	0	1	0	NA	Night_Mode_Select_EEPROM

INSTALLATION & OPERATING INSTRUCTIONS

S.No.	VFD Parameters	MODBUS ADDRESS(D EC)	OFFSET	DVT Factor	Min	Max	Default	Unit	VFD Parameters
1	MASTER ON OFF	1000	1	1	0	1	0	NA	MASTER_ON_OFF
2	CONTROL MODE	1001	1	1	1	4	2	NA	SPEED_MODE_SELECT
3	DIRECTION	1002	1	1	1	2	1	NA	SPEED_DIRECTION_SELECT
4	APPLICATION	1003	1	1	0	1	0	NA	APP_MODE
5	LOCK_UNLOCK	1004	1	1	0	1	0	NA	LOCK_UNLOCK
6	CONTROL TYPE	1005	1	1	0	1	0	NA	CONTROL_TYPE
7	MIN POWER VFD	1006	2	1	100	9999	700	W	MIN_PV_POWER_VFD
8	MAX CURRENT	1008	2	10	50	250	160	A	MAX_CURRENT
9	OVER CURRENT VFD	1010	2	1	5	19	16	A	OVER_CURR_VFD_LIMIT
10	DRY RUN CURRENT	1012	2	1	1	10	5	A	DRY_RUN_LIMIT
11	DRY RUN POWER	1014	2	1	100	9999	200	W	DRY_RUN_POWER
12	DC BUS OVER VOLTAGE	1016	2	1	500	800	790	V	DC_BUS_OV_LIMIT
13	OVER TEMPERATURE VFD	1018	2	1	100	130	115	°C	VFD_OVER_TEMP_LIMIT
14	THERMAL DERATING	1020	2	1	0	200	100	NA	THERMAL_DERATING_FACTOR
15	MAX FREQ	1022	2	1	1	400	240	NA	MAX_FREQ_SET
16	OVER_VOLT_PV_LIMIT	1024	2	1	400	800	790	NA	OVER_VOLT_PV_LIMIT
17	UNDER_VOLT_PV_LIMIT	1026	2	1	100	300	160	NA	UNDER_VOLT_PV_LIMIT
18	OVERLOAD_GSC_LIMIT	1028	2	10	70	160	160	NA	OVERLOAD_GSC_LIMIT
19	GSC_OVER_TEMP_LIMIT	1030	2	1	100	130	108	°C	GSC_OVER_TEMP_LIMIT
20	Retry_time_Minutes	1034	2	1	1	30	10	NA	Retry_time_Minutes

S.No.	Motor Parameters	MODBUS ADDRESS(DEC)	OFFSET	DVT Factor	Min	Max	Default	Unit	Motor Parameters
1	MOTOR TYPE	2000	1	1	0	2	2	NA	MOTOR_TYPE
2	TORQUE PERCENT	2001	2	100	0	200	200	%	TORQUE_PERCENT
3	RATED CURRENT	2003	2	10	50	180	140	A	Motor_Rated_I
4	RATED POWER	2005	2	10	3	10	10	HP	MOTOR_POWER
5	RATED VOLTAGE INDUCTION	2007	2	1	40	460	456	V	MOTOR_VOLTAGE_IND
6	RATED VOLTAGE S4RM	2009	2	1	40	460	456	V	MOTOR_VOLTAGE_S4RM
7	RATED VOLTAGE PMSM	2011	2	1	40	460	360	V	MOTOR_VOLTAGE_PM
8	RATED FREQUENCY INDUCTION	2013	2	1	0	120	60	Hz	MOTOR_RATED_FREQ_IND
9	RATED FREQUENCY S4RM	2015	2	1	0	120	60	Hz	MOTOR_RATED_FREQ_S4RM
10	RATED FREQUENCY PMSM	2017	2	1	0	250	120	Hz	MOTOR_RATED_FREQ_PMSM
11	NO OF POLES INDUCTION	2019	2	1	2	8	2	NA	IND_MOTOR_POLES
12	NO OF POLES S4RM	2021	2	1	2	8	2	NA	S4RM_MOTOR_POLES
13	NO OF POLES PMSM	2023	2	1	2	8	4	NA	PMSM_MOTOR_POLES
14	REFERENCE SPEED	2025	2	1	100	4000	3300	RPM	SPEED_REF_INPUT_DISPLAY
15	POWER FACTOR	2027	2	100	60	100	75	NA	POWER_FACTOR
16	LEAKAGE INDUCTANCE	2029	2	10000	5	999	56	H Lls	
17	MAGNETIC INDUCTANCE	2031	2	10000	20	9999	881	H Lm	
18	ROTOR RESISTANCE	2033	2	100	20	9999	33	ohm Rr	
19	STATOR RESISTANCE	2035	2	100	20	9999	43	ohm Rs	
20	START TIME	2037	2	1	1	60	15	Min	MOTOR_START_TIME
21	STOP TIME	2039	2	1	1	60	15	Min	MOTOR_STOP_TIME

S.No.	PUMP Parameters	MODBUS ADDRESS(D EC)	OFFSET	DVT Factor	Min	Max	Default	Unit	PUMP Parameters
1	PUMP TYPE	3000	1	1	0	2	1	NA	PUMP_TYPE
2	PUMP HEAD	3001	2	1	5	999	50	m	PUMP_HEAD
3	POW1	3003	2	1	0	9999	1000	W	POW1
4	D1	3005	2	1	0	9999	40	LPM	D1
5	POW2	3007	2	1	100	9999	3000	W	POW2
6	D2	3009	2	1	0	9999	80	LPM	D2
7	POW3	3011	2	1	200	9999	6000	W	POW3
8	D3	3013	2	1	0	9999	120	LPM	D3
9	POW4	3015	2	1	300	9999	8000	W	POW4
10	D4	3017	2	1	0	9999	160	LPM	D4
11	POW5	3019	2	1	400	9999	9999	W	POW5
12	D5	3021	2	1	0	9999	200	LPM	D5



INSTALLATION & OPERATING INSTRUCTIONS

S.No.	GRID PARAMETERS	MODBUS ADDRESS(DEC)	OFFSET	DVT Factor	Min	Max	Default	Unit	GRID PARAMETERS
1	RATED GRID FREQ	4000	2	1	50	60	50	Hz	RATED_GRID_FREQ
2	OVER_CURR_BOOST_LIMIT	4002	2	1	6	15	10	NA	OVER_CURR_BOOST_LIMIT
3	KP_PLL	4004	2	1000	1	9999	96	NA	KP_PLL
4	KI_PLL	4006	2	1000	1	9999	6	NA	KI_PLL
5	KP_PLL_SLOW	4008	2	1000	1	9999	96	NA	KP_PLL_SLOW
6	KI_PLL_SLOW	4010	2	1000	1	9999	6	NA	KI_PLL_SLOW
7	MIN VOLTAGE	4012	2	10	1500	2300	1650	V	V_GRID_RMS_MIN
8	MAX VOLTAGE	4014	2	10	2300	2850	2700	V	V_GRID_RMS_MAX
9	VOLT HYSTERESIS	4016	2	1	5	40	5	V	V_GRID_HYS
10	V_GRID_UNBALANCE_SET	4018	2	1	3	50	50	V	V_GRID_UNBALANCE_SET
11	V_GRID_UNBALANCE_RESET	4020	2	1	3	50	45	V	V_GRID_UNBALANCE_RESET
12	ONE_PHASE_MISSING_FACTOR	4022	2	100	1	100	80	NA	ONE_PHASE_MISSING_FACTOR
13	TWO_PHASE_MISSING_FACTOR	4024	2	100	1	100	80	NA	TWO_PHASE_MISSING_FACTOR
14	MIN FREQUENCY	4026	2	10	450	595	470	Hz	GRID_FREQ_MIN
15	MAX FREQUENCY	4028	2	10	505	650	520	Hz	GRID_FREQ_MAX
16	FREQ HYSTERESIS	4030	2	10	1	50	1	Hz	GRID_FREQ_HYS
17	RELAY_CLOSING_INIT_DELAY	4032	2	1000	100	1000	167	NA	RELAY_CLOSING_INIT_DELAY
18	RELAY_CLOSE_DELAY	4034	2	100	1	100	5	NA	RELAY_CLOSE_DELAY
19	BOOST VOLTAGE REF	4036	2	1	550	700	620	V	BOOST_VDC_REF
20	BOOST VOLTAGE KP	4038	2	1000	1	9999	1	NA	BOOST_VDC_KP
21	BOOST VOLTAGE KI	4040	2	1000	0	9999	5	NA	BOOST_VDC_KI
22	BOOST CURRENT KP	4042	2	1000	0	9999	5	NA	BOOST_KP_CURR
23	BOOST CURRENT KI	4044	2	1000	50	9999	100	NA	BOOST_KI_CURR
24	VOLTAGE REF	4046	2	1	550	780	650	V	GSC_VDC_REF
25	VOLTAGE KP	4048	2	1000	0	9999	100	NA	GSC_VDC_KP
26	VOLTAGE KI	4050	2	1000	0	9999	1	NA	GSC_VDC_KI
27	CURRENT KP	4052	2	10	55	999	250	NA	GSC_KP_CURR
28	CURRENT KI	4054	2	10	10	9999	4000	NA	GSC_KI_CURR
29	GAIN_ADJUST_A	4056	2	1000	0	9999	1010	NA	GAIN_ADJUST_A
30	GAIN_ADJUST_B	4058	2	1000	0	9999	1000	NA	GAIN_ADJUST_B
31	GAIN_ADJUST_C	4060	2	1000	0	9999	1000	NA	GAIN_ADJUST_C
32	I_GRD_A_OFFSET_TEST_L	4062	2	100	0	999	131	NA	I_GRD_A_OFFSET_TEST_L
33	I_GRD_B_OFFSET_TEST_L	4064	2	100	0	999	100	NA	I_GRD_B_OFFSET_TEST_L
34	I_GRD_C_OFFSET_TEST_L	4066	2	100	0	999	100	NA	I_GRD_C_OFFSET_TEST_L
35	Wvcos_A2_L	4068	2	100	0	9999	5500	NA	Wvcos_A2_L
36	Wvcos_B2_L	4070	2	100	0	9999	4920	NA	Wvcos_B2_L
37	Wvcos_C2_L	4072	2	100	0	9999	5000	NA	Wvcos_C2_L
38	Wvsin_A2_L	4074	2	100	0	9999	5000	NA	Wvsin_A2_L
39	Wvsin_B2_L	4076	2	100	0	9999	4500	NA	Wvsin_B2_L
40	Wvsin_C2_L	4078	2	100	0	9999	5000	NA	Wvsin_C2_L
41	Wvcos_A4_L	4080	2	100	0	9999	5100	NA	Wvcos_A4_L
42	Wvcos_B4_L	4082	2	100	0	9999	5000	NA	Wvcos_B4_L
43	Wvcos_C4_L	4084	2	100	0	9999	5000	NA	Wvcos_C4_L
44	Wvsin_A4_L	4086	2	100	0	9999	5000	NA	Wvsin_A4_L
45	Wvsin_B4_L	4088	2	100	0	9999	5200	NA	Wvsin_B4_L
46	Wvsin_C4_L	4090	2	100	0	9999	5000	NA	Wvsin_C4_L
47	ELCFD_MUL_FACT	4092	2	10	1	999	15	NA	ELCFD_MUL_FACT
48	TEMP_DERATING_START	4094	2	1	70	100	80	NA	TEMP_DERATING_START

S.No.	CONTROL PARAMETERS	MODBUS ADDRESS(DEC)	OFFSET	DVT Factor	Min	Max	Default	Unit	CONTROL PARAMETERS
1	SPEED KP	5000	2	100	0	1000	5	NA	Speed_ErrorPI_PM_Kp
2	SPEED KI	5002	2	100	0	1000	2	NA	Speed_ErrorPI_PM_Ki
3	DRYRUN RPM LIMIT	5004	2	1	0	9999	2500	RPM	DRY_RUN_RPM_LIMIT
4	TORQUE BOOST PER	5006	2	1000	0	100	30	%	INIT_VOLTPERCENT_FACTOR
5	Id REF PMSM	5008	2	10	0	200	0	NA	Id_ref_PM
6	PMSM THETA FACTOR	5010	2	10	0	50	0	NA	PMSM_THETA_FACTOR
7	MIN RPM PMSM	5012	2	1	200	999	500	RPM	PMSM_MIN_RPM
8	RAMP TIME PMSM	5014	2	10	30	400	30	s	INIT_RAMP_TIME_PMSM
9	LPF_CUTOFF_VDC_FCORR	5016	2	100	10	4000	400	NA	LPF_CUTOFF_VDC_FCORR
10	LPF_CUTOFF_VDC_MOD	5018	2	100	10	4000	1000	NA	LPF_CUTOFF_VDC_MOD

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S.No.	PV PARAMETERS	MODBUS ADDRESS(DEC)	OFFSET	DVT Factor	Min	Max	Default	Unit	PV PARAMETERS
1	MPPCR VFD	7000	2	1	50	5000	3600	NA	VFD_MPPT_CALL_RATE
2	MPPCR GSC	7002	2	1	100	9999	3600	NA	GSC_MPPT_CALL_RATE
3	VOLTAGE TOLERANCE	7004	2	1	0	300	50	NA	TOL_V
4	CURRENT TOLERANCE	7006	2	1	0	4999	60	NA	TOL_I
5	PVO FACTOR	7008	2	100	1	300	20	NA	VFD_VDC_KP
6	I/O FACTOR	7010	2	100	0	500	50	NA	VFD_VDC_KI
7	DVO FACTOR	7012	2	100	20	700	300	NA	VFD_VDC_STEP
8	MIN_PV_MPPT_VOLT	7014	2	1	150	500	180	NA	MIN_PV_MPPT_VOLT
9	I_PV1_REF_MAX	7016	2	10	20	200	100	NA	I_PV1_REF_MAX
10	IMP FACTOR	7018	2	100	0	100	25	NA	IMP_FACTOR

S.No.	FLOAT PARAMETERS (Not for Server)	MODBUS ADDRESS(DEC)	OFFSET	DVT Factor	Min	Max	Default	Unit	FLOAT PARAMETERS (Not for Server)
1	MAX POWER VFD	6020	3	1	1000	10000	9600	W	MAX_PV_POWER_VFD
2	MAX POWER GSC	6024	3	1	1000	11200	9600	W	MAX_PV_POWER_GSC
3	SWITCHING FREQ	6028	3	1	1600	16000	3200	Hz	SWITCHING_FREQ

S.No.	DISPLAY PARAMETERS	MODBUS ADDRESS(DEC)	OFFSET	DVT Factor	Min	Max	Default	Unit	DISPLAY PARAMETERS
1	FIRMWARE_VER	3860	1	1	NA	NA	NA	NA	FIRMWARE_VER
2	Today_Time	6052	4	1	NA	NA	NA	Hr	Today_Time
3	P_Motor_Slowest_Server	6056	4	1	NA	NA	NA	NA	P_Motor_Slowest_Server
4	FREQ_HZ_DISPLAY	6060	4	10	NA	NA	NA	Hz	FREQ_HZ_DISPLAY
5	V_RMS_DISPLAY_VFD	6064	4	10	NA	NA	NA	V	V_RMS_DISPLAY_VFD
6	I_OUTPUT_DISPLAY	6068	4	10	NA	NA	NA	A	I_OUTPUT_DISPLAY
7	SPEED_RPM_DISPLAY	6072	4	1	NA	NA	NA	RPM	SPEED_RPM_DISPLAY
8	flow_LPM	6076	4	10	NA	NA	NA	LPM	flow_LPM
9	Fault_Code	6080	4	1	NA	NA	NA	NA	Fault_Code
10	STATUS_KALPA	6084	4	1	NA	NA	NA	NA	STATUS_KALPA
11	PV1_Volt_Avg_RMS	6088	4	10	NA	NA	NA	V	PV1_Volt_Avg_RMS
12	BOOST_I1_Avg	6092	4	100	NA	NA	NA	A	BOOST_I1_Avg
13	PV2_Volt_Avg_RMS	6096	4	10	NA	NA	NA	V	PV2_Volt_Avg_RMS
14	BOOST_I2_Avg	6100	4	100	NA	NA	NA	A	BOOST_I2_Avg
15	TEMP_VFD_LPF	6104	4	10	NA	NA	NA	°C	TEMP_VFD_LPF
16	Today_Energy_VFD	6108	4	1	NA	NA	NA	NA	Today_Energy_VFD
17	V_An_RMS	6112	4	10	NA	NA	NA	V	V_An_RMS
18	I_GRD_A_RMS	6116	4	10	NA	NA	NA	A	I_GRD_A_RMS
19	V_Bn_RMS	6120	4	10	NA	NA	NA	V	V_Bn_RMS
20	I_GRD_B_RMS	6124	4	10	NA	NA	NA	A	I_GRD_B_RMS
21	V_Cn_RMS	6128	4	10	NA	NA	NA	V	V_Cn_RMS
22	I_GRD_C_RMS	6132	4	10	NA	NA	NA	A	I_GRD_C_RMS
23	Freq_PLL	6136	4	10	NA	NA	NA	Hz	Freq_PLL
24	POWER_GRD_LPF	6140	4	100	NA	NA	NA	KW	POWER_GRD_LPF
25	Today_Energy_GSC	6144	4	1	NA	NA	NA	NA	Today_Energy_GSC
26	Today_Time_GSC	6148	4	1	NA	NA	NA	NA	Today_Time_GSC
27	Cumulative_Energy_GSC_Import	6152	4	100	NA	NA	NA	NA	Cumulative_Energy_GSC_Import
28	Today_Energy_GSC_Import	6156	4	1	NA	NA	NA	NA	Today_Energy_GSC_Import
29	LATITUDE	6160	4	10000	0	999999	226275	NA	LATITUDE
30	LONGITUDE	6164	4	10000	0	999999	755802	NA	LONGITUDE

INSTALLATION & OPERATING INSTRUCTIONS



S.No.	AUX PARAMETERS	MODBUS ADDRESS(DEC)	OFFSET	DVT Factor	Min	Max	Default	Unit	DISPLAY PARAMETERS
1	TERMINAL MODE SELECT	8000	1	1	1	2	1	NA	TERMINAL_MODE_SELECT
2	TOGGLE SWITCH ENABLE	8001	1	1	1	2	2	NA	TOGGLE_SWITCH_ENABLE
3	FREQ CONTROL MODE	8002	1	1	1	3	1	NA	FREQ_CONTROL_MODE
4	VOLTAGE SENSE MIN VALUE	8003	2	10	0	100	10	NA	VOLTAGE_SENSE_MIN_VALUE
5	VOLTAGE SENSE MIN VALUE PER	8005	2	1	0	100	100	NA	VOLTAGE_SENSE_MIN_VALUE_PER
6	VOLTAGE SENSE MAX VALUE	8007	2	10	0	100	100	NA	VOLTAGE_SENSE_MAX_VALUE
7	VOLTAGE SENSE MAX VALUE PER	8009	2	1	30	100	100	NA	VOLTAGE_SENSE_MAX_VALUE_PER
8	CURRENT SENSE MIN VALUE	8011	2	10	40	200	40	NA	CURRENT_SENSE_MIN_VALUE
9	CURRENT SENSE MIN VALUE PER	8013	2	1	0	30	0	NA	CURRENT_SENSE_MIN_VALUE_PER
10	CURRENT SENSE MAX VALUE	8015	2	10	40	200	200	NA	CURRENT_SENSE_MAX_VALUE
11	CURRENT SENSE MAX VALUE PER	8017	2	1	30	100	100	NA	CURRENT_SENSE_MAX_VALUE_PER
12	DELAY SENSING	8019	2	1	20	900	30	NA	DELAY_SENSING

6.1.5 Pressure Relief Vent

Pressure relief vent releases the internal pressure.

CHAPTER 7 : OPERATION OF UNIT

7.1 Display Module Description

Following figure 7.1 indicates the outer look of Display. It has five buttons, three LED indicators, one 128X64 pixel LCD Display and Buzzer.

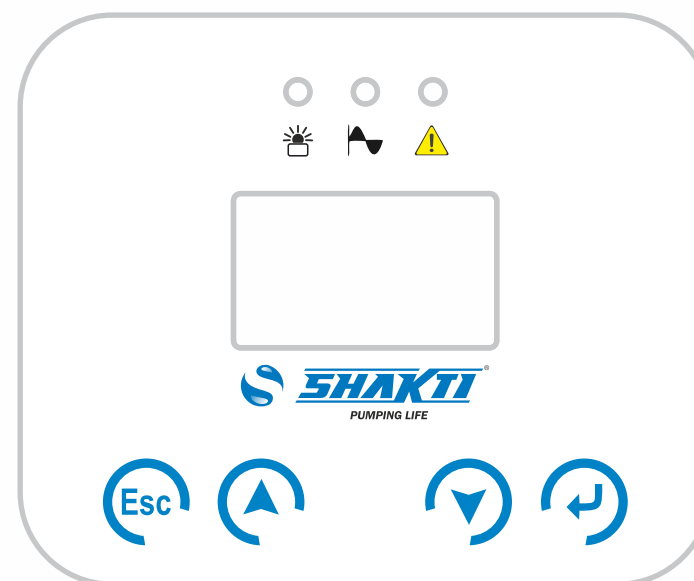












Figure 7.1 LCD display layout

7.2.Button Description and Operation

		Functionality
Power On		<ul style="list-style-type: none"> • NA
Power Off		<ul style="list-style-type: none"> • NA
ESC		<ul style="list-style-type: none"> • Previous Screen
UP ARROW		<ul style="list-style-type: none"> • Used for Scrolling up • For increasing the parameter values in Configuration menu
DOWN ARROW		<ul style="list-style-type: none"> • Used for Scrolling down • For decreasing the parameter values in Configuration menu
ENTER		<ul style="list-style-type: none"> • Selection

7.3.LED Description and Indication

INDICATION	LED 1	LED 2		LED 3
	GREEN	AMBER	GREEN	RED (Warning)
PV OK				
Feeding To Grid				
1 Min Countdown				
Warning & Fault				

7.4. LCD Operation

● Startup

Upon starting the unit for the first time, the LCD Display enters into Factory Setup interface. In factory setup, the user gets an option to set various parameter required for the proper functioning of the product which are illustrated in the figure 7.2.

Scroll through various options displayed on the screen with the up & down buttons and press Enter to set the parameter and Esc to exit the particular option. For example in the language setting user has an option to choose one language out of the four options available. The RTC Date is set in the format DD/MM/YY and the RTC Time in HH:MM:SS format. Other options are common to factory setup option in main menu therefore, is discussed in section C of CONFIGURE. After the successful starting of the product or whenever the LCD is not operated for a period of time, 11 status screens appears in rolling until menu button is pressed.

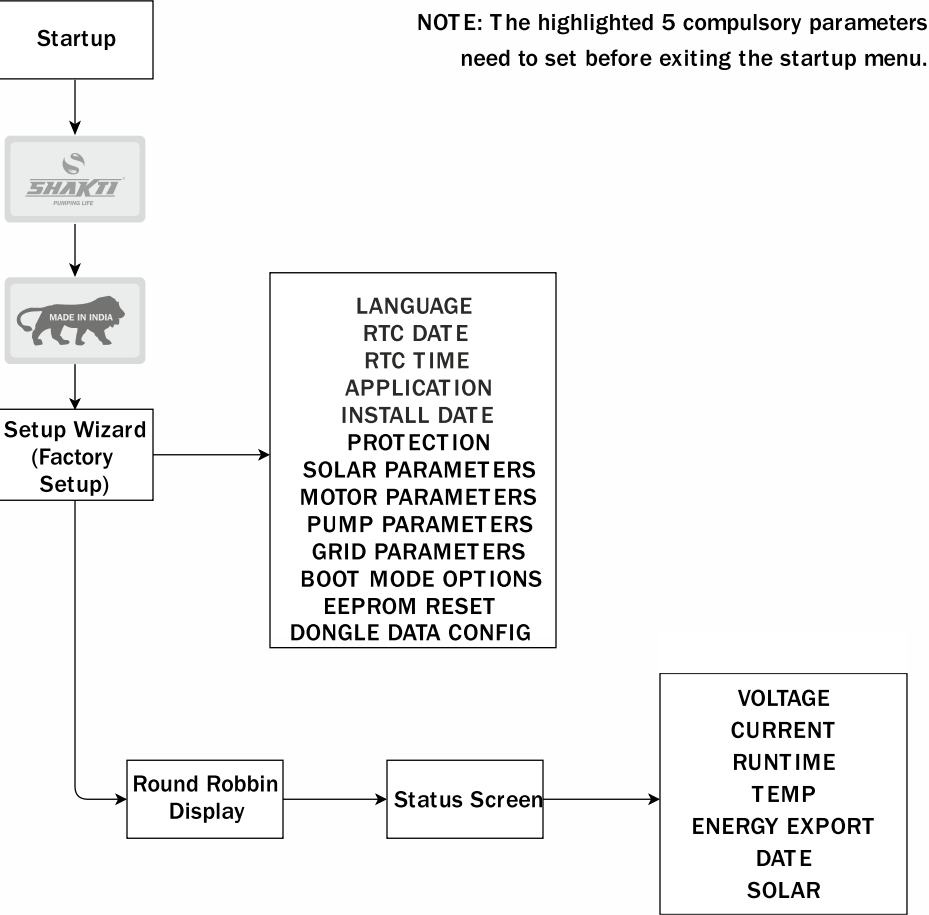


Figure 7.2 Startup menu tree

● Main Menu

In the main menu user can change the setting or get information by transferring from one interface to another. The STATUS, CONTROL, and CONFIGURE, are discussed separately in further sections. FAULT, DAY, and YEAR LOGS of the product can be viewed in the LOGS. The ABOUT section provides the information of firmware version, serial number, network details.

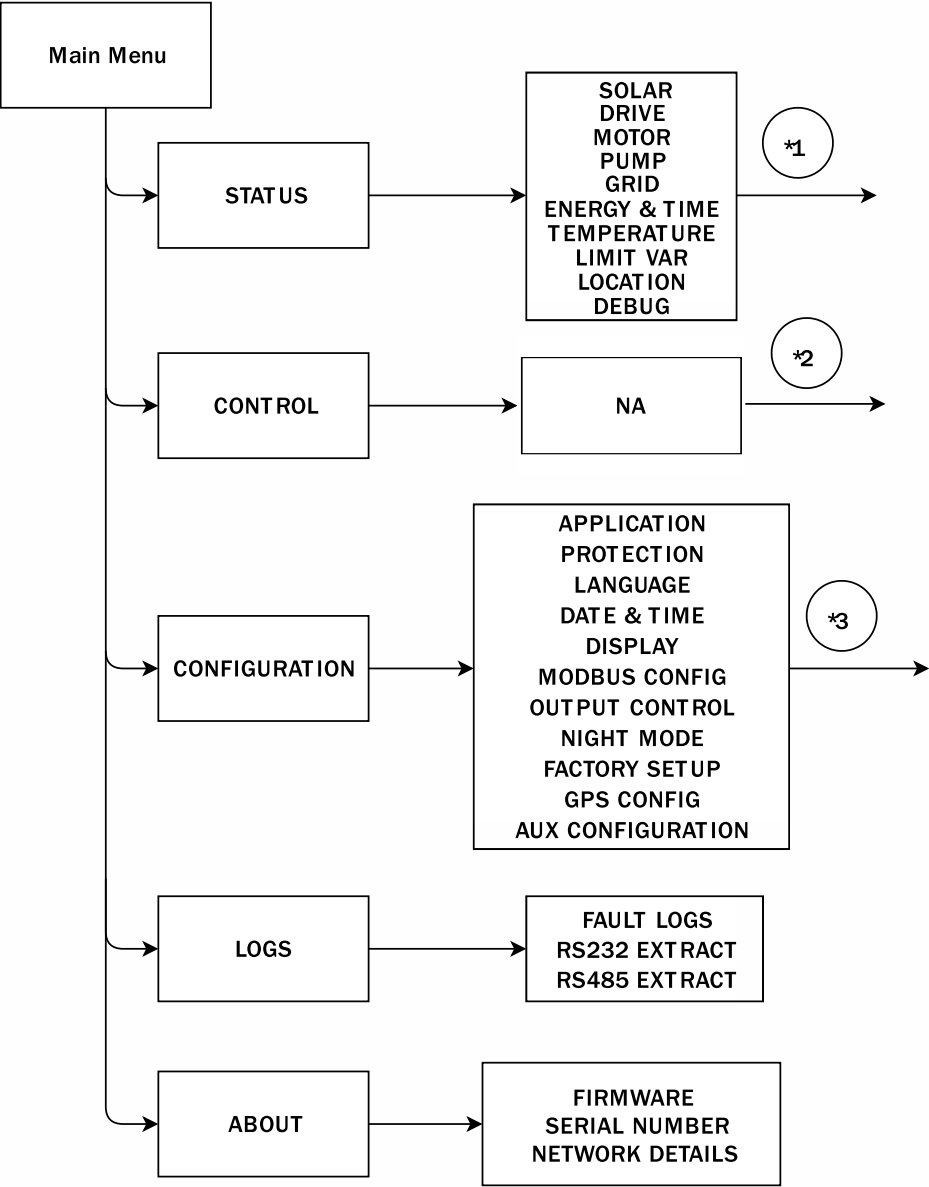


Figure 7.3 Main Menu tree

► STATUS*1

A) SOLAR

This status shows the real time PV condition of the system, such as input voltage (V), input current (A), input power (W), open circuit voltage (V), short circuit current (A), maximum power (W), MPPT voltage (V), and cumulative energy (kWh).

B) DRIVE

Not applicable for this product.

C) MOTOR

Not applicable for this product.

D) PUMP

Not applicable for this product.

E) GRID

This status shows the situation of GRID connected to the system, it includes line voltages (V), line currents (A), and frequency (Hz).

F) ENERGY

Under ENERGY the data of total energy sent to grid & VFD, today and till date with their duration is available.

GRD EDAY : Total energy sent to grid today (kWh)

GRD ETOT : Total energy sent to grid till date (kWh)

GRD TTOT : Total time energy is sent to grid (Hr)

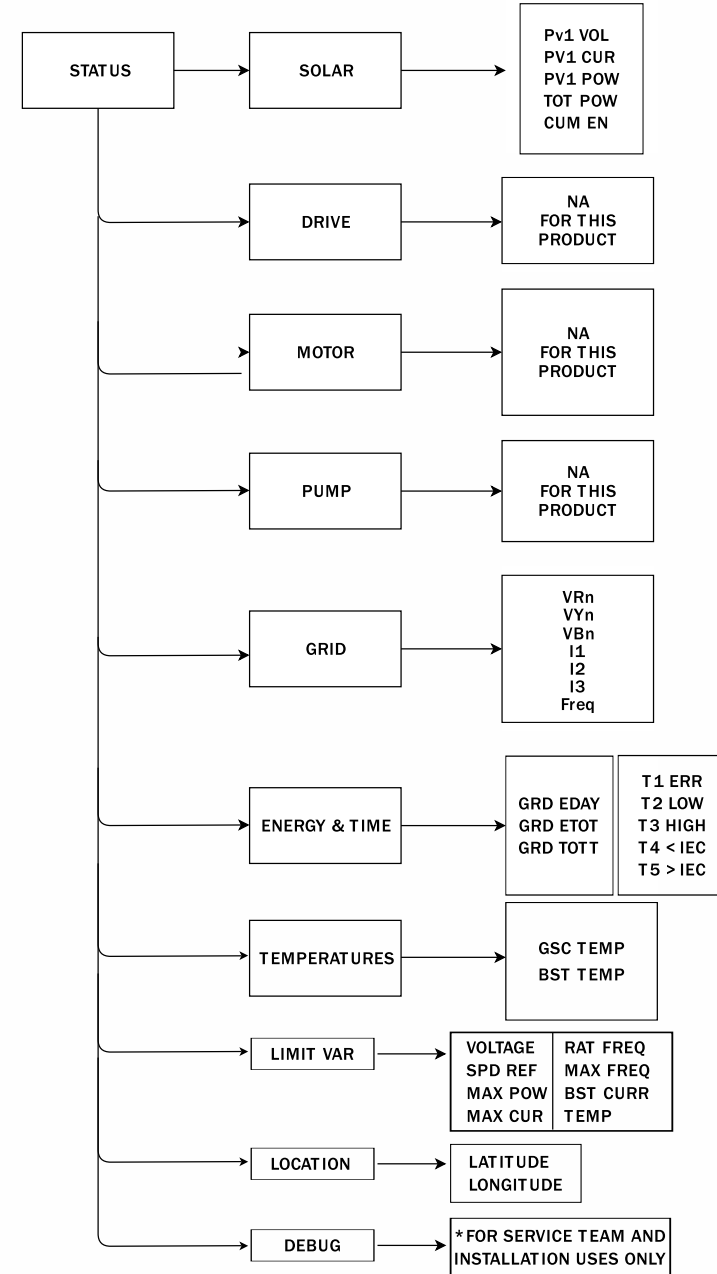


Figure 7.4 STATUS Menu tree

► **CONTROL** *2

Not applicable for this product.

► **CONFIGURE** *3

A) APPLICATION

Not applicable for this product.

B) PROTECTION

The protection limit for various parameters can be set according to the users requirements.

C) LANGUAGE: User get the chance to select the language (by default, it is English).

D) DATE & TIME: User can update date and time to synchronise with real time.

E) DISPLAY: User can select Display mode either Shakti screen or Rolling page.

F) MODBUS CONFIG: When communicating through RS232 and Rs485, user have to select slave id and baud rate i.e. 1 and 9600 respectively.

G) OUTPUT CONTROL: User can either enable or disable output control.

H) NIGHT MODE: User can either enable or disable Night mode.

I) FACTORY SET UP

A security password is required to access this menu block.

i. **SOLAR PARAMETERS :** According to PV panels connected to the system parameters shown in the figure 7.6 can be set.

ii. **MOTOR PARAMETERS :** Not applicable for this product.

iii. **PUMP PARAMETERS :** Not applicable for this product.

iv. **GRID PARAMETERS :** If required the parameters can be set according to the local GRID, keeping in mind the safety regulation specific to that area.

v. **BOOT MODE OPTIONS :** This functionality requires another security password to upgrade the firmware of the system by USB or SERIAL BOOT MODE.

vi. **EEPROM RESET :** EEPROM can be reset only by authorized technician/service personnel. Users are not allowed to reset the EEPROM since it may cause malfunctioning of the unit.

J) GPS CONFIG: Latitude and Longitude can be configured manually according to the location.

K) AUX CONFIG.: Not applicable for this product.

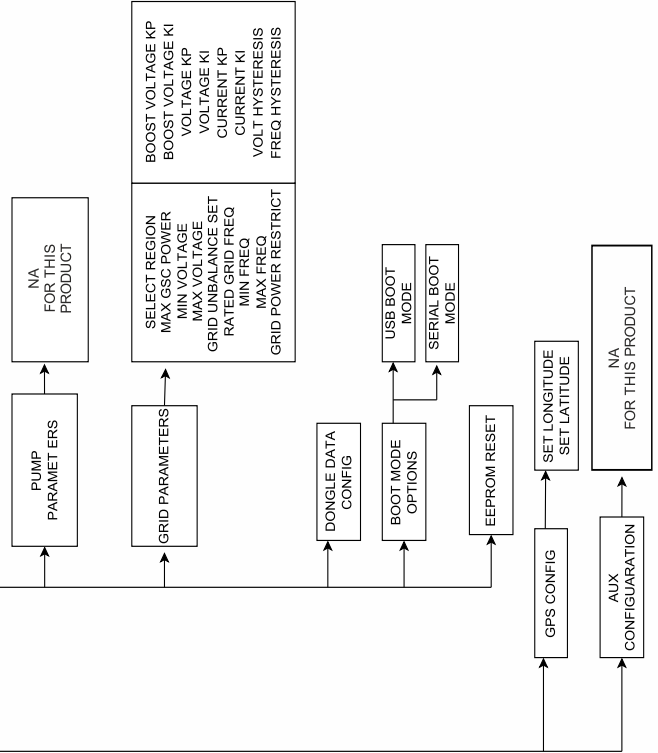
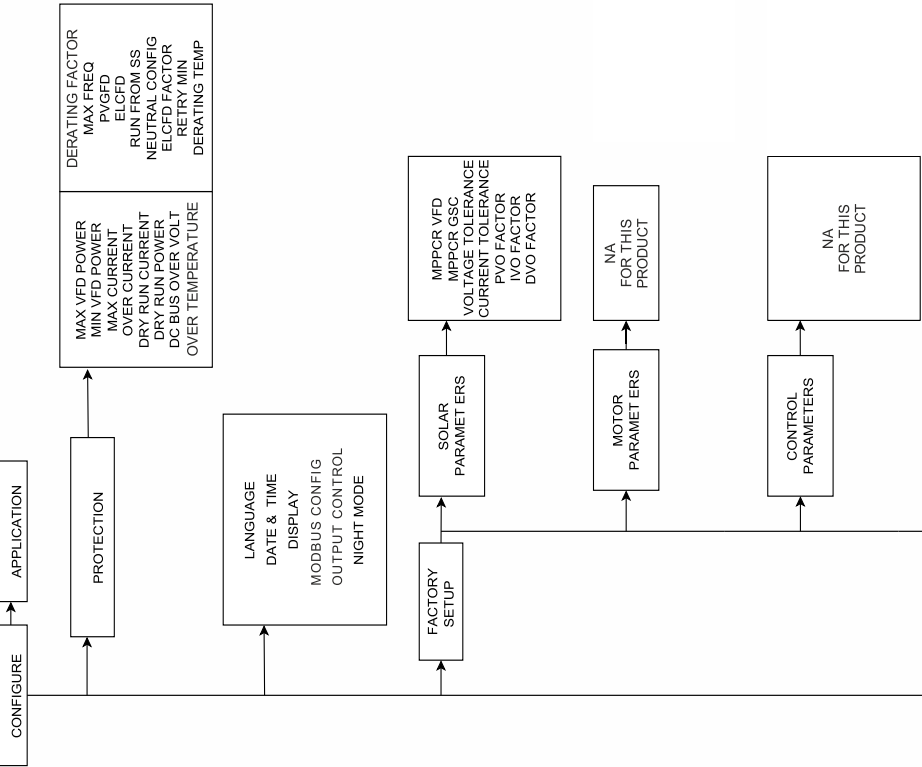


Figure 7.6 CONFIGURE Menu tree

CHAPTER 8 : NUMERICAL DISPLAY INFORMATION

The shakti display has got an unique feature that all the pages can be uniquely located with the use of words as well as numerals also. The location of pages wrt numerals has a definite sequence as described below:

Table 8.1.1 contains all parameters with their display number. No numbers are displayed corresponding to ROLLING PAGES and MENU. Once someone enters the menu, all the pages are numbered based on their sequential location in the menu.

For e.g., STATUS is at 1ST location and is therefore designated as 1 in the front. Any page inside STATUS will start with 1. For example SOLAR page is at 1st location inside STATUS page so, it's numeral designator is 11, wherein 1 corresponds to STATUS PAGE and another 1 corresponds to the first page inside page number 1. Another example, To understand numeral location of INDIAN GRID of SELECT REGION is given below:

3 CONFIGURE >> 9 FACTORY SETUP >> 5 GRID PARAMETERS >> 1 SELECT REGION >> 1 INDIAN GRID.

Hence, Numeral designator for INDIAN GRID of GRID PARAMETERS is 3951 as shown in figure 8.1, which signifies go to the 3rd page of menu to reach CONFIGURATION then go to 9th location of CONFIGURATION to reach FACTORY SETUP (page 39). Then enter the 5TH location of page 39 to reach GRID PARAMETERS (page 395) then enter into 1ST location to go to SELECT REGION (page 3951) there go to 1ST location which is INDIAN GRID (page 39511).

All parameters and pages are numbered as per the above description. Except when the location inside a page is more than 9 then the designator is added with an extra underscore for example 12th location inside any page is designated as _12.

E.g., Numeral designator of ELCFD is 32_12.

For ease of customers, the page numbers are displayed on the top and locations are displayed in front of all the parameters.

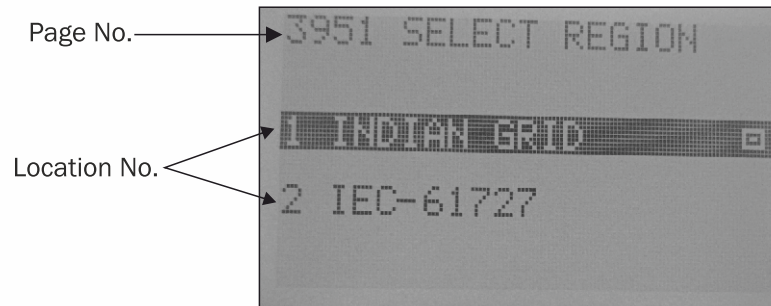


fig. 8.1

S.NO.	HEADINGS	S.NO.	HEADINGS	S.NO.	HEADINGS
0	MENU	32_12	ELCFD	37	OUTPUT CONTROL
1	STATUS	32_12_1	ENABLE	371	ENABLE
11	SOLAR	32_12_2	DISABLE	372	DISABLE
12	DRIVE	32_13	RUN FROM SS	38	NIGHT MODE
13	MOTOR	32_14	NEUTRAL CONFIG	381	DISABLE
14	PUMP	32_14_1	YES	382	ENABLE
15	GRID	32_14_2	NO	39	FACTORY SETUP
16	ENERGY AND TIME	32_15	ELCFD FACTOR	391	SOLAR PARAMETERS
17	TEMPERATURES	32_16	RETRY TIME	3911	MPPCR VFD
18	LIMIT VAR	32_17	DERATING TEMP	3912	MPPCR GSC
19	LOCATION	33	LANGUAGE	3913	VOLTAGE TOLERANCE
1_10	DEBUG	331	ENGLISH	3914	CURRENT TOLERANCE
		34	DATE & TIME	3915	PVO FACTOR
2	CONTROL	341	SET DATE	3916	IVO FACTOR
		342	SET TIME	3917	DVO FACTOR
3	CONFIGURE	35	DISPLAY	392	MOTOR PARAMETERS
31	APPLICATION	351	DISPLAY MODE	393	CONTROL PARAMETERS
32	PROTECTION	3511	ROLLING PAGES	394	PUMP PARAMETERS
321	MAX VFD POWER	3512	SHAKTI SCREEN	395	GRID PARAMETERS
322	MIN VFD POWER	352	CONTRAST	3951	SELECT REGION
323	MAX CURRENT	353	AUTOROLL	39511	INDIAN GRID
324	OVER CURRENT	3531	YES	39512	IEC-61727
325	DRY RUN CURRENT	3532	NO	3952	MAX GSC POWER
326	DRY RUN POWER	354	DISPLAY LOCK	3953	MIN VOLTAGE
327	DC BUS OVER VOLTAGE	3541	YES	3954	MAX VOLTAGE
328	OVER TEMPERATURE	3542	NO	3955	GRID UNBALANCE SET
329	DERATING FACTOR	3543	CHANGE PASSWORD	3956	RATED GRID FREQ
32_10	MAX FREQ	36	MODBUS CONFIG	39561	50 Hz
32_11	PVGF	361	RS232 SLAVE ADD	39562	60 Hz
32_11_1	ENABLE	362	RS232 BAUD RATE	3957	MIN FREQUENCY
32_11_2	DISABLE	363	RS485 SLAVE ADD	3958	MAX FREQUENCY
		364	RS485 BAUD RATE	3959	GRID POWER RESTRICT

S.NO.	HEADINGS
39591	DISABLE
39592	ENABLE
395_10	BOOST VOLTAGE KP
395_11	BOOST VOLTAGE KI
395_12	VOLTAGE KP
395_13	VOLTAGE KI
395_14	CURRENT KP
395_15	CURRENT KI
395_16	VOLT HYSTERESIS
395_17	FREQ HYSTERESIS
396	DONGLE DATA CONFIG
3961	NO
3962	YES
397	BOOT MODE OPTIONS
3971	USB BOOT MODE
3972	SERIAL BOOT MODE
398	EEPROM RESET
3981	YES
3982	NO
310	GPS CONFIG
310_1	SET LATITUDE
310_2	SET LONGITUDE
4	LOGS
41	FAULT LOGS
42	RS232 EXTRACT
421	DAY DATA EXTRACT
422	YEAR DAT EXTRACT
423	FAULT DATA EXTRACT
43	RS485 EXTRACT
431	DAY DATA EXTRACT
432	YEAR DAT EXTRACT
433	FAULT DATA EXTRACT
5	ABOUT
51	FIRMWARE
52	SERIAL NUMBER
521	UNIT SERIAL NO.
522	DONGLE SERIAL NO.
53	NETWORK DETAILS

Table 8.1

CHAPTER 9 FAULT DIAGNOSIS AND SOLUTION

This chapter describes the drive faults, related messages on LCD display, possible reasons of fault and their troubleshooting.

9.1 Fault Type

Type	Drive action when fault happen
Drive fault	If any fault is detected it will occur in following manner <ul style="list-style-type: none"> Fault information will be shown at LCD display Output of drive will be cut-off and motor will decelerate and stop.
External fault	For monitoring and protecting drive external signal can be given which can trip the drive.















Table 9.1 Fault type

Note : In case of remote monitoring the motor will not turn on and the fault status can be seen in menu under fault report.

If the short circuit fault occurs:

1. Remove the motor connection and run the drive.
 2. If the drive runs OK
 - a. Check the loose connection of motor wire in the connector side, some strands may be touching.
 - b. Check the cable for the motor.
 - c. Check the megger of the motor and motor winding related problems.
- Reason for low power and DC bus under voltage:
1. Check dust deposition on the solar panel.
 2. Check the direction of solar panels.

9.1.1 Fault information and description in detail

Fault Type	LCD Display Message	Load Type	Possibility Reason/s (reasons do not limit to the following given reasons)	Troubleshooting
DC BUS OVERVOLTAGE	02 DC BUS OVERVOLTAGE 	GRID	1. DC bus voltage in the drive is more than the voltage set 2. Mechanical Jam(Pump/Motor)	1. Check the no. Of PV cells connected in series. 2. Make sure the voltage is less than the voltage mentioned in the specification sheet on page no.7. 3. Contact customer care
OUTPUT OVER VOLTAGE	03 OUTPUT OVERVOLTAGE 	GRID	1. DC bus voltage in the drive is more than the voltage set.	1. Check the no. Of PV cells connected in series. 2. Make sure the voltage is less than the voltage mentioned in the specification sheet on page no.7. 3. Contact customer care
GRID VOLTAGE LOW	10 GRID VOLT LOW 	GRID	1. Grid voltage is low	1. Decrease minimum grid voltage settings. 2. Contact Customer care.
GRID ERROR	11 GRID ERROR 	GRID	1. Grid voltage is less than 50V in any phase.	1. Check for availability of grid. 2. Contact Customer care.
TWO PHASE ERROR	12 TWO PHASE ERROR 	GRID	1. Voltage in two phases of grid connector is low. 2. Wire is loose at the connector.	1. Check for availability of grid. 2. Check the connection at the grid connector side. 3. Contact customer care.
ONE PHASE ERROR	13 ONE PHASE ERROR 	GRID	1. Voltage in one phase of grid connector is low. 2. Wire is loose at the connector.	1. Check for availability of grid. 2. Check the connection at the grid connector side. 3. Contact customer care
GRID VOLTAGE HIGH	14 GRID VOLT HIGH 	GRID	1. When grid voltage in any of the phase is greater than 258V.	1. Increase the maximum grid voltage settings. 2. Contact customer care.
GRID SIDE OVERLOAD	15 GRID SIDE OVERLOAD 	GRID	1. When grid current is greater than the set limits.	1. Restart the device. 2. Contact Customer care.
GSC OVER CURRENT	16 GSC OVER CURRENT 	GRID	1. During grid tie, any of the grid current increases suddenly.	1. Restart the device. 2. Contact Customer care.
PV OVER VOLTAGE	18 PV OVERVOLTAGE 	GRID	1. If PV average voltage exceed the 765 volts.	1. Reduce the PV string voltage. 2. Contact Customer care.
PV UNDER VOLTAGE	19 PV UNDERVOLTAGE 	GRID	1. If PV average voltage is under the 150 volts.	1. Increase the PV string voltage. 2. Wait for sufficient sunshine. 3. Contact customer care.
GSC OVER TEMPERATURE	20 GSC OVER TEMP 	GRID	1. Unit temperature raised above over temperature limits.	1. Restart the device. 2. Increase the GSC over temperature limits. 3. Contact customer care.
PVGFD GSC FAULT	21 PVGFD DETECTED 	GRID	1. When PV ground fault is detected.	1. Check PV connections. 2. Contact Customer care.
GSC SHORT CIRCUIT TRIP	22 GSC SHORT CKT TRIP 	GRID	1. When there is a short circuit at the grid output of unit.	1. Ensure output is not short and restart the device. 2. Contact Customer care.

INSTALLATION & OPERATING INSTRUCTIONS












Fault Type	LCD Display Message	Load Type	Possibility Reason/s (reasons do not limit to the following given reasons)	Troubleshooting
EARTH LEAKAGE FAULT	24 EARTH LEAKAGE 	GRID	1. Leakage current is greater than the set level.	1. Restart the device 2. Increase the ELCPD_MUL_FACT parameter value. 3. Contact Customer care.
PV UNBALANCE GSC FAULT	25 PV UNBALANCE 	GRID	1. For a 5-10 KW device, voltage more than 200V is reflecting even if in that particular string PV is not connected. 2. PV1 or PV2 is not active even if PV panels are connected.	1. Restart the device. 2. Contact customer care.
OUTPUT DISABLE FLAG	26 OUTPUT DISABLED 	GRID	1. Output control is disabled.	1. Enable the output control from output control page in configuration. 2. Contact customer care.
ISLANDING FAULT	27 ISLANDING DETECTED 	GRID	1. When grid is not present and load matches the input power.	1. Check whether grid is present. 2. Contact Customer care.
GRID UNBALANCE FAULT	29 GRID UNBALANCE 	GRID	1. Difference between the phase voltages is greater than the set value.	1. Increase the grid unbalance set voltage value. 2. Restart the device.
PHASE SEQUENCE ERROR	30 PHASE SEQUENCE ERR 	GRID	1. The phase sequence of grid power supply is not correct.	1. Check the connection at the grid connector side. 2. Contact customer care.
GRID FREQUENCY LOW	31 GRID FREQ LOW 	GRID	1. When grid frequency is less than the set value.	1. Decrease the minimum grid frequency parameter value 2. Contact customer care.
GRID FREQUENCY HIGH	32 GRID FREQ HIGH 	GRID	1. When grid frequency is more than the set value.	1. Increase the maximum grid frequency parameter value 2. Contact customer care.
ISLANDING FREQUENCY FAULT	33 ISLANDING FREQ DETECTED 	GRID	1. When grid frequency varies more than 0.15 Hz in 2ms.	1. Restart the device 2. Contact customer care.

Table 9.2 fault information and description

CHAPTER 10 : RECYCLING & DISPOSAL

Electrical & electronic waste should not be thrown out in open or buried or fired. They must never be treated as residential waste. A unit which was reached end of its life or is not needed any more should be returned to the dealer or to the company. A user may also act as per the government norms prevailing in the area.

WARRANTY CERTIFICATE

Dear Customer. Congratulation. for purchasing our product.

Pump and Motor are warranted against defects in workmanship and material under normal use, service & specified duty conditions. We provide one time warranty service for twelve months from the date of purchase by the first user.

Shakti Pumps (India) Limited warrants this product to be free from damage/ defects in material and workmanship under normal use and service for Twelve Months from the date of purchase by the first user. The user shall produce valid and original copy of invoice for availing warranty. The user shall carry defective pump set to nearest authorized service center .

This warranty does not cover any loss or damage/ defect of any nature resulting from wrong product selection/ improper installation or installation by unauthorized/ untrained person/ sandy condition/ dry running and improper use of the pump sets. The warranty also does not cover consequential losses/ damages arising due to failure of pump/ motor. No warranty will be provided on mechanical seal, rubber parts, fasteners, cables in pump motor / pump sets. Our obligation is limited to recycling or repairing or replacing product/ parts ex^l factory. Equipment for repairs should be returned free of cost to us. The forgoing is subject to the provision that the user does not open the unit and make any change or repair without prior approval of authorized service center during the warranty period. This warranty excludes every condition whether statutory or otherwise, whatsoever not herein expressly set out.

WARRANTY CARD

Customer to fill following details

Name :
 Address :
 City/Village :
 District :
 State :
 Country :
 Pin Code :
 Mobile no. :
 Email id :

Information on Device:

Model no :
 Serial no. :
 Invoice no. :
 Commissioning date :
 Fault date and time :
 Message related to fault on display :
 Brief fault description and photo of display :
 Sign :
 Date :
 Place :

Installer to fill following details

Modules Used :
 Modules per string :
 Number of strings :
 Dealer license Number :
 Company :
 City/Village :
 State :
 Country :
 Pin Code :
 Mobile no. :
 Email id :
 Sign :
 Date :
 Place: :

INSTALLATION & OPERATING INSTRUCTIONS

BOOK-POST

To,
SHAKTI PUMPS (INDIA) LIMITED
Plot No. 401, 402, & 413, Industrial Area, Sector - 3, Pithampur - 454774,
Dist. - Dhar, (M.P.) - INDIA. Toll Free. 1800 103 5555
E-mail : info@shaktipumps.com, sales@shaktipumps.com
Visit us at : www.shaktipumps.com

Stamp

