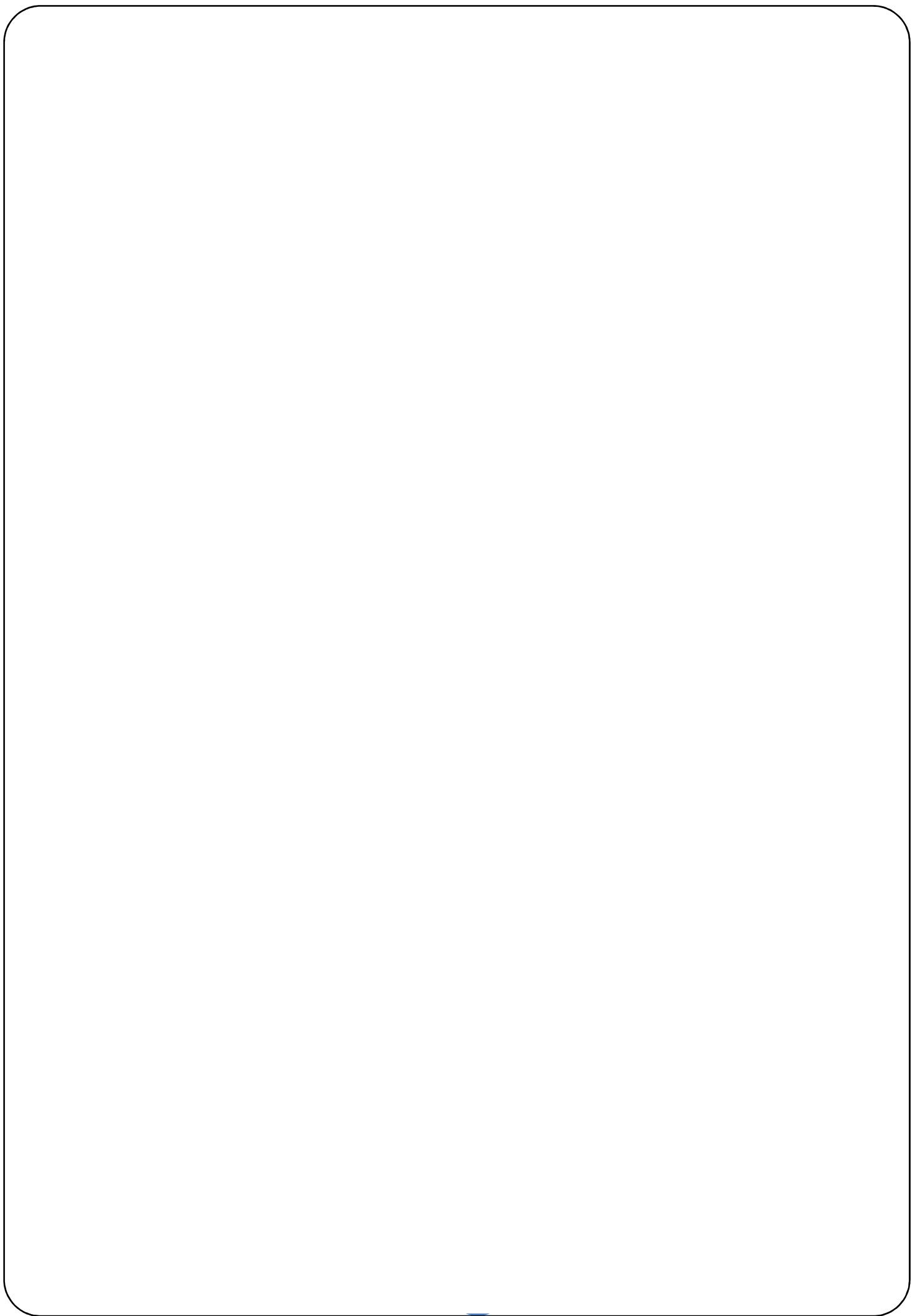# Tescom®

USER MANUAL

TSC040 Solar Converter

SAFETY WARNINGS

<u>IMPORTANT NOTICES</u>

1. This manual must be carefully read before applying any power to the Solar Converter unit.

2. All warnings in the manual should be adhered to.

3. All operating instructions should be followed.

4. Power input cords of the Solar Converter should be routed carefully so that they are not to be walked on.

5. Please save this manual.

6. Please save or recycle the packaging materials.

WARNING !!!

- Do not apply electrical power to the Solar Converter equipment before arrival of authorized service personal.
- Installation and commissioning of Solar Converter must be performed by a qualified technician.
- Adequate protection against input over currents must be provided, considering the nominal current rating of the Solar Converter.
- Do not insert any object into ventilation holes or other openings.
- To reduce the risk of fire or electric shock, install the unit in temperature and humidity controlled indoor area free of flammable and corrosive substances.
- If input power is connected risk of electric shock is valid.

WARNING !!!

- **Since it is high voltage equipment, the Solar Converter contains dangerously high voltages. The risk of contact with these voltages is minimized using special design features and internal safety shields in accordance with IP20 standards.**

- **All maintenance and installation procedures requiring access to the inside of the device must be exclusively performed by trained personal.**

- **SOLAR CONVERTER DOES NOT HAVE AUTOMATIC PROTECTION AGAINST VOLTAGE RETURNING TO THE INPUT. POWER SWITCHES OR FUSES OUTSIDE THE SOLAR CONVERTER MAY HAVE VOLTAGES ON THEIR CONNECTION TERMINALS EVEN WHEN THEY ARE TURNED OFF.**
- **SERVICE PERSONNAL MUST INSULATE THE SOLAR CONVERTER (BY TURNING OF ITS OUTPUT and BATTERY SWITCHES and disconnecting the PV panels) BEFORE WORKING ON THE UNIT.**

- **Installation and commissioning of this device must be performed by qualified service personal trained and authorized by the manufacturer (or distributor)**

- **Risk of electric shock, do not remove cover. No user serviceable parts inside, refer to qualified service personal for high quality and secure servicing.**

- **Risk of electric shock, hazardous live parts inside.**

CONTENTS

I. GENERAL DESCRIPTION

1.1 Introduction

Aim of this user manual is to inform user and authorized technical service personnel on **TSC040 series** solar converters. Authorized technical service personnel and user are responsible to read this user manual thoroughly in order to install/use the device properly.

Manufacturer does not accept any liability in respect of any damage which is caused by negligence of aforementioned rules.

TSC040 series solar converters are devices which are produced and designed with PWM and IGBT technologies and have enhanced communication interfaces.

TSC040 series solar converters supply continuous power to loads from PV input power. It monitors input, battery, output voltage and currents, if any one of them is out of tolerance; The Solar Converter arranges power redundancy automatically.

Model	Output power
TSC040	40000 Watts

Table 1: TSC040 series solar converter models

Advantages of solar converters:

- Increased power quality
- Battery current control
- No mechanical components
- Remote monitoring of solar converter
- Power event logging

Features:
- Central DSP controlled structure
- High efficiency
- Rack and wall mount options
- Enhanced diagnostic
- INPUT
  - o IGBT technology is used
  - o PV voltage low limit
  - o PV voltage high limit
- BATTERY
  - o Flexible battery quantity
  - o Adjustable battery charging current limit
- OUTPUT
  - o Short circuit protection
  - o Output fuse protection
  - o Adjustable output voltage. (Service)
- COMMUNICATION and INTERFACE
  - o RS232 interface and RS485
  - o Interactive control command protection
  - o LCD front panel ,3 buttons ,indicator lamp and buzzer on front panel
  - o Modbus adaptor
  - o 200 alarms logging with time and date
  - o Input voltage and current, output voltage and current, cabinet inside temperature, battery current measurements

1.2 Design
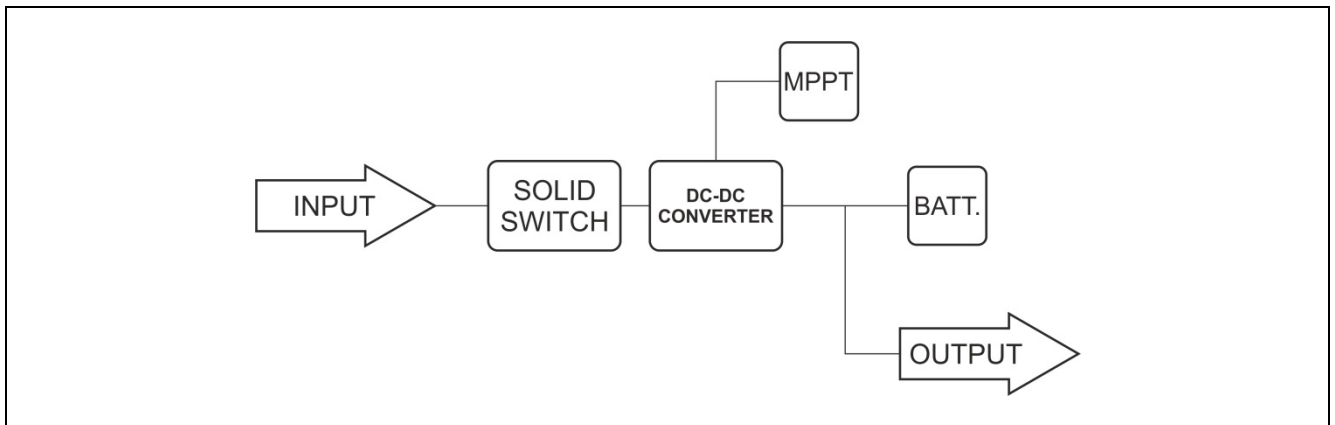
Figure 1: TSC040 series solar converter block diagram

Input: is Solar Panels, which are the power source of the unit.

Solid State Switch: is for switching solar power on and off.

Boost DC-DC converter: is the booster part of the unit, which boosts low solar voltage to a proper level, which is determined by user.

MPPT: is the maximum power point tracker, which controls voltage levels at a certain point where maximum power from solar panels is harvested.

Battery: is the battery group, which is reserve power for load

Output: is the load of the system.

1.3 Physical Appearance
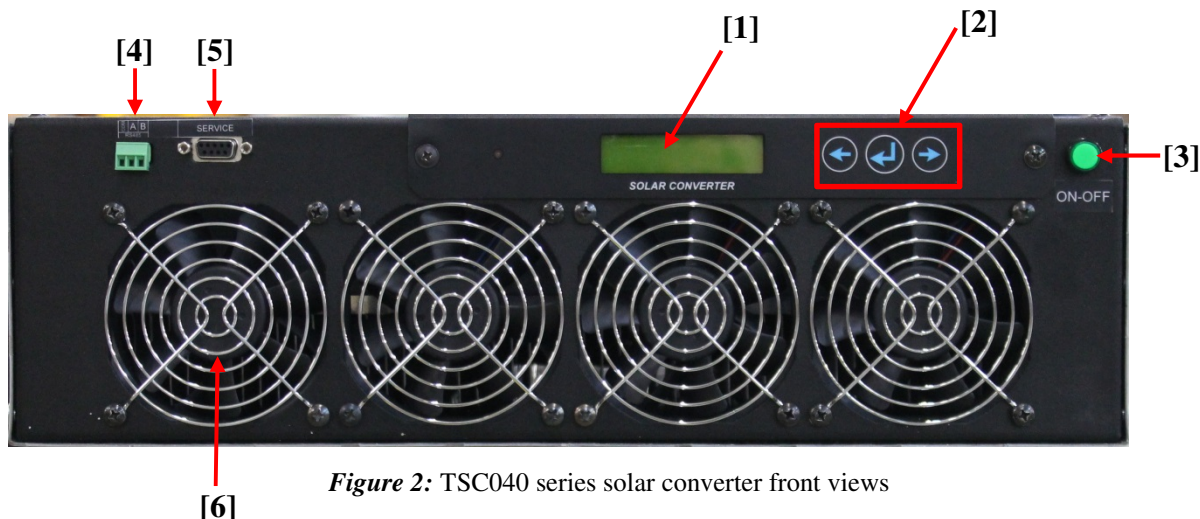
Figure 2: TSC040 series solar converter front views
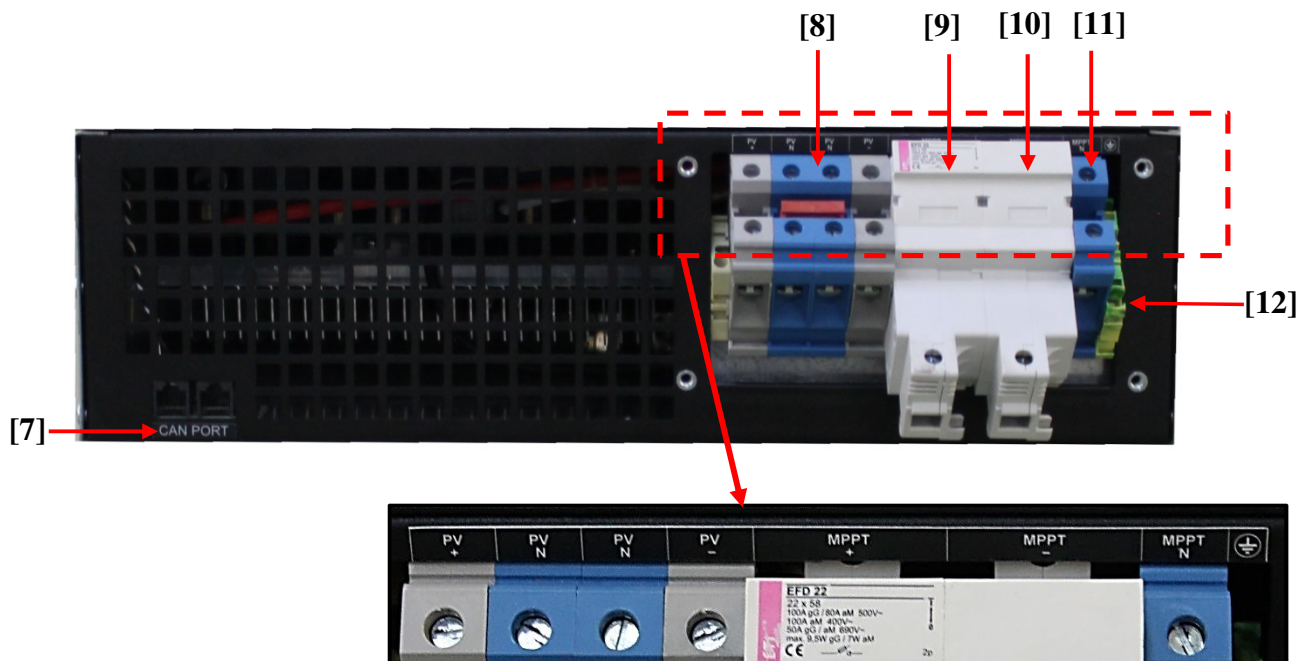
Figure 3: TSC040 series solar converter rear view

1. LCD display
2. Control Buttons
3. ON-OFF Button
4. RS485 communication port
5. RS232 communication port
6. Cool Fans
7. CAN communication port
8. Input terminals
9. SW1(+ output)
10. SW2(- output)
11. Neutral terminal(output)
12. Earth

5
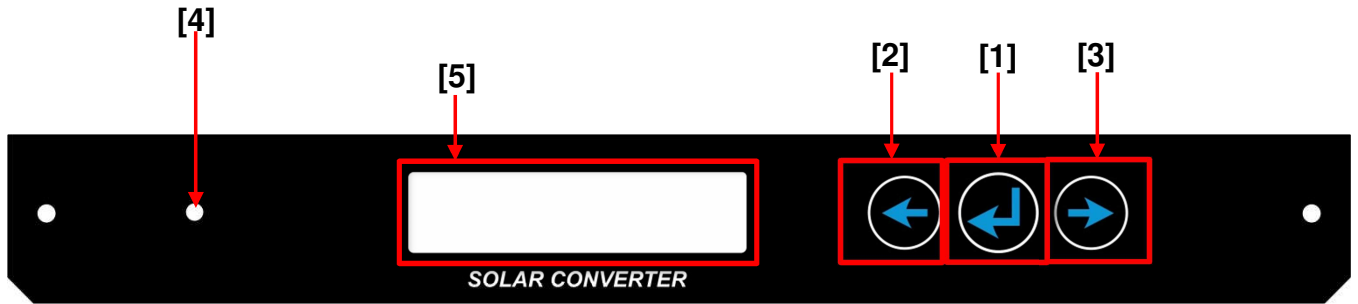
Figure 4: Control panel detailed view

1. ENTER button
2. LEFT /DOWN button
3. RIGHT/UP button
4. STATUS led
5. LCD display

Status LED has 3 modes for indicating system status:

- Green Led:
  - ➢ Led is on continuously
  - ➢ System is operating normally
  - ➢ Buzzer isn't active
- Yellow Led:
  - ➢ Led is Flashing
  - ➢ System is in warning mode
  - ➢ Buzzer is active
- Red Led:
  - ➢ Led is Flashing
  - ➢ System is in fault mode
  - ➢ Buzzer is active

Alphanumeric LCD panel has two lines:

- Top line displays menu items and measured parameters
- Bottom line displays alarms

1.4 Technical Specification

MODEL	TSC040
INPUT	
MPP voltage range(Pos/Neg)	100-300V
MPP voltage range for full power	200-300V
Maximum input voltage	300V
Start-Up DC input voltage (Vstart)	100V
Maximum input current	100A-DC
Number of MMPT tracker	2
Sugested PV power for input	40000W< S.P. <50000W
Night energy consumption	5W
Poles	3 (Positive, Neutral and Negative)
OUTPUT	
Maxiumum output power	40000W
Rated output voltages	± 405VDC (Dependent of Battery Number)
Maximum output currents	±66A
Efficiency	> 97%
Poles	3 (Positive, Neutral and Negative)
FRONT PANEL	
Panel features	Two line, 16 character LCD provides instantaneous power,lifetime energy production,PV array voltage and current, charging voltage and current, and alarm and fault messages
COMMUNICATION	
RS232	Service
RS485	Standard
CAN	Standard
PC software	Optional
MECHANICAL DATA	
Dimensions (HxWxD)	(3U)135x495x840 - Rack Type (3U)150x525x815
Weight (kg)	31
Mounting system	Wall Bracket/Cabinate System
Connection type	Both Input and Output 600V 35mm² Terminals
ENVIRONMENT CONDITION	
Operating temperature	0°C – 40°C
Storage temperature	-10°C to + 50°C
Altitude	1000m @ nominal power
Max. relative humidity	< 90% (non-condensing) during operation
Max. installation altitude	2000 m at nominal power rating
Protection level	IP20
COMPLIANCE	
Quality standard	ISO9001
FRONT PANEL	
LCD panel	Available - Standard
Software management	Available - Standard
PROTECTIONS	
Input	Optional 700V-DC Lightning/surge arrester and 700V 100A Fuse
Input(Power Supply)	250V 3A Fuse
Output	700V 100A Fuse

II. INSTALLATION

2.1 Introduction

WARNING!

- Do not apply electrical power to the Solar Converter equipment before the arrival of authorized service personnel.

- The Solar Converter equipment should be installed only by qualified service personnel.

- Eye protection should be worn to prevent injury from accidental electrical arcs. Remove rings, watches and all metal objects. Only use tools with insulated handles. Wear rubber gloves.

- The company may not be held liable for any damage caused by incorrect connections or by operations that are not described in this manual.

2.2 Preliminary controls

The storage area must have the following characteristics
Temperature : -10 to +50 C
Relative humidity : 95% max.
During storage keep the output switch always ''OFF'' (0 position).

2.3 Unpacking

Solar Converter is packed and enclosed in a structural cardboard carton to protect it from harm. Before unpacking, inspect for damage that may have occurred during the shipment. If any damage is noted, call the shipper immediately and retain the shipping carton and Solar Converter. If there is no damage in packaging, unpack Solar Converter carefully and take box out. Package contents are as follows;

- User manual
- CC05 coded RS232 connection cable
- CAN connection cable
- Warranty certificate
- Toroid (for communication cable)
- Output fuses(two 100A fuses)

2.4 Equipment installation site and positioning

When choosing the site in which to install the Solar Converter, the following points should be taken into consideration:

- Avoid dusty environments
- Check that the floor is level and capable of withstanding the weight of the Solar Converter
- Avoid cramped environments that could impede the normal maintenance activities
- The relative humidity should not exceed 90%, non-condensing.
- Check that the ambient temperature, with the Solar Converter running, remains between 0 and 40 C
- Avoid installing the equipment in places exposed to the direct sunlight and hot air.

2.5 Electrical connections

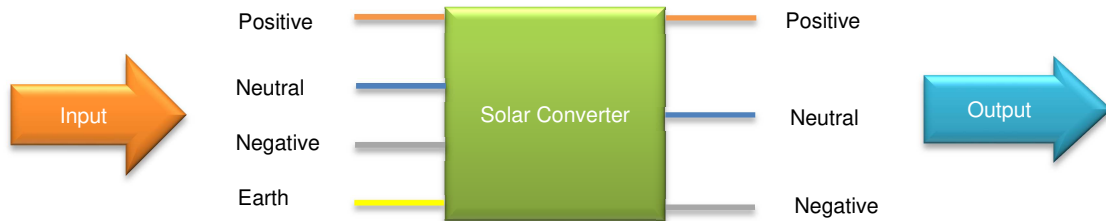*Diagrams of connection to the electrical system*

Basic connection

Figure 5: Electrical system

Cable sizes / Fuses

The input/output cables can be sized to suit the Solar Converter rating according to the table below

Cables	TSC040
Input	3x16 mm2 (Positive + Negative + Neutral)-1x10 mm2(Earth)
Output	3x16 mm2 (Positive + Negative + Neutral)

Table 2: *Input and output cable sizes*

Fuses	TSC040
Input	Solar Box
Output	100A

Table 3: *Input and output fuses*

Connections

TSC040 Series Solar Converter runs only on PV panel supplies with Positive, Neutral and Negative lines.
Before making power connections to the unit, ensure that the incoming power sources are de-energized and insulated.

All control cables should be screened and run in a separate trunking to the power cables.

PV +	PV N	PV N	PV −	MPPT +	MPPT −	MPPT N	⏚

Terminal		
PV input terminal (+)	MPPT output terminal (+)	
PV input terminal (-)	MPPT output terminal (-)	Converter (Earth)
PV input terminal (N)	MPPT output terminal (N)	

Table 4: *TSC040 input and output terminals*

Wiring procedure

Input Connections

1. During connection match Positive cable to positive input, Negative cable to negative input, Neutral cable to neutral input and Earth cable to earth input.

Output Connections

2. For output connections you have three outlets at the back of the Solar Converter
   - You can directly plug the load cable into this output.
   - During connection of the load, match Positive cable to positive output, Negative cable to negative output and Neutral cable to neutral output.

   Note: These auxiliary cables must be shielded and double insulated. (Recommended cross-section =1mm^2)

ATTENTION!!!   Failure to follow adequate grounding procedures can result in electric shock hazard to people or risk of fire.

Electromagnetic compatibility

This Solar Converter conforms to the class C2 specifications (in accordance with the provisions laid down by the EN62040-2 standard: CONVERTER – EMC requirement). In home environment, it may cause radio interference. The user may have to take supplementary measures.
This product is designed for professional use in industrial and commercial environments. Connections to the RS485 connectors should be made with the cables provided or, in any case, with shielded cables less than three meters long.

Installing the solar converter

When installing the equipment the following points should be considered:

- The air outlet and inlet of the Solar Converter is on the rear and front respectively, because of this do not prevent air ventilation from the rear and front side.
- No objects should be left on its top surface
- Sufficient space should be left in front of the equipment for it to be turned on/off and maintenance operations to be performed on it (>1 m)
- Keep out of your equipment from the explosive and flammable items

3.1 Description

The purpose of the Solar Converter is to provide maximum power, which is in predefined limits, available from the PV panels. While the input voltage is in acceptable tolerances, The Solar Converter converts the DC voltage provided by the PV panels into the required DC voltage level at the output. If the voltage at the input is out of the predefined tolerance, the Solar Converter stops and waits until the voltage at the input is in range again.

3.2 Powering on for the first time

- Check that all the connections have been made following the information given in the "Connections" paragraph.

- Make sure that the voltages at the input and the output of the system within the range.

- For the first time operation, The system wait for press Start/Stop Button.

Switching On (Normal Operation) the Solar Converter from Off Position

- Engage the fuses
- Press to Start/Stop button
- If there is no fault the Solar Converter will start producing energy.

Figure 6: Power ON

- If there is no fault, the Solar Converter will start harvesting energy from the PV panels and pump current into the load side after press Start/Stop Button.

Switching Off (Normal Operation) the Solar Converter from On Position

- Press to Start/Stop button
- The Solar Converter will stop producing energy.
- Deactivate the fuses.

Figure 7: Power OFF

3.3 Protections inside the solar converter

Output short circuit protection

In the event of a fault on the load, like short circuit, Solar Converter shuts-down the output voltage. To restart after a short circuit, find out the short circuit on the load side and disconnect it from the output of the Solar Converter. Then restart the Solar Converter again.

Fuses

There are some fuses on the Solar Converter:
Power supply fuse (on-board glass fuse)
Output fuse

Battery protection

Battery charge current limit (adjustable)

Input protections

Input DC voltage high protection (adjustable)
Input DC voltage low protection (adjustable)

Output protections

Output DC voltage high protection (adjustable)
Output DC voltage low protection (adjustable)

WARNING: The electronic circuitry of the Solar Converter although is supplied by the voltage at the output, turning OFF the output switch will not cause the system to turn off due to self-supply. Therefore, if the output switch is turned OFF, NEVER turn it on while the system ON. Turn OFF the system completely and then follow commissioning procedure from the beginning.

WARNING: Check CAN connection between solar converter and UPS

4.1 Introduction

Solar Converter front panel has a LCD display (2 lines), 3 buttons and 1 LED.

Display

At the center of the control panel, there is a 2 lines/16 alphanumeric characters display, which provides a detailed overview of the current status of the Solar Converter. Directly from front panel you can control the Solar Converter, monitor the electrical values of the inputs, output etc. and change the main settings.

The LCD display has 2 lines and the functions of lines are as follows:

First line: Menu items and measured parameters
Second line: Time shared indication of alarms
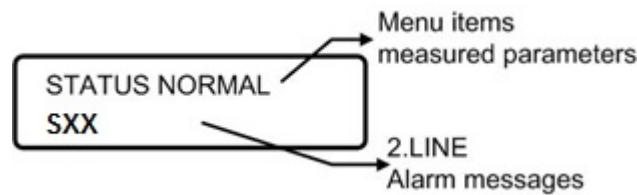
Figure 8: LCD Display

The tag SXX at the beginning of the fault messages on the second line are the standard fault codes for a fault condition. The remaining message part can be different in each language.

Status Led

There is a single LED for on the control panel of the Solar Converter.

Green LED: Status OK
Yellow LED: Warning indication
Red LED: Fault indication
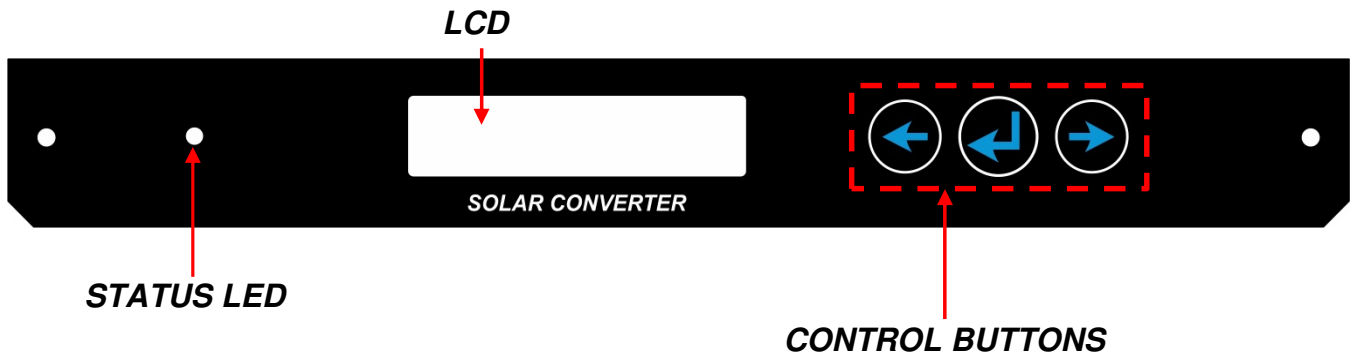
Figure 9: Control panel

Key Symbols

There are 3 control keys which provide flexible move on menus, these are:

↵   ENTER button to enter menu or to confirm a selection

←   Navigate left and down between menu items

→   Navigate right and up between menu items

Display Menus

The function of LCD panel is arranged as a 2 level menu structure.
-Main menu
-Sub menus

4.2 Front panel menu explanations

Enter button enables user to select a menu option. Each menu option has an "EXIT" option at the bottom of selection. User can exit menu selection by

| Level 1	Level 2	Options	Explanation
1.STATUS			User can see status about of the system in this menu.
	StatusCod:xxxxx		Status code table is in Manual page: 22
	FaultCode:xxxxx		Fault code table is in Manual page: 21
	ENTER - EXIT		Exits from status menu.
2.MEASUREMENTS			User can find various measurements related to system under this menu.
	VpvPOS : xxx.xV		PV positive voltage
	VpvNEG : xxx.xV		PV negative voltage
	IpvPOS : xxx.xA		PV positive current
	IpvNEG : xxx.xA		PV negative current
	PpvPOS: xxxxx W		PV positive power
	PpvNEG: xxxxx W		PV negative power
	VoutPOS: xxx.xV		Output positive voltage
	VoutNEG: xxx.xV		Output negative voltage
	IoutPOS: xxx.xA		Output positive current
	IoutNEG: xxx.xA		Output negative current
	PouTotal:xxxxxW		Output positive power
	PinTotal:xxxxxW		Output negative power
	AmbTemp: xx.x°C		Ambience temperature
	InTemp : xx.x°C		Input air temperature
	Temp1 : xx.x°C		Booster temperature
	Temp2 : xx.x°C		Input buck converter temperature
	Temp3 : xx.x°C		Balancer Temperature
	FanSpeed: %xxx		Fan Speed
	E: xxxxxxx.xkWh		total energy
	ENTER - EXIT		Exits from Measurements menu.
3.ALARM LOGS			User can see alarm logs about of the system in this menu.
	000 >Press Enter		
	ENTER - EXIT		Exits from alarm logs menu.

4.INFORMATION			User can see information about of the system in this menu.
	HourMetr:xxxxxh		Total working hours
	ChassisN:ææææææ		Chasis number
	Pmax: xx kW		Power of device
	M-Version:xxxxx		Mainboard version
	P-Version:xxxxx		Front panel version
	Intern.Comm.:	OK / --	Communication status between front panel and mainboard
	ENTER - EXIT		Exits from information menu.
4.Options			User can see options under this menu
	LCD OPTIONS		
	COMM. OPTIONS		Communication options
	ENTER - EXIT		Exits from options menu.
4.1 LCD OPTIONS			User can see LCD options under this menu
	Language:	TR/EN	
	Backlight :	1-10	Backlight setting
	Bl. Dim : x s	1-10	
	Buzzer:	On/Off/Passive	On: Buzzer is open Off: Buzzer is Off until the alarm occurs Passive: The buzzer closes
	Click	On/Off	
	ENTER - EXIT		Exits from LCD menu.
4.2 COMM. OPTIONS			User can see communication options under this menu
	Device ID : xx		ID of device
	Modbus: baudrate		MODBUS RTU communication frequency
	Rs232: baudrate		Rs232 communication frequency
	ENTER - EXIT		Exits from communication options menu.
5.TIME			User can see time options under this menu
	Time : xx:xx:xx		Displays time of the system.
	Date : xx/xx/xx		Displays date of the system.
	Time Sync :	RTC or UPS	Displays time synchronization of the system.
	ENTER - EXIT		Exits from time menu.
5. SERVICE			This menu only use by the authorized persons.
	HourMetr:xxxxxh		Total working time
	FanMaint:Cancel		Remaining time for fan maintenance
	GenMaint:Cancel		Remaning time for general maintenance
	Fault Reset		
	Logout : OK		
	UPSVref: xxxxx		instant voltage reference incoming from UPS

	UPSVBstRf:xxxxx		Instant boost voltage reference
	UPSIchgRf:xxxxx		instant battery charging value
	ENTER - EXIT		Exits from service menu.
6.ADJUST			This menu used for specific settings. Contact the manufacturer.
	Passw: xxxx xxxx		Password entry
	ENTER - EXIT		Exits from adjust menu.

4.3 Front panel fault and warning explanations

Code	Message	Explanation
		Alarm1
S01 PV High	FAULT	If PV voltage is high than setup value, this fault occurs
S02 PV Low	FAULT	If PV voltage is low than setup value, this fault occurs
S03 Dc Bus High	FAULT	If Dc bus voltage is high than setup value, this fault occurs
S04 Dc Bus Low	FAULT	If Dc bus voltage is low than setup value, this fault occurs
S05 Temp. High	FAULT	If temperature is high than setup value, this fault occurs
S06 IGBT Satura.	FAULT	If IGBT saturation has a problem. that fault occurs
S07 Fan Fault	FAULT	If fan has a problem, that fault occurs
S08 CurrSens.Err	FAULT	If Current sensor has a problem, that fault occurs
S09 Emergency St	FAULT	Emergency stop fault
S10 EepromCrcErr	FAULT	If Eeprom checksum has a problem, that fault occurs
S11 Eeprom Error	FAULT	If Eeprom has a problem, that fault occurs
S12 UPS Stop	FAULT	If UPS is stopped, that fault occurs
S13 UPS Bat.Test	FAULT	This message appears during the ups battery test
S14 Can BMS Err	FAULT	If connection between Solar Converter and BMS has a problem, that fault occurs
S15 Can UPS Err	FAULT	If connection between Solar Converter and UPS has a problem, that fault occurs
S16 Out.Diod Err	FAULT	If output diode is damage, that fault occurs

		ALARM2
S17 In.Fuse Err	FAULT	If entry fuse is open, that fault occurs

WARNİNGS		
S33 Battery Test	WARNING	Battery test warning
S34 Boost Charge	WARNING	Boost charge warning
S35 Buck Start	WARNING	Buck start test warning
S36 Booster Stop	WARNING	Booster stop warning
S37 BuckBst Strt	WARNING	Balancer start warning
S38 Temp High	WARNING	Temperature rises warning
S39 Solar Reset	WARNING	Device newly opened warning
S40 Fan %100	WARNING	If the fan is operating at 100%, this warning is displayed
S41 Test Mode	WARNING	If the device test mode, this warning is displayed
S42 Step Mode	WARNING	If the step mode is active, this warning is displayed
S43 Lock Key Opn	WARNING	If the lock key is open, this warning is displayed
S44 PV Low Warn.	WARNING	If PV voltage is dropping, this warning is displayed
S48 Servis.login	WARNING	Servis login warning

LCD WARNİNGS		
S62 In.Com.Fault	WARNING	If connection between Panel and Converter has a problem, this warning is displayed
S63 Fan. Maint.	WARNING	Fan maintenance time warning
S64 Gen. Maint.	WARNING	General maintenance time warning

V. COMMUNICATION INTERFACE AND REMOTE MANAGEMENT

TSC040 series Solar Converters have communication interfaces listed hereunder.

Possible connections to Solar Converter unit	
RS232	Serial communication (Service)
RS485	Available (Standard)
CAN interface	Available (Standard)
Modbus connection	Over RS485 available (optional)

Table 5: Communication Options

The following information contains standard communication interface for TSC040 series Solar Converter. For special requirements CAN interface is also available on the system.
The following communication interfaces are available for Solar Converter units

RS232 Connector

RS232 communication connector of the TSC040 series Solar Converter is a D-type, 9 pins, female connector. RS232 data pins are isolated from Solar Converter circuits.

RS232 hardware	
Baud rate	2400
Connection	3 wire (RX,TX,GND)
Bits	8 bits
Parity	None
Flow	None
Stop bit	1

Table 6: RS232 hardware

RX GND TX
RS232
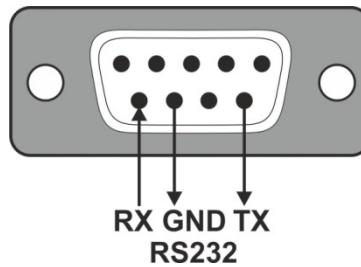
Figure 10: RS232 data pins

Pin nr.	Description
Pin 6	RS232 data receive pin
Pin 7	RS232 Ground pin
Pin 9	RS232 data transmit pin

Table 7: RS232 pin explanations

RS232 Connection To PC

To connect Solar Converter to any PC from RS232 use CC05 cable for connection.

Figure 11: RS232 data connection

Notes
- CC05 cable is not a standard RS232 cable, PC side is standard RS232 pins but the Solar Converter side pin functions are different from a standard RS232 cable.
- Maximum cable length of the RS232 interface is 25 meters.

RS232 security

The UPS serial port is interactive with PC computer so the PC can send any command to Solar Converter, in this case unauthorized users can change parameters and send unwanted commands to Solar Converter. To prevent unauthorized access to Solar Converter from serial port security is provided.

A special command is required by the Solar Converter before accepting the RS232 commands. If this command is not provided to the Solar Converter, the incoming commands from RS232 will be cancelled.

RS-485 Connector

RS-485 allows cable length up to 1200 m, multi-point, half duplex, serial communication bus standard. It also defines three interface points (signal lines); "A", "B" and "C". The data is transmitted on "A" and "B". "C" is a ground reference. This section also defines the logic states 1 (off) and 0 (on), by the polarity between A and B terminals. If A is negative with respect to B, the state is binary 1. The reversed polarity (A +, B −) is binary 0.
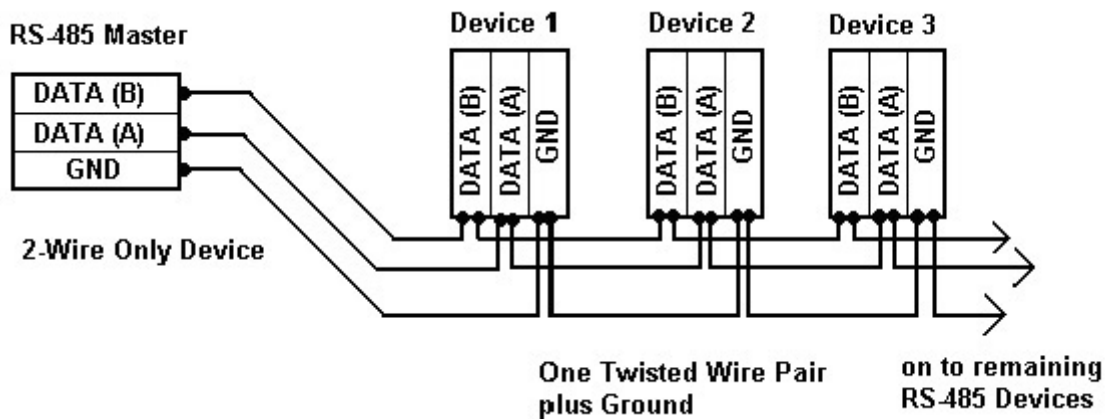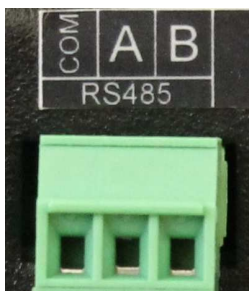

Figure 12: RS485 data connection

Figure 13: RS485

Pin nr.	Description
COM	Ground pin
A	Transceiver pin
B	Transceiver pin

Table 8: RS485 data pins

VI. **MODBUS RTU HOLDING REGISTER MAP**

Addr	Parameter	Descriptions	Type
33	Device Number (Rack No)	**0-99**	ushort
34	Service Login Status	0-> Logout, 10->Service login	ushort
35	Mother Board Connection Status	1->Comm Lost, 2->Comm OK	ushort
36	Positive PV Voltage before input diode	xxx.x Volt (x0,1)	ushort
37	Negative PV Voltage before input diode	xxx.x Volt (x0,1)	ushort
38	Positive PV Current	xxx.x Ampere (x0,1)	ushort
39	Negative PV Current	xxx.x Ampere (x0,1)	ushort
40	Positive PV Power	xxxxx Watt (x0,1)	ushort
41	Negative PV Power	xxxxx Watt (x0,1)	ushort
42	Positive output Voltage	xxx.x Volt (x0,1)	ushort
43	Negative output Voltage	xxx.x Volt (x0,1)	ushort
44	Positive output Current	xxx.x Ampere (x0,1)	ushort
45	Negative output Current	xxx.x Ampere (x0,1)	ushort
46	Total output power	xxxxx Watt	ushort
47	Total input power	xxxxx Watt	ushort
48	Ambient Temperature	xx.x Celcius (x0,1)	ushort
49	Input Air Temprerature	xx.x Celcius (x0,1)	ushort
50	Booster modul Temperature	xx.x Celcius (x0,1)	ushort
51	Buck modul Temperature	xx.x Celcius (x0,1)	ushort
52	Balancer modul Temperature	xx.x Celcius (x0,1)	ushort
53	Fan Speed	%0 - %100	ushort
54	Maximum Total output Power	xx kW	ushort
55	Alarm1 bits	Description is in Manual page: 16	ushort
56	Alarm2 bits	Description is in Manual page: 16	ushort
57	Warning bits	Description is in Manual page: 17	ushort
58	Lcd Warning bits	Description is in Manual page: 17	ushort
59	FaultCode	Description below	ushort
60	StatusCode	Description below	ushort
61	UPS Voltage Reference		ushort
62	UPS Boost voltage Reference		ushort
63	UPS Charge Current Reference		ushort
64	Mother Board Program Version		ushort
65	Panel Program Version		ushort
66	Positive Energy High word	xxxxxxx.x kWh (x0,1)	ushort
67	Positive Energy Low word	xxxxxxx.x kWh (x0,1)	ushort
68	Negative Energy High word	xxxxxxx.x kWh (x0,1)	ushort
69	Negative Energy Low word	xxxxxxx.x kWh (x0,1)	ushort
70	Total Energy High word	xxxxxxx.x kWh (x0,1)	ushort
71	Total Energy Low word	xxxxxxx.x kWh (x0,1)	ushort
72	Total Energy High word after first start-up	xxxxxxx.x kWh (x0,1)	ushort
73	Total Energy Low word after first start-up	xxxxxxx.x kWh (x0,1)	ushort
74	ChasisNumber Digit – 0	Ascii ('A' , etc.)	ushort
75	ChasisNumber Digit – 1	Ascii ('A' , etc.)	ushort
76	ChasisNumber Digit – 2	Ascii ('A' , etc.)	ushort
77	ChasisNumber Digit – 3	Ascii ('A' , etc.)	ushort
78	ChasisNumber Digit – 4	Ascii ('A' , etc.)	ushort
79	ChasisNumber Digit – 5	Ascii ('A' , etc.)	ushort
80	Selected Language	ENG (0) – TR (1)	ushort
81	Modbus ID	0-99	ushort
82	Active Log Count	0-511	ushort
83	Last Log Count	0-511	ushort
84	Fan Maintanence Hour	0-65535 hour (Note: 0 is cancel)	ushort
85	General Maintanence Hour	0-65535 hour (Note: 0 is cancel)	ushort
86	Backlight Intensity	0-10 (10 is most bright level)	ushort
87	Backlight Intensity Dimmer Value	After 1-11 sn, backlight level is 4	ushort
88	Buzzer Status	PASSIVE (0) – OFF (1) – ON (2)	ushort
89	Button Click Sound Status	OFF (0) – ON (1)	ushort

90	Modbus ID	0-99	ushort
91	Modbus BaudRate	115200 (0) – 19200 (1) – 9600 (2) – 2400 (3)	ushort
92	RS232 Baud Rate	115200 (0) – 19200 (1) – 9600 (2) – 2400 (3)	ushort
93	Menu Navigate	Which menu on screen now	ushort
94			ushort
95	Total Hour from First Start-up	xxxxx hour	ushort
96			ushort
97			ushort
98			ushort
99			ushort

FAULT CODE DESCRIPTIONS		
1001	L1 HIGH SIDE LEM ERROR	
1002	L2 HIGH SIDE LEM ERROR	
1003	L3 HIGH SIDE LEM ERROR	
1004	L1 LOW SIDE LEM ERROR	
1005	L2 LOW SIDE LEM ERROR	
1006	L3 LOW SIDE LEM ERROR	
1007	OUTPUT HIGH SIDE LEM ERROR	
1008	OUTPUT LOW SIDE LEM ERROR	
1009	BALANCER LEM ERROR	
1010	EEPROM MEMORY ERROR	
1011	EEPROM MEMORY CRC ERROR	
1012	IGBT SATURATION FAIL ERROR	Alarm of IGBT Saturation occurs 4 times in 10 min.
1013	TEMPERATURE FAIL ERROR	Tolerance of Temperature occurs 4 times in 30 min.
1014	OUTPUT POSITIVE ERROR	
1015	OUTPUT NEGATIVE ERROR	

STATUS CODE DESCRIPTIONS		
1401	ISOLATED SUPPLY 1 ERROR	
1402	ISOLATED SUPPLY 2 ERROR	
1403	BOOSTER DC POSITIVE BUS HIGH ERROR	
1404	BOOSTER DC NEGATIVE BUS HIGH ERROR	
1405	BOOSTER DC POSITIVE BUS LOW ERROR	
1406	BOOSTER DC NEG BUS LOW ERROR	
1407	BUCK DC POS BUS LOW ERROR	
1408	BUCK DC NEG BUS LOW ERROR	
1409	SOLAR TEMP HIGH ERROR	
1410	BOOSTER IGBT SAT ERROR	
1411	BUCK IGBT SAT ERROR	
1412	BUCKBOOST IGBT SAT ERROR	
1413	EMERGENCYSTOP ERROR	
1414	LOCKKEYOPEN ERROR	
1415	CAN UPS ERROR	
1416	UPS STOP ERROR	
1417	UPS BATT TEST ERROR	
1419	CAN BMS ERROR ERROR	
1422	INPUT FUSE POS ERROR	
1423	INPUT FUSE NEG ERROR	
1424	PV DC POS BUS HIGH ERROR	
1425	PV DC NEG BUS HIGH ERROR	
1426	PV DC POS BUS LOW ERROR	
1427	PV DC NEG BUS LOW ERROR	

AGKK12690   01/2018