




## Modbus Registers Map- Conext CL 60E & CL 60A

Three Phase PV Inverter 60 kW - 66 kVA (E) / 63.4 kVA (A)  
(Applicable to Both NA and IEC Model)


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## Revision Approvals

Rev	Date	Approvals					
		Author	TC	Product Mgr	Program Mgr	Compliance Eng	Customer (if required)
1.0	2016-Aug-15	Eddie Leung	Prasad Rao	Catherine Chen	Fari Ordubadi	Ajith Kumar	
2.0	2016-Nov-03	Sateesh Suswaram	Prasad Rao	Catherine Chen	Fari Ordubadi	Ajith Kumar	
3.0	2017-Apr-12	Umesha M	Prasad Rao	Catherine Chen	Fari Ordubadi	Ajith Kumar	

## Revision History

Rev	Date	Description of Changes	Author
1.0	2016-Oct-31	1. Initial release	Eddie Leung
2.0	2016-Nov-03	2. Update the document as per review comments	Sateesh
2.1	2016 - Nov	Updated with comments for review	Firmware Team
2.2	2016-Nov-22	Reviewed, added few registers and updated comments	Sateesh
2.3	2017-Jan-10	Added trouble shooting section / fault code	Sateesh
2.4	2017-Feb-21	Revised the Fault description in Fault list and Appendix	Keyur
2.5	2017-Mar-15	Updated the document with <ul style="list-style-type: none"> <li>Exception codes table.</li> <li>Provided example values for few of the registers</li> <li>Corrected slave address range list</li> <li>Adjusted Font sizes, Corrected spellings and removed troubleshooting section.</li> </ul>	Umesha
3.0	2017-Apr-12	<ul style="list-style-type: none"> <li>Updated the values for register: 0x1387 (Device Model Code): 0x1061(CL60A) &amp; 0x1062(CL60E)</li> <li>Configuration Variables: Function code 0x03, 0x06 &amp; 0x10</li> <li>Updated data range for few variables.</li> <li>Added Modbus Address register 0x9C84 in SS registers</li> <li>Added document number</li> </ul>	Sateesh

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## 1. Introduction

### 1.1 Scope

This document defines the Modbus registers map required for Conext CL60E and Conext CL 60A Three-Phase PV Inverters 60kW – 66kVA(E) / 63.4kVA(A).

### 1.2 Related Documents

Document Reference	Document Title	Document Number	Version
•	Modbus Read Device Identification extension (FC 43/14)	RFC TR_026	0.8
•	Modbus Application Protocol Specification	From www.modbus.org	1.1b
•	SunSpec Alliance Interoperability Specification Common Elements	www.sunspec.org	1.5
•	SunSpec Alliance Interoperability Specification Inverter Models	www.sunspec.org	1.1

## 2. Modbus Implementation

### 2.1 Port Settings

<b>Slave Address</b>	1-246, (Default address is 01)
<b>Baud Rate</b>	9600(default), 19200
<b>Check (Parity) Bit</b>	Even, Odd, None (default)
<b>Data Bits</b>	8
<b>Stop Bits</b>	1 (default), 2
<b>Interface</b>	RS485 two wire cable connection

### 2.2 Modes of connection


#### 2.2.1 RTU Mode

The Conext CL60 inverter supports RTU mode of Modbus communication with above port settings.

#### 2.2.2 Modbus/TCP-IP

The Conext CL60 inverter supports Modbus/TCP-IP mode. The Modbus/TCP-IP does not require any baud rate settings as well other parameters like RTU mode. However, this requires parameters like IP address, Modbus Port number and Sub net to communicate with other external Tools/software.

Parameter	Values
IP	192.168.1.100
Sub net	255.255.0.0
Port number	502

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### 2.3 Supported Modbus Function Codes

Function Code	Description
0x03h	Read Holding Registers
0x04h	Read-only Register
0x06h	Write Single Holding Register
0x10h	Write Multiple Holding Registers

Support broadcast address 0

### 2.4 Supported Modbus Exception Codes

Exception Code	Description
0x01	Illegal Command function code
0x02	Illegal register address
0x03	Illegal register count
0x04	Illegal data value
0x05	Unknown error

### 2.5 Broadcast

Broadcast request packets from the master are supported. Broadcasts are only valid with Function 16(10h) and Function 06 (06h) and are triggered by setting the slave address to zero (0). All slaves will receive and execute the request, but will not respond.

Note: Broadcast is only valid for Modbus RTU mode.

#### Notes:


1. U16: 16-bit unsigned integer, big-endian;
2. U32: 32-bit unsigned integer; little-endian for double-word data.
3. Big-endian for byte data;
4. S16: 16-bit signed integer, big-endian;
5. S32: 32-bit signed integer; little-endian for double-word data. Big-endian for byte data
6. Power factor: (+) is leading, (-) is lagging,

## 3. Registers

### 3.1 Inverter Models supported

Modbus registers defined in this table are common among Conext CL 60E and Conext CL 60A products.


Conext CL 60E European(E)	Conext CL 60A Americas(A)
PVSCL60E	PVSCL60A

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### 3.2 Operation Variables

Operation variables are read only using Modbus function code 0x04h.

Modbus Register s (Hex)	Register Description	Data type	Data ranges	Units	Notes
0x0A15	LCD Firmware Version	STR*30	(0-30) Characters	UTF-8- (Ex: LCD_CL-60A_V11_V03_Q_M)	UTF-8 Character Encoding
0x0A24	DSP Firmware Version	STR*30	(0-30) Characters	UTF-8 (Ex: MDSP_CL-60A_V11_V1_B)	UTF-8 Character Encoding
0x1355	Protocol Number	U32		Number	Decimal Value
0x1357	Protocol Version	U32		Number	Decimal value
0x137D	Serial Number	STR*20		UTF-8 (Ex: A1608180127)	UTF-8 Character Encoding
0x1387	Device Model Code	U16	0x1061 (CL60 A) 0x1062 (CL60 E)		
0x1388	Nominal Output Power	U16		0.1kW	
0x1389	Output Power Wiring Type	U16	(1-2)	1: 3Phase/4Wire 2: 3Phase/3Wire	Refer the section 3.5
0x138A	Energy Produced Today	U16		kWh/10	Accumulated energy produced today
0x138B	Energy Produced Life time	U32		kWh	Life time energy produced since commissioning
0x138D	Total Operation Hour Life time	U32		Hr	Hour
0x138F	Internal Temperature	S16	-400 to 1000	°C/10	Internal Ambient Temperature
0x1392	DC Voltage 1	U16	0 to 11000	V/10	
0x1393	DC Current 1	U16	0 to 1600	A/10	
0x1395	DC Current 2	U16		NA	Not Applicable
0x1398	Total DC power	U32	0 to 80000	W	DC Input power
0x139A	A-B Line Voltage/Phase A Voltage	U16	0 to 3800	V/10	Refer the section 3.5 Output wiring type
0x139B	B-C Line Voltage/Phase B Voltage	U16		V/10	
0x139C	C-A Line Voltage/Phase C Voltage	U16		V/10	
0x139D	Phase A Current	U16	0 to 1600	A/10	
0x139E	Phase B Current	U16		A/10	
0x139F	Phase C Current	U16		A/10	
0x13A4	Total Apparent Power	U32		VA	
0x13A6	Total Active Power	U32	0 to 66000	W	
0x13A8	Reactive power	S32		VAR	
0x13AA	Power Factor	S16		1/1000	+ is leading; - is lagging.
0x13AB	Grid frequency	U16	450 to 650	Hz/10	
0x13AD	Operation state	U16	0x0000 (Run) 0x8000 (Stop) 0x1300 (Key Stop) 0x1500 (Emergency Stop) 0x1400 (Standby) 0x1200 (Initial Standby) 0x1600 (Starting) 0x9100 (Alarm) 0x8100 (Derating) 0x8200 (Dispatch) 0x5500 (Fault) 0x2500 (Communication Failure)		
0x13AE	Fault/Alarm time: Year	U16	Refer the Section 3.6 for more details on the Fault/Alarm Codes		
0x13AF	Fault/Alarm time: Month	U16			
0x13B0	Fault/Alarm time: Day	U16			

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0x13B1	Fault/Alarm time: Hour	U16	Note: Fault/Alarm time and Fault/Alarm code (0x13AE – 0x13B3) are valid only when The operation state register (0x13AD) value is 0x5500 (fault). The operation state register (0x13AD) value is 0x9100 (Alarm).		
0x13B2	Fault/Alarm time: Minute	U16			
0x13B3	Fault/Alarm time: Second	U16			
0x13B4	Fault/Alarm code 1	U16			
0x13B8	Nominal Reactive Output Power	U16		kVAR/10	
0x13CE	Impedance to Ground in Parallel Connection	U16	1 to 20000, 0xFFFF (invalid)	1kΩ	
0x13D8	Operation State Bit Map	BIT32	Refer the Section 3.7 for bit mappings of operation state		
0x13F8	Daily Operation Time	U16		Minutes	Minutes
0x13F9	Present country	U16	Refer the Section 3.8 for all the values associated with country		
0x1407	Monthly Energy	U32		kWh/10	
0x1419	Negative Voltage to Ground	S16	-10000 to 10000	V/10	
0x141A	Bus voltage	U16	0 to 15000	V/10	
0x1B64	Current: String 1	U16		A/100	Note: CL 60A offers 8 String inputs (0x1B64 to 0x1B6B).  CL 60E offers 14 string inputs (0x1B64 to 0x1B71).
0x1B65	Current: String 2	U16		A/100	
0x1B66	Current: String 3	U16		A/100	
0x1B67	Current: String 4	U16		A/100	
0x1B68	Current: String 5	U16		A/100	
0x1B69	Current: String 6	U16		A/100	
0x1B6A	Current: String 7	U16		A/100	
0x1B6B	Current: String 8	U16		A/100	
0x1B6C	Current: String 9	U16		A/100	
0x1B6D	Current: String 10	U16		A/100	
0x1B6E	Current: String 11	U16		A/100	
0x1B6F	Current: String 12	U16		A/100	
0x1B70	Current: String 13	U16		A/100	
0x1B71	Current: String 14	U16		A/100	

### 3.3 Configuration Parameters


Read configuration parameters by Modbus function code 0x3h.

Write configuration parameters by Modbus function codes 0x6h or 0x10h

Modbus Registers (Hex)	Name	Data type	Data range	Unit	Notes
0x1387	System clock: Year	U16		(Ex: 2017)	Receive time synchronization settings of the monitoring system
0x1388	System clock: Month	U16		(Ex: 03)	
0x1389	System clock: Day	U16		(Ex:15)	
0x138A	System clock: Hour	U16		(Ex:10)	
0x138B	System clock: Minute	U16		(Ex:50)	
0x138C	System clock: Second	U16		(Ex:59)	
0x138D	Start/Stop	U16	0xCF (Start) 0xCE (Stop) 0xBB (Emergency stop)		
<b>Active Power Control</b>					
0x138E	Power limitation switch	U16	0xAA (Enable) 0x55 (Disable)		
0x138F	Power limitation setting	U16	0 to 1100	1/10 Percentage	Available when the power limitation switch (0x138E) is enabled
<b>Reactive Power control: Constant PF</b>					
0x139A	Power factor setting	S16	-1000 to -800 800 to 1000	1/1000	Availability depends on Reactive power adjustment switch (0x13AB)

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0x13AB	Reactive power adjustment switch		<b>0x55:</b> Reactive power is OFF and power factor returns to 1, Reactive power percentage returns to 0; <b>0xA1:</b> Reactive Power factor setting is valid, Reactive power percentage returns to 0; <b>0xA2:</b> Reactive power percentage setting valid, power factor returns to 1; <b>0xA3:</b> Enable Q(P) curve configuration; <b>0xA4:</b> Enable Q(U) curve configuration		
<b>Reactive Power control: Constant KVAR</b>					
0x13AC	Reactive power percentage setting	S16	0 to 1000 0 to -1000	1/10 Percentage	Availability depends on Reactive power adjustment switch (0x13AB)
0x13AE	Power limitation adjustment	U16	CL 60E (0 to 660) CL 60A (0 to 634)	kW /10	
0x13AF	Reactive power adjustment	S16	CL 60E (0 to 300,0 to -300) CL 60A (0 to 300,0 to -300)	kVAR/10	
<b>Reactive Power control: Q(P)</b>					
Note: 0x13BA – 0x13CD are available when the reactive power adjustment option (0x13AB) is set to Enable Q(P) curve (0xA3). Applicable to all countries except Italy					
0x13BA	Lower Power	U16	0 to 500; default: 500	1/10 Percentage	Lower Power < Upper Power
0x13BB	Upper Power	U16	500 to 1000; default: 1000	1/10 Percentage	
0x13BC	Upper limit-PF (Cap)	U16	900 to 1000; default: 1000	1/1000	
0x13BD	Lower limit-PF (Ind)	U16	900 to 1000; default: 900	1/1000	
<b>Reactive power: Italy only</b>					
0x13C8	PowerA (Italy)	U16	200 to 1000; default: 200	1/10 Percentage	PowerA <= PowerB < PowerC
0x13C9	PowerB (Italy)	U16	200 to 1000; default: 500	1/10 Percentage	
0x13CA	PowerC (Italy)	U16	200 to 1000; default: 1000	1/10 Percentage	
0x13CB	PF_max (Italy)	U16	900 to 1000; default: 900	1/1000 Percentage	
0x13CC	Uin (Italy)	U16	1000 to 1100; default: 1050	1/10 Percentage	Uin > Uout
0x13CD	Uout (Italy)	U16	900 to 1000; default: 1000	1/10 Percentage	
<b>Reactive Power control: Q(U)</b>					
Note: 0x13D9 – 0x13F0 are available when the reactive power adjustment option (0x13AB) is set to Enable Q(U) curve (0xA4). Applicable to all countries except Italy					
0x13D8	Lower U Limit	U16	800 to 1000; default: 800	1/10 Percentage	
0x13D9	Upper U Limit	U16	1000 to 1200; default: 1150	1/10 Percentage	
0x13DA	U1 Limit	U16	900 to 1100; default: 800	1/10 Percentage	U1 Limit + Hysteresis < U2 Limit-Hysteresis
0x13DB	U2 Limit	U16	1000 to 1100; default: 1050	1/10 Percentage	
0x13DC	Hysteresis	U16	0 to 50; default: 0	1/10 Percentage	
0x13DD	Lower Q/Sn	U16	(Ind) 0 to 500; default: 250	1/10 Percentage	
0x13DE	Upper Q/Sn	U16	(Cap) 0 to 500; default: 250	1/10 Percentage	
<b>Reactive power: Italy only</b>					
0x13E9	V1i (Italy)	U16	900 to 1100; default: 920	1/10 Percentage	
0x13EA	V2i (Italy)	U16	900 to 1100; default: 900	1/10 Percentage	V2i < V1i < V1s < V2s

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0x13EB	V1s(Italy)	U16	900 to1100; default: 1080	1/10 Percentage	
0x13EC	V2s(Italy)	U16	900 to 1100; default: 1100	1/10 Percentage	
0x13ED	Qmax(Italy)	U16	500 to 1000; default: 900	1/1000 Percentage	
0x13EE	Pin(Italy)	U16	200 to1000; default: 200	1/10 Percentage	Pin > Pout
0x13EF	Pout(Italy)	U16	10 to 200; default: 90	1/10 Percentage	
0x13F0	Curve selection (Italy)	U16	Curve selection: 0 or 1		0: Curve A 1: Curve B

### 3.4 SunSpec Registers

All SunSpec registers are read only.

Modbus Registers (Hex)	Name	Data type	Data range	Unit	Notes
<b>Common Block (Common Elements)</b>					
0x9C40	C_SunSpec_ID	U32	0x53756E53		Value as per SunSpec Specification
0x9C42	C_SunSpec_DID	U16	1		SunSpec common model
0x9C43	C_SunSpec_Length	U16	66		
0x9C44	C_Manufacturer	STR*32	"Schneider Electric"		Manufacturer Name
0x9C54	C_Model	STR*32	"PVSCL60E or PVSCL60A"		Inverter Models Supported
0x9C64	C_Options	STR*16	"CL60A" or "CL60E"		Models Short Name
0x9C6C	C_Version	STR*16	LCD_VXX_VXX_X_X (Ex: LCD_V11_V03_R_M)		LCD Firmware version
0x9C74	C_SerialNumber	STR*32	(Ex: A1612160390)		Inverter Serial Number
0x9C84	C_DeviceAddress	U16	Ex: 01		Inverter Modbus Address
<b>Device Specific Block (Inverter Models)</b>					
0x9C86	C_SunSpec_DID	U16	103		Value for 3-Phase inverter as per SunSpec
0x9C87	C_SunSpec_Length	U16	50		
0x9C88	I_AC_Current	U16		0.1A	
0x9C89	I_AC_CurrentA	U16		0.1A	
0x9C8A	I_AC_CurrentB	U16		0.1A	
0x9C8B	I_AC_CurrentC	U16		0.1A	
0x9C8C	I_AC_Current_SF	S16	-1		Scaling factor equivalent to divide by 10
0x9C8D	I_AC_VoltageAB	U16		0.1V	Applicable to PVSCL60A (Refer register 0x1389 Operational register where value 2 represent 3P/3W)
0x9C8E	I_AC_VoltageBC	U16		0.1V	
0x9C8F	I_AC_VoltageCA	U16		0.1V	
0x9C90	I_AC_VoltageAN	U16		0.1V	Applicable to PVSCL60E (Refer register 0x1389 Operational register where value 1 represent 3P/4W)
0x9C91	I_AC_VoltageBN	U16		0.1V	
0x9C92	I_AC_VoltageCN	U16		0.1V	
0x9C93	I_AC_Voltage_SF	S16	-1		Scaling factor equivalent to divide by 10
0x9C94	I_AC_Power	S16		100W	Active Power
0x9C95	I_AC_Power_SF	S16	2		Scaling Factor equivalent to multiply by 100
0x9C96	I_AC_Frequency	U16		0.01Hz	Power frequency
0x9C97	I_AC_Frequency_SF	S16	-2		Scaling Factor equivalent to divide by 100
0x9C98	I_AC_VA	S16		100VA	Apparent power
0x9C99	I_AC_VA_SF	S16	1		Scaling factory equivalent to Multiply by 10
0x9C9A	I_AC_VAR	S16		100VAR	Reactive Power
0x9C9B	I_AC_VAR_SF	S16	1		Scaling Factor equivalent to multiply by 10
0x9C9C	I_AC_PF	S16		0.0001%	
0x9C9D	I_AC_PF_SF	S16	-3		Scaling Factor equivalent to divide by 1000
0x9C9E	I_AC_Energy_WH	U32		WH	Life time Accumulated energy (Watt Hours).
0x9CA0	I_AC_Energy_WH_SF	S16	2		Scaling factor equivalent to Multiply by 100
0x9CA5	I_DC_Power	S16		100W	Sint16
0x9CA6	I_DC_Power_SF	S16	2		Scaling factor equivalent to Multiply by 100

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0x9CA7	I_Temp_Cab	S16		0.1°C	Internal Temperature
0x9CAA	I_Temp_Other	S16		0.1°C	Other temperature
0x9CAB	I_Temp_SF	S16	-1		Scaling factor equivalent to Divide by 10
0x9CAC	I_Status	U16	<b>Operating status</b> 1: (Off) 2: (Wait for PV voltage) 3: (Starting) 4: (MPP) 5: (Regulated) 6: (Shutting down) 7: (Error) 8: (Waiting for electric utility company)		
0x9CAD	I_Status_Vendor	U16	<b>Vendor operating state</b> 1 (Running) 2 (Stop) 3 (Waiting to start) 4 (Push button to shutdown)		
0x9CAE	I_Event_1	BIT32	<b>Event States</b> Bit0: (Grounding/isolation fault) Bit1: (DC voltage high) Bit2: (AC Disconnect Open) Bit3: (DC Disconnect Open) Bit4: (Offline) Bit5: (Enclosure opened) Bit6: (Manual shutdown) Bit7: (Temperature high) Bit8: (Frequency high) Bit9: (Frequency low) Bit10: (AC voltage high) Bit11: (AC voltage low) Bit12: (Fuse opened) Bit13: (Temperature low) Bit14: (Data storage or communication failure) Bit15: (Hardware self-check error)		

### 3.5 Output Power Wiring Type

Values at register 0x1389 defines the validity and usage of registers 0x139A - 0x139F


0x1389 Values	Wiring	0x139A	0x139B	0x139C	0x139D	0x139E	0x139F
1	3P/4W	Phase A Voltage	Phase B Voltage	Phase C Voltage	Phase A Current	Phase B Current	Phase C Current
2	3P/3W	A-B Line Voltage	B-C Line Voltage	C-A Line Voltage	Phase A Current	Phase B Current	Phase C Current

### 3.6 Fault Codes


Note: For more details on the Fault codes please refer the troubleshooting section the installation manual (975-0768-01-01)

Short description of Fault / Warning:


Fault Code	Fault Name	Description
2	Grid Voltage High	Grid voltage is higher than the set protection value.
3	Transient Voltage High	Grid instantaneously voltage is too high.
4	Grid Voltage Low	Grid voltage is lower than the set protection value
5	Transient Voltage Low	Grid instantaneously voltage is too low.
6	Hardware Fault	Contact Schneider Electric
7	Transient AC Over current	Contact Schneider Electric
8	Grid Frequency High	Grid frequency exceeds inverter upper set limit.
9	Grid Frequency Low	Grid frequency is below the inverter set limit.

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10	Islanding	The main distribution system is disconnected due to power outage. The PV grid and the local load together form an isolated grid.
11	DC Current High	The DC proportion of AC current exceeds the allowable range of the inverter. The power quality of the grid is poor
12	leakage current fault	Rainy days or bad grounding
13	Abnormal grid power	Grid parameters exceed the allowable ranges
14	Grid AC Voltage Out of Range	Grid voltage is outside the allowable range.
15	Grid AC Voltage Out of Range	Grid voltage is outside the allowable range.
16	Power module Overload	Contact Schneider Electric
17	Unbalanced AC Voltage	The grid three-phase voltage is not balanced.
19	DC Bus Voltage High	This fault is caused by a high DC bus voltage due to transients
20	DC Bus Voltage High	Same as above
21	PVx input over current detected	Contact Schneider Electric
23	PV string input Configuration Changed	Check the string input configuration and restart the inverter
24	DC Bus bar voltage Imbalance	Midpoint offset is detected between the positive and negative bus voltage. Wait for recovery. If this fault persists, Contact Schneider Electric
25	The instantaneous unbalance of the voltage midpoint is detected	Same as above
26	Bus voltage fluctuation	Bus voltage fluctuation is too large. If this fault persists, Contact Schneider Electric
36	Module Temperature High	This fault is caused by the inverter detecting the internal temperature of the inverter or the module temperature being too high. Check trouble shooting in Appendix.
37	Ambient Temperature High	Same as above
38	Relay Failure	Contact Schneider Electric
39	Insulation impedance fault (ISO-flt)	Inverter panel has low insulation resistance. Check trouble shooting in Appendix.
40	Over current protection	There may be over-voltage DC module, over-current, AC module over-current. Contact Schneider Electric
41	Hardware Fault	The hardware circuit reference value automatically changes. Contact Schneider Electric
42	Current unbalance fault	The inverter detects the unbalanced three-phase grid current. Check troubleshooting in Appendix
43	Ambient temperature Low	The ambient temperature is lower than -25°C .
44	AC-DC inverter fault.	Inverter hardware circuit failure
47	Incorrect PV input configuration	The PV input configuration mode settings are incorrect for the actual connection
48	Hardware Fault	Wait for recovery. If fault persists, contact Schneider Electric.
49	Hardware Fault	Same as above
50	Hardware Fault	Same as above
51	Hardware Voltage/Current High	Same as above
70	Fan failure	Fan speed is not within the normal range. Check troubleshooting in Appendix
71	AC SPD Fault	Probable lightning surge in the vicinity of PV plant. Check troubleshooting in Appendix
72	DC SPD Fault	same as above
73	PV String Fuse Blown	Stop the inverter and disconnect all the sources and replace the fuse
74	LCD communication failure	The LCD communication line is damaged or the cable is loose
75	Low irradiance.	1, bad weather, lack of radiation from Sun. 2, the sun is blocked due to huge clouds
76	PV power overload	The PV voltage is too high and causing excessive input power.

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78	PV1 Power Abnormal	PV1 is not connected. Check troubleshooting in Appendix
87	AFD Module abnormal alarm	Contact Schneider Electric.
88	Arc fault	The ARC fault is detected on DC side of the inverter Check troubleshooting in Appendix.
89	AFD disabled alarm	The arc detection function is artificially turned off. Reactivate it through LCD.
532	String 1 reversed polarity	PV positive and negative reversed.
533	String 2 reversed polarity	PV positive and negative reversed.
534	String 3 reversed polarity	PV positive and negative reversed.
535	String 4 reversed polarity	PV positive and negative reversed.
536	String 5 reversed polarity	PV positive and negative reversed.
537	String 6 reversed polarity	PV positive and negative reversed.
538	String 7 reversed polarity	PV positive and negative reversed.
539	String 8 reversed polarity	PV positive and negative reversed.
540	String 9 reversed polarity	PV positive and negative reversed.
541	String 10 reversed polarity	PV positive and negative reversed.
542	String 11 reversed polarity	PV positive and negative reversed.
543	String 12 reversed polarity	PV positive and negative reversed.
544	String 13 reversed polarity	PV positive and negative reversed.
545	String 14 reversed polarity	PV positive and negative reversed.
546	String 15 reversed polarity	PV positive and negative reversed.
547	String 16 reversed polarity	PV positive and negative reversed.
548	String 1 component abnormal	The string has an abnormal phenomenon
549	String2 component abnormal	The string has an abnormal phenomenon
550	String3 component abnormal	The string has an abnormal phenomenon
551	String4 component abnormal	The string has an abnormal phenomenon
552	String5 component abnormal	The string has an abnormal phenomenon
553	String6 component abnormal	The string has an abnormal phenomenon
554	String7 component abnormal	The string has an abnormal phenomenon
555	String8 component abnormal	The string has an abnormal phenomenon
556	String9 component abnormal	The string has an abnormal phenomenon
557	String10 component abnormal	The string has an abnormal phenomenon
558	String11 component abnormal	The string has an abnormal phenomenon
559	String12 component abnormal	The string has an abnormal phenomenon
560	String13 component abnormal	The string has an abnormal phenomenon
561	String14 component abnormal	The string has an abnormal phenomenon
562	String15 component abnormal	The string has an abnormal phenomenon
563	String16 component abnormal	The string has an abnormal phenomenon


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### 3.7 Operation State Bit Map (0x13D8, 0x13D9)

Operation States	Corresponding bit in Address(0x13D8-0x13D9)	Notes
Run	0	Total Run State bit BIT17
Stop	1	1
Key stop	3	3
Emergency Stop	5	5
Standby	4	4
Initial standby	2	2
Starting	6	6
Alarm	10	Total run state bit BIT17
Derating	11	Total run state bit BIT17
Dispatch	12	Total run state bit BIT17
Fault	9	Total fault state bit BIT18
Communication Fault	13	Total fault state bit BIT18
Total run bit (Inverter is operational and connected to grid)	17	
Total fault bit (Inverter is in Fault state and operation is halted)	18	

### 3.8 Country code Information

Code	Country	Country (English)
0	GB	Great Britain
1	DE	Germany
2	FR	France
3	IT	Italy
4	ES	Spain
5	AT	Austria
6	AU	Australia
7	CZ	Czech
8	BE	Belgium
9	DK	Denmark
10	GR_L	Greece
11	GR_IS	Greece Islands
12	NL	Netherlands
13	PT	Portugal
14	CHN	China
15	SE	Sweden
16	Other 50Hz	
17	RO	Romania
18	TH	Thailand
19	TK	Turkey
20	AU-WEST	Australia (west)
21	Reserved	
25	Vorarlberg (Austria)	Vorarlberg (District)
26-59	Reserved	Reserved
60	CA	Canada
61	US	America
62	Other 60Hz	
70	JP 50Hz	
71	JP 60Hz	

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