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We want to thank our customers who use the Touch Operation Panel.

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Select a TOP model and an external device.

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Describes how to set the TOP communication.

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Describes how to set up communication for external devices.

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Describes the cable specifications required for connection.

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Refer to this section to check the addresses which can communicate with an external device.

1. System configuration

The system configuration of TOP and "GREENPOWER – OHS CPS Master" is as follows.

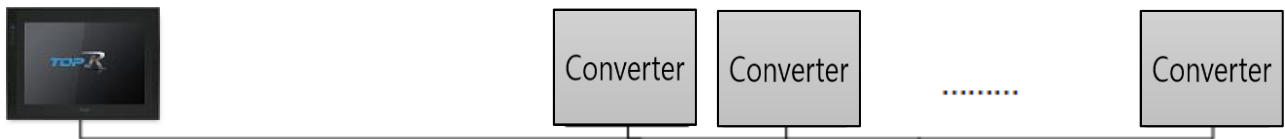
Series	CPU	Communication method	System setting	Cable
GREENPOWER – OHS CPS	Converter	RS-485	3.1 Settings example 1 (Page 4)	4. Cable table Page 10

■ Connection configuration

- 1:1 connection

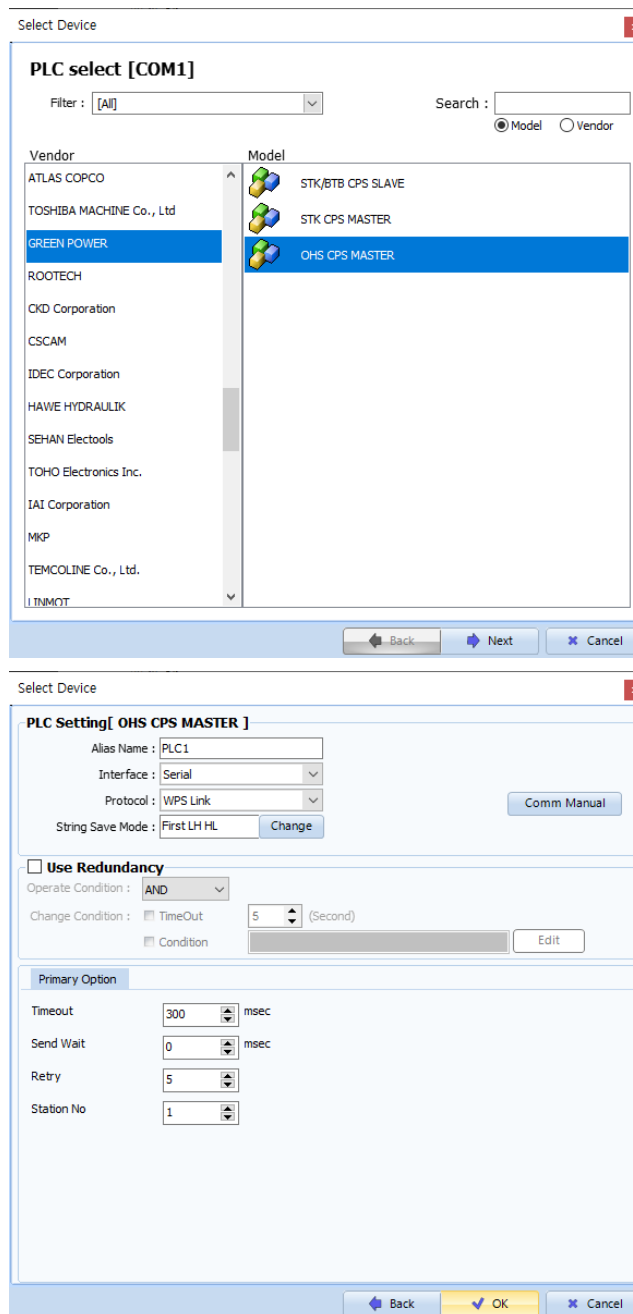


- 1:N connection



2. External device selection

- Select a TOP model and a port, and then select an external device.



Settings		Contents					
TOP	Model	Check the display and process of TOP to select the touch model.					
External device	Vendor	Select the vendor of the external device to be connected to TOP. Select "GREENPOWER".					
	PLC	Select an external device to connect to TOP. <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: black; color: white;">Model</th> <th style="background-color: black; color: white;">Interface</th> <th style="background-color: black; color: white;">Protocol</th> </tr> </thead> <tbody> <tr> <td>OHS CPS MASTER</td> <td>Serial</td> <td>WPS Link</td> </tr> </tbody> </table> <p>Please check the system configuration in Chapter 1 to see if the external device you want to connect is a model whose system can be configured.</p>	Model	Interface	Protocol	OHS CPS MASTER	Serial
Model	Interface	Protocol					
OHS CPS MASTER	Serial	WPS Link					

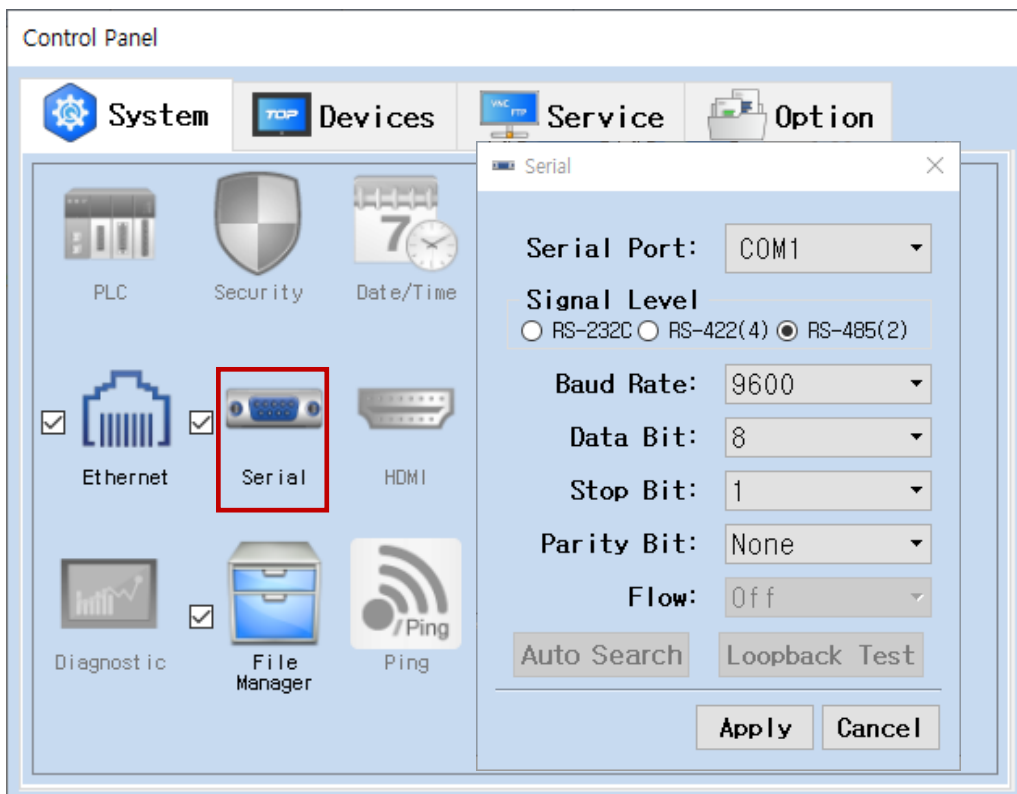
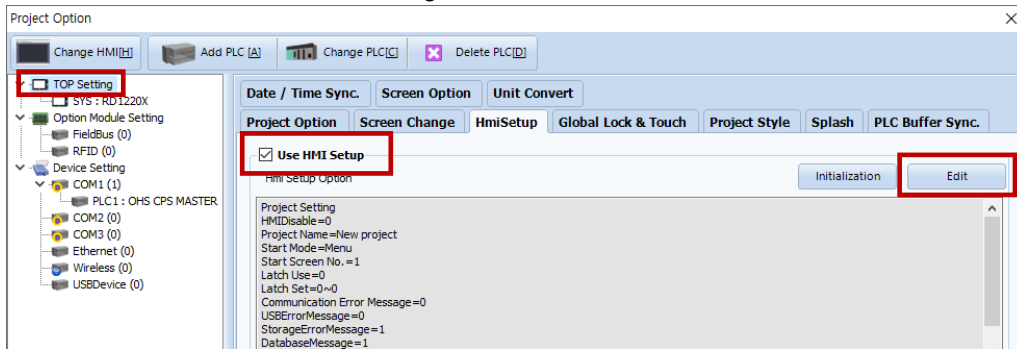
3. TOP communication setting

The communication can be set in TOP Design Studio or TOP main menu. The communication should be set in the same way as that of the external device.

3.1 Communication setting in TOP Design Studio

(1) Communication interface setting

- [Project > Project properties > TOP settings] → [Project option > Check "Use HMI settings" > Edit > Serial]
- Set the TOP communication interface in TOP Design Studio.



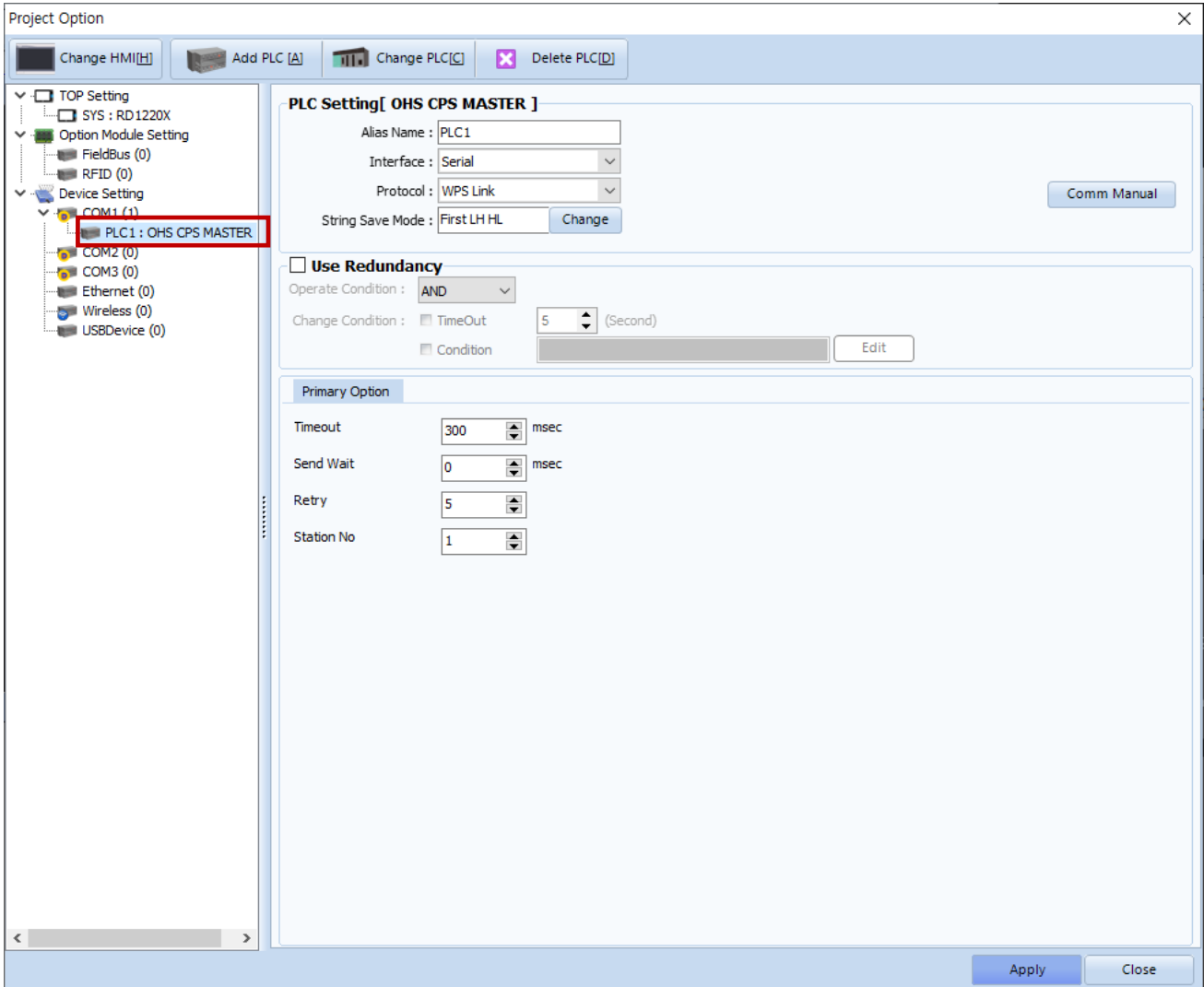
Items	TOP	External device	Remarks
Signal Level (port)	RS-485	RS-485	
Baud Rate		9600	
Data Bit		8	
Stop Bit		1	
Parity Bit		none	

* The above settings are examples recommended by the company.

Items	Description
Signal Level	Select the serial communication method between the TOP and an external device.
Baud Rate	Select the serial communication speed between the TOP and an external device.
Data Bit	Select the serial communication data bit between the TOP and an external device.
Stop Bit	Select the serial communication stop bit between the TOP and an external device.
Parity Bit	Select the serial communication parity bit check method between the TOP and an external device.

(2) Communication option setting

- [Project > Project properties > Device setting > COM > "PLC1 : OHS CPS MASTER"]
 - Set the options of the communication driver of OHS CPS MASTER in TOP Design Studio.

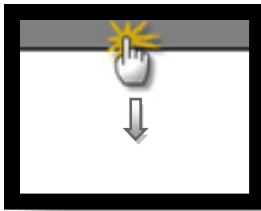


Items	Settings	Remarks
Interface	Select "Serial".	Refer to "2. External device selection".
Protocol	Select "WPS Link".	
TimeOut (ms)	Set the time for the TOP to wait for a response from an external device.	
SendWait (ms)	Set the waiting time between TOP's receiving a response from an external device and sending the next command request.	
Retry	Configure the amount of request attempts from TOP to external device.	
Station No	Prefix	

3.2. Communication setting in TOP

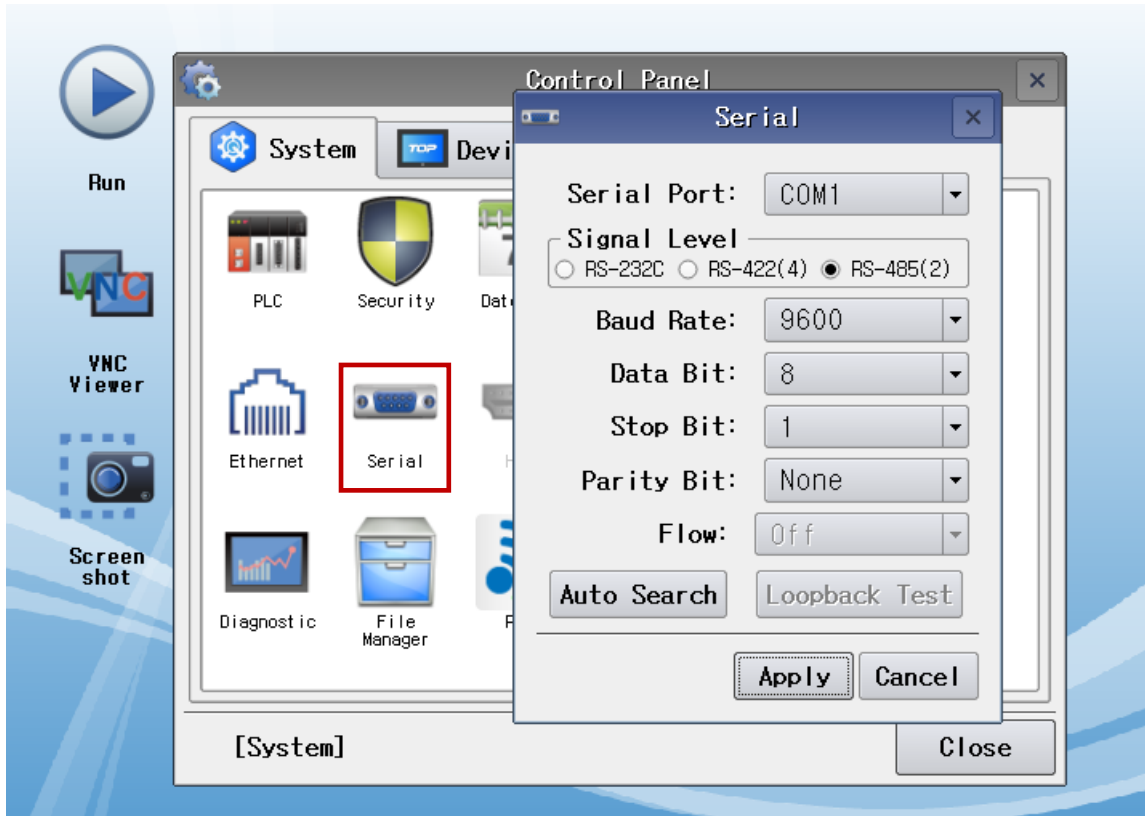
* This is a setting method when "Use HMI Setup" in the setting items in "3.1 TOP Design Studio" is not checked.

- Touch the top of the TOP screen and drag it down. Touch "EXIT" in the pop-up window to go to the main screen.



(1) Communication interface setting

- [Main screen > Control panel > Serial]



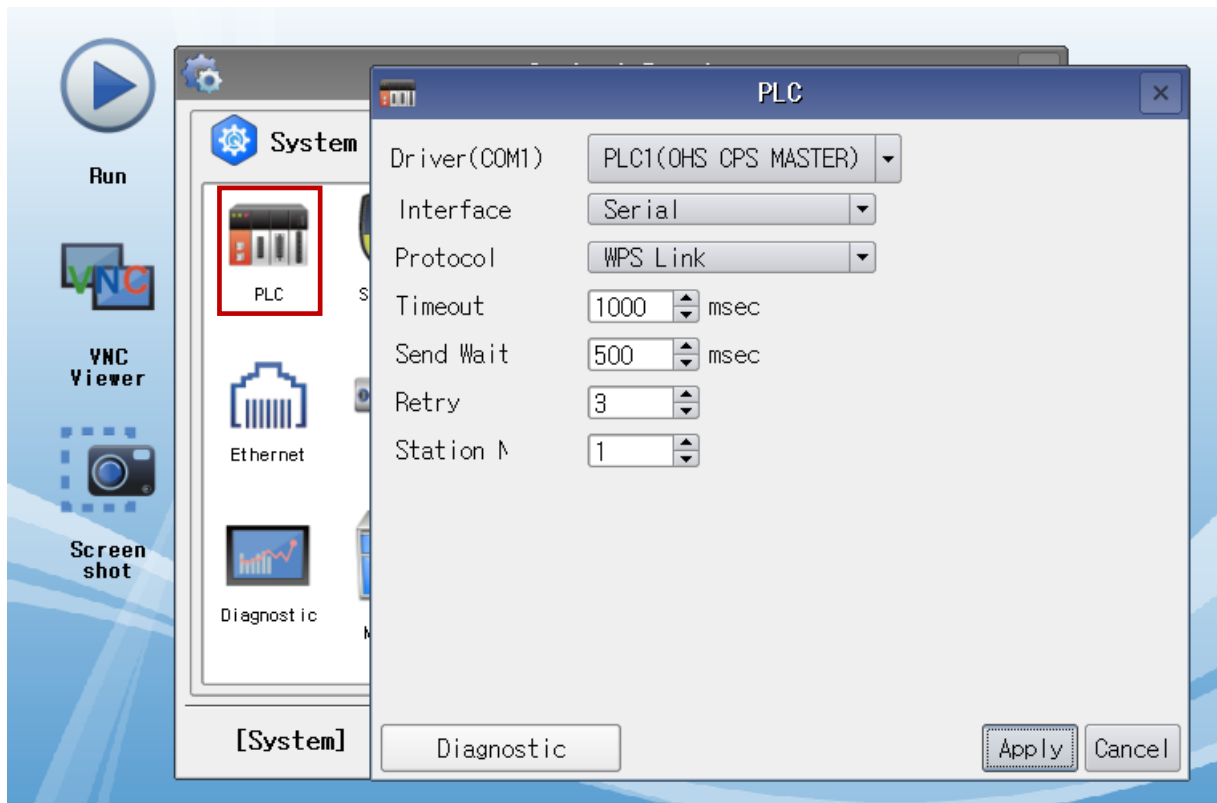
Items	TOP	External device	Remarks
Signal Level (port)	RS-485	RS-485	
Baud Rate		9600	
Data Bit		8	
Stop Bit		1	
Parity Bit		none	

* The above settings are setting examples recommended by the company.

Items	Description
Signal Level	Select the serial communication method between the TOP and an external device.
Baud Rate	Select the serial communication speed between the TOP and an external device.
Data Bit	Select the serial communication data bit between the TOP and an external device.
Stop Bit	Select the serial communication stop bit between the TOP and an external device.
Parity Bit	Select the serial communication parity bit check method between the TOP and an external device.

(2) Communication option setting

■ [Main screen > Control panel > PLC]



Items	Settings	Remarks
Interface	Select "Serial".	Refer to "2. External device selection".
Protocol	Select "WPS Link".	
TimeOut (ms)	Set the time for the TOP to wait for a response from an external device.	
SendWait (ms)	Set the waiting time between TOP's receiving a response from an external device and sending the next command request.	
Retry	Configure the amount of request attempts from TOP to external device.	
Station No	Prefix	

3.3 Communication diagnostics

- Check the interface setting status between the TOP and an external device.
 - Touch the top of the TOP screen and drag it down. Touch "EXIT" in the pop-up window to go to the main screen.
 - Check if the COM port settings you want to use in [Control Panel > Serial] are the same as those of the external device.

- Diagnosis of whether the port communication is normal or not
 - Touch "Communication diagnostics" in [Control Panel > PLC].
 - The Diagnostics dialog box pops up on the screen and determines the diagnostic status.

OK	Communication setting normal
Time Out Error	Communication setting abnormal - Check the cable, TOP, and external device setting status. (Reference: Communication diagnostics sheet)

- Communication diagnostics sheet
 - If there is a problem with the communication connection with an external terminal, please check the settings in the sheet below.

Items	Contents	Check		Remarks	
System configuration	How to connect the system	OK	NG	1. System configuration	
	Connection cable name	OK	NG		
TOP	Version information	OK	NG	2. External device selection 3. Communication setting	
	Port in use	OK	NG		
	Driver name	OK	NG		
	Other detailed settings	OK	NG		
	Relative prefix	Project setting	OK		NG
		Communication diagnostics	OK		NG
	Serial Parameter	Transmission Speed	OK		NG
		Data Bit	OK		NG
Stop Bit		OK	NG		
Parity Bit		OK	NG		
External device	CPU name	OK	NG	6. Supported addresses (For details, please refer to the PLC vendor's manual.)	
	Communication port name (module name)	OK	NG		
	Protocol (mode)	OK	NG		
	Setup Prefix	OK	NG		
	Other detailed settings	OK	NG		
	Serial Parameter	Transmission Speed	OK		NG
		Data Bit	OK		NG
		Stop Bit	OK		NG
Parity Bit		OK	NG		
Check address range	OK	NG			

4. External device setting

Refer to the vendor's user manual to identically configure the communication settings of the external device to that of the TOP.



6. Supported addresses

The devices available in TOP are as follows:

The device range (address) may differ depending on the CPU module series/type. The TOP series supports the maximum address range used by the external device series. Please refer to each CPU module user manual and be take caution to not deviate from the address range supported by the device you want to use.

Device	Type / size	Data range	Description
ID	DEC 16bit	0~99	Unit classification
STATUS	DEC 16bit	0~4	Unit status information 0 : STOP 1 : RUN 2 : Fault 3 : Warning 4 : FailOver
VOLTAGE1	DEC 16bit	0~9999	Rectification voltage
VOLTAGE2	DEC 16bit	0~9999	Boost voltage
CURRENT1	DEC 16bit	0~9999	Boost current 1
CURRENT2	DEC 16bit	0~9999	IGBT current
CURRENT3	DEC 16bit	0~9999	Track current
FREQUENCY1	DEC 16bit	0~9999	Output frequency
TEMP1	DEC 16bit	0~9999	Converter heat sink temperature
TEMP2	DEC 16bit	0~9999	Converter internal temperature
ERROR_CODE	DEC 16bit	0~9999	Converter Error Code
VOLTAGE_RS	DEC 16bit	0~9999	Input voltage RS
VOLTAGE_ST	DEC 16bit	0~9999	Input voltage ST
VOLTAGE_TR	DEC 16bit	0~9999	Input voltage TR
CURRENT_R	DEC 16bit	0~9999	Input current R
CURRENT_S	DEC 16bit	0~9999	Input current S
CURRENT_T	DEC 16bit	0~9999	Input current T
FREQUENCY2	DEC 16bit	0~9999	Input frequency
POWER_FACTOR	FLOAT 32bit	-9.99~+9.99	3-phase power factor
TOTAL_KW	DEC 16bit	0~9999	Instantaneous Power
KVAR	DEC 16bit	-999~+999	Instantaneous Reactive Power
KWH	DEC 32bit	0~999,999,999	Accumulated power energy

Converter Error list

Error_Code	Error Name	Description	Converter LCD
1	HeatSink_OverHeat_60	Heat sink overheats to 60 °C (Bimetal)	HeatSink Warning
2	Panel_OverTemp	Converter panel internal overheating	Panel O.T warning
3	IGBT_OverHeat_Warning	IGBT overheats to 60 °C	IGBT O.T Warning
4	Main_Fan_Warning	Main fan malfunction	Reserved
5	Reserved	Reserved	Reserved
6	Reserved	Reserved	Reserved
7	Reserved	Reserved	Reserved
8	Reserved	Reserved	Reserved
9	Fail-Over	Fail-over operating switching	Fail-Over
10	Reserved	Reserved	Reserved
11	Reserved	Reserved	Reserved
12	Reserved	Reserved	Reserved
13	Reserved	Reserved	Reserved
14	Reserved	Reserved	Reserved
15	Smoke_Detect_Warning	Smoke detector operation	SMOKE_Warning
16	Reserved	Reserved	Reserved
17	RS232_Comm_Fail	Failed communication with watt-hour meter	RS232 Comm Fail
18	RS485_Comm_Fail	Master Panel Communication Fail	RS485 Comm Fail
19	Reserved	Reserved	Reserved
20	Reserved	Reserved	Reserved
21	Reserved	Reserved	Reserved
22	Reserved	Reserved	Reserved
23	Reserved	Reserved	Reserved
24	Reserved	Reserved	Reserved
25	Reserved	Reserved	Reserved
26	Reserved	Reserved	Reserved
27	Reserved	Reserved	Reserved
28	Reserved	Reserved	Reserved
29	Reserved	Reserved	Reserved
30	Reserved	Reserved	Reserved
31	Reserved	Reserved	Reserved
32	Reserved	Reserved	Reserved
33	Erec_peakVoltage	Input voltage greater than 420 V results in overvoltage	Erec P.V
34	Erec_OverVoltage	Input voltage greater than 400 V results in overvoltage	Erec O.V
35	Erec_UnderVoltage	Input voltage lesser than 230 V results in undervoltage	Erec U.V
36	Eboost_PeakVoltage	Overvoltage occurs when DC voltage is 500V or higher.	Eboost P.V
37	Eboost_OverVoltage	Overvoltage occurs when DC voltage is 480V or higher.	Eboost O.V
38	Reserved	Reserved	Reserved

Error_Code	Error Name	Description	Converter LCD
39	Reserved	Reserved	Reserved
40	Reserved	Reserved	Reserved
41	Reserved	Reserved	Reserved
42	lboost_PeakCurrent	Boost IGBT greater than 150 A results in overcurrent	lboost P.C
43	lboost_OverCurrent	Boost IGBT greater than 140 A results in overcurrent	lboost O.C
44	lboost2_PeakCurrent	Boost IGBT greater than 140 A results in overcurrent	lboost2 P.C
45	lboost2_OverCurrent	Boost IGBT greater than 150 A results in overcurrent	lboost2 O.C
46	Reserved	Reserved	Reserved
47	Reserved	Reserved	Reserved
48	lsrc_PeakCurrent	Track current 100 A or higher	lsrc P.C
49	lsrc_OverCurrent	Track current 90 A or higher	lsrc O.C
50	lsrc_UnderCurrent	Track current 25 A or lower	lsrc U.C
51	lsrc_FO_PeakCurrent	FO_Track current 100 A or higher	F/O lsrc P.C
52	lsrc_FO_OverCurrent	FO_Track current 90 A or higher	F/O lsrc O.C
53	lsrc_FO_UnderCurrent	FO_Track current 25 A or lower	F/O lsrc U.C
54	lout_PeakCurrent	Inv IGBT current 120 A or higher	lout P.C
55	lout_OverCurrent	Inv IGBT current 110 A or higher	lout O.C
56	Boost1_Gate_Fault	Boost1 IGBT malfunction	BoostA GateFault
57	Boost2_Gate_Fault	Boost2 IGBT malfunction	BoostB GateFault
58	Reserved	Reserved	Reserved
59	Inv1_Gate_Fault	Inverter1 IGBT malfunction	InvA GateFault
60	Inv2_Gate_Fault	Inverter2 IGBT malfunction	InvB GateFault
61	Initial_Charge_Fail	Failed initial charging during RUN operation	InitCharge Fail
62	EMO_Stop_Int	Internal emergency operation for converter	EMO Stop Int
63	EMO_Stop_Ext	Internal emergency operation for converter	EMO Stop Ext
64	Reserved	Reserved	Reserved
65	Fuse_Open	Input Fuse Open	Fuse Open
66	Sag_Gen_Fault	Power outage lasts longer than 1 s	Sag Gen Fault
67	Main_Fan_Fault	Faulty operation of main fan	Main Fan Fault
68	HeatSink_OverHeat_80	Heat sink overheats to 80 °C (Bimetal)	HeatSink OverHeat
69	IGBT_OverHeat	IGBT overheats to 80 °C (NTC)	IGBT OverHeat
70	Track_Cable_OverHeat	Track Power Cable 90 °C thermal wire operation	OutCable OverHeat
71	Inside_Cable_OverHeat	Converter's Internal Power Cable 90 °C thermal wire operation	InCable OverHeat
72	Busbar_OverHeat	Output busbar overheats to 80 °C (Bimetal)	Busbar OverTemp
73	FO_Track_Cable_OverHeat	Heat-detecting wire operates when the temperature of FO_Track Power Cable reaches 90 degree.	F/O OutCable O.T.
74	Reserved	Reserved	Reserved
75	FO_Busbar_OverHeat	Overheat when the temperature of FO_output terminal block busbar reaches 75 degree or higher.	F/O Busbar O.T.

Error_Code	Error Name	Description	Converter LCD
76	Panel_Over Temp	Overheat when the internal temperature reaches 40 degree.	Panel O.T Fault
77	Reserved	Reserved	Reserved
78	Regulator Fault(Interlock)	Regulator Fault (Bypass break)	Regulator Fault
79	EEPROM_ad_check_sum_fail	Controller EEPROM Data Load error	Ad Data R/W Fail
80	EEPROM_sys_check_sum_fail	Faulty controller EEPROM data load	Sys Data R/W Fail
81	EEPROM_gain_check_sum_fail	Faulty controller EEPROM data load	GainData R/W Fail
82	Watchdog_fault	Faulty controller operation	WatchDog Fault
83	Reserved	Reserved	Reserved
84	Reserved	Reserved	Reserved
85	Reserved	Reserved	Reserved
86	Reserved	Reserved	Reserved
87	Reserved	Reserved	Reserved
88	Reserved	Reserved	Reserved
89	est Eboost PV	Boost predictive overvoltage occurs	est Eboost P.V
90	est Eboost OV	Boost predictive overvoltage occurs	est Eboost O.V
91	est inv Eboost PV	(Inverter duty calculation) Boost predictive overvoltage occurs	est inv Eboost P.V
92	est inv Eboost OV	(Inverter duty calculation) Boost predictive overvoltage occurs	est inv Eboost O.V
93	Erec Eboost Gap	Voltage error due to voltage detection error	Erec-Eboost Gap
94	Reserved	Reserved	Reserved
95	Reserved	Reserved	Reserved
96	Reserved	Reserved	Reserved
97	FailOver_MC_Short	Fail-Over MC Short Error when the Fail-Over operates	FailOvere MC Short
98	CPS2_Main_MC_Short	CPS2 Main-MC Open Error when the Fail-Over operates	FailOvere MC Short
99	CPS2_Sub_MC_Short	CPS2 Sub-MC Open Error when the Fail-Over operates	FailOvere MC Short
100	Reserved	Reserved	Reserved
101	Reserved	Reserved	Reserved
102	Reserved	Reserved	Reserved
103	Reserved	Reserved	Reserved
104	Reserved	Reserved	Reserved
105	Cap OverHeat	Overheat when the temperature of the resonant capacitor is over 75 (Bimetal)	Cap OverTemp
106	Reserved	Reserved	Reserved
107	Reserved	Reserved	Reserved
108	EXT_Earthquake	External earthquake detection signal input	Earthquake
109	Reserved	Reserved	Reserved
110	Reserved	Reserved	Reserved
111	Reserved	Reserved	Reserved
112	Reserved	Reserved	Reserved