

INVT RM Serial Maintenance Guide (version 1.0)

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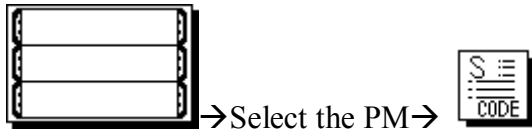
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Part I: Power Module (PM)

1.1 Reading Module S_CODE



The following LCD interface will displayed.

RM200/20	N=01 (S)	12:00	
S0: 0001-0000-0000-0000	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">S_Code01</div> <hr style="border-top: 1px dashed black;"/> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">Mod Ver</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px; text-align: center;"></div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px; text-align: center;"></div>		
S1: 0001-0000-0000-0000			
A0: 1001-0000-0000-0300			
A1: 1001-0000-0000-0300			
A2: 1001-0000-0000-0300			
A3: 1001-0000-0000-0300			
A4: 1001-0000-0000-0300			
A5: 1001-0000-0000-0300			
1#Utility Abnormal	11-11	11:12:25	
3#Byp Volt Abnormal	11-11	11:12:25	
Batt Not Connected	11-11	11:12:25	

Every bit of S0-S1 deputy one status.

Every bit of A0-A5 deputy one alarm (or Fault).

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1.2 Status Bits Description

Seq.			Items	0	1	2	4	8	
1	S0	1	1	Load on status	None	UPS	BYP	Other Module	
2			2	REC status	OFF	Soft-start	Normal work		
3			3	INV status	OFF	Soft-start	Normal work		
4			4	BYP status	Out range	Ok for supply			
5		2	5	Battery status	Not connected	Boost	float	Discharging	not work
6			6	Reserved					
7			7	Reserved					
8			8	Reserved					
9		3	9	Maintenance CB status	Open	Closed			
10			10	Reserved					
11			11	Reserved					
12			12	Positive Battery connect status	Not connect	Connected			
13		4	13	negative Battery connect status	Not connect	Connected			
14			14	INV allow on status	Inhibited On	Allow On			
15			15	INV supply status	Not allow to supply	Ready for supply	Supplying		
16			16	Generator in	Not Generator	Generator In			
17	S1	1	1	Reserved					
18			2	Reserved					
19			3	Reserved					
20			4	Exterior BCB trip	Trip signal inactive	Trip signal active			
21		2	5	Exterior BCB connect status	Not connected	Connected			
22			6	Exterior BCB status	Open	Closed			
23			7	EPO status	Not EPO	EPO			

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24	3	8	Module pulled Out	Pushed (Connected OK)	Pulled (Connected Fail)			
25		9	Inv available	Inv not available	Available			
26	3	10	System power up end	During power up step	Power up step ended.			
27		11	Reserved					
28	4	12	Reserved					
29		13	Reserved					
30	4	14	Reserved					
31		15	Reserved					
32		16	Reserved					

1.3 Alarm Bits Description

Seq.			Items	0	1	2	4	8
1	A0	1	1	Synchronous Fault	Sync.	Not sync.		
2			2	Main Input Fault	OK	Fault		
3			3	REC Fault	OK	Fault		
4			4	INV Fault	OK	Fault		
5		2	5	Reserved				
6			6	Reserved				
7			7	Reserved				
8			8	Reserved				
9		3	9	Reserved				
10			10	Reserved				
11			11	Reserved				
12			12	Reserved				
13		4	13	Input phase A over current	OK	Fault		
14			14	Input phase B over current	OK	Fault		
15			15	Input phase C over current	OK	Fault		
16			16	Output phase A voltage Fault	OK	Fault		
17	A1	1	1	Output phase B voltage Fault	OK	Fault		
18			2	Output phase C voltage Fault	OK	Fault		
19			3	Reserved				
20			4	Reserved				
21		2	5	Reserved				
22			6	Positive bus voltage Fault	OK	Low voltage	Over voltage	
23			7	Negative bus voltage Fault	OK	Low voltage	Over voltage	
24			8	Input current unbalance Fault	OK	Fault		
25		3	9	Input voltage Fault	OK	Fault		

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26	A2	4	10	Input Frequency Fault	OK	Fault				
27			11	Input Sequence Fault	OK	Fault				
28			12	REC soft-start Fault	OK	Fault				
29			13	REC IGBT over current	OK	Fault				
30		14	Reserved							
31		15	REC over temperature	OK	Fault					
32		16	Positive bus over voltage Fault	OK	Fault					
33		1	1	1	Negative bus over voltage Fault	OK	Fault			
34				2	Fan Fault	OK	Fault			
35				3	Reserved					
36				4	Reserved					
37		2	2	5	Positive bus under voltage	OK	Fault			
38				6	Negative bus under voltage	OK	Fault			
39				7	Positive battery reversed	OK	Fault			
40				8	Negative battery reversed	OK	Fault			
41		3	3	9	Reserved					
42	10			Reserved						
43	11			Positive charger voltage Fault	OK	under voltage	over voltage			
44	12			Negative charger voltage Fault	OK	under voltage	over voltage			
45	4	4	13	Reserved						
46			14	Reserved						
47			15	Positive charger Fault	OK	Fault				
48			16	Negative charger Fault	OK	Fault				
49	A3	1	1	Positive battery voltage low	OK	Fault				
50			2	Negative battery voltage low	OK	Fault				
51			3	Positive battery EOD	OK	Fault				
52			4	Negative battery EOD	OK	Fault				
53		2	2	5	Input neutral lost	OK	Fault			
54				6	BYP sequence Fault	OK	Fault			

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55		7	BYP voltage Fault	OK	Fault			
56		8	Reserved					
57		3	9	Reserved				
58	10		Reserved					
59	11		BYP frequency over track range	OK	Fault			
60	12		Reserved					
61		4	13	Reserved				
62	14		Over load time out	OK	Fault			
63	15		Reserved					
64	16		Reserved					
65	A4	1	1	Manual shutdown	normal	shutdown		
66			2	INV protect	OK	Fault		
67			3	Transfer times limit in one hour	OK	Fault		
68			4	INV power back feed	OK	Fault		
69		2	5	Reserved				
70			6	Reserved				
71			7	Reserved				
72			8	INV over temperature Fault	OK	Fault		
73		3	9	INV IGBT over current	OK	Fault		
74			10	Reserved				
75			11	Over load	normal	over load		
76			12	INV relay or fuse Fault	OK	Fault		
77		4	13	Reserved				
78			14	Reserved				
79			15	Reserved				
80			16	Reserved				
81	A5	1	1	Reserved				
82			2	Output shorted	OK	Fault		

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83		3	Battery test	None	OK	Fault		
84		4	Battery maintenance	None	OK	Fault		
85	2	5	Reserved					
86		6	Reserved					
87		7	Reserved					
88		8	Reserved					
89	3	9	Reserved					
90		10	Reserved					
91		11	Reserved					
92		12	Reserved					
93	4	13	Reserved					
94		14	Reserved					
95		15	Reserved					
96		16	Reserved					

1.4 Alarms Check and Solution Index

1.4.1 Synchronous Fault

- A) BYP frequency out of synchronize range.
- B) SYNC signal in the parallel Fault.

1.4.2 Main Input Fault

- A) Main input voltage out of range.
- B) Main input frequency out of range.
- C) Main input sequence is reversed

1.4.3 REC Fault

- A) REC over temperature.
- B) Dc bus over voltage latched.
- C) REC soft-start Fault.
- D) Input current unbalance.

1.4.4 INV Fault

- A) INV IGBT over current.
- B) INV over temperature.

1.4.5 Input phase A/B/C over current

- A) Input current over limited.
 - Index 1: IGBT Fault.
 - Index 2: DC bus shorted.
 - Index 2: IGBT driver Fault.

1.4.6 Output Phase A/B/C Voltage Fault

- A) INV voltage out of range.
 - Index 1: IGBT open.
 - Index 2: IGBT driver lost.
 - Index 3: Voltage detects and sample fail.

1.4.7 Positive/Negative Bus Voltage Fault

- A) DC bus voltage out of range.

1.4.8 Input current unbalance fault

- A) The difference of max current and min current of the input three phases is out of the limited range.
 - Index 1: One of the input current detecting CT/HALL fail..

Index 2: Some REC IGBT open.

Index 3: input current detecting and sample circuit fail.

1.4.9 Input Voltage Fault

A) Input voltage out of range.

1.4.10 Input Frequency fault

A) Input frequency out of range

1.4.11 Input Sequence Fault

A) Input sequence is reversed

1.4.12 REC soft-start fault

A) After the REC soft-start step, the bus voltage can not reach the limited value.

Index 1: REC SCR fail.

Index 2: REC SCR driver fail.

Index 3: Bus voltage detects and sample fail.

1.4.13 REC IGBT over current

A) Big current flow through REC IGBT.

Index 1: REC IGBT fail.

Index 2: DC Bus shorted.

Index 3: REC IGBT driver fail.

1.4.14 REC over temperature

A) REC temperature out of the limited range.

1.4.15 Positive/Negative bus over voltage fault

A) Bus voltage over the up limited.

1.4.16 Fan fault

A) At least one of the fan fail.

1.4.17 Positive/Negative bus under voltage

A) Bus voltage out of the low limitation.

1.4.18 Positive/Negative battery reversed

A) Battery connection reversed.

1.4.19 Positive/Negative charger voltage fault

A) Charger voltage out of the range limited.

Index I: Charger IGBT fail.

Index 2: Charger IGBT driver fail.

Index 3: Charger voltage detecting and sampling circuit fail.

1.4.20 Positive/Negative charger fault

- A) During charging step (boost or float), the charger voltage out of the range limited.

Index I: Charger IGBT fail.

Index 2: Charger IGBT driver fail.

Index 3: Charger voltage detecting and sampling circuit fail.

1.4.21 Positive/Negative battery voltage low

- A) Battery voltage is low (a little bigger than the EOD point).

1.4.22 Positive/Negative battery EOD

- A) Battery voltage reaches the end of discharge point.

1.4.23 BYP sequence fault

- A) BYP sequence reversed.

1.4.24 BYP voltage fault

- A) BYP voltage out of the range limited.

1.4.25 BYP frequency over track range

- A) BYP frequency out of the sync. Window.

1.4.26 Over load time out

- A) INV over load time out.

1.4.27 Manual shutdown

- A) Manual Off button is pressed to shutdown the PM.

1.4.28 INV protect.

- A) INV detects power back feed to dc bus.
- B) INV voltage out of range.
- C) INV detects the bus voltage over the limited.

NOTES: INV protect fault is auto cleared.

1.4.29 Transfer times limit in one hour

- A) Transfer to BYP times in one hour exceeds the limited.

1.4.30 INV power back feed

- A) INV detects power back feed to dc bus.

1.4.31 INV over temperature fault

- A) INV temperature out of the limited range.

1.4.32 INV IGBT over current

- A) Big current flow through INV IGBT.
 - Index 1: INV IGBT fail.
 - Index 2: INV IGBT driver fail.

1.4.33 Over load

- A) PM over load.

1.4.34 INV relay or fuse fault.

- A) INV relay Fail
 - Index 1: relay can not be closed.
 - Index 2: relay can not be opened.
- B) INV fuse fail.

1.4.35 Output shorted

- A) Output shorted is detected.

1.4.36 Battery test Fail.

- A) Battery test condition is not allowed.
 - Index 1: Battery capacity low than 25%.
 - Index 2: Battery voltage (cell) smaller than (float voltage (cell) – 0.1V).
 - Index 3: BYP is not qualified.
 - Index 4: At least one Alarm exists in the system.
- B) Battery discharging time smaller than 20 Sec.

1.4.37 Battery maintenance Fail.

- A) Battery test condition is not allowed.
 - Index 1: Battery capacity low than 25%.
 - Index 2: Battery voltage (cell) smaller than (float voltage (cell) – 0.1V).
 - Index 3: BYP is not qualified.
 - Index 4: At least one Alarm exists in the system.
- B) The time lasted before battery voltage low is smaller than 20 Sec.