Startup / Trouble Shooting
Inverter OFF

1. Record the system Information from the system label in the table below.

System Information form System Label			
Model / Unit S/O	**KVA from S/O**	**Vin from S/O**	**Vout from S/O**

2. Check system for loose connections.
3. Check that all connections are properly connected.
4. Measure the resistance of the bottom (output) of the input Circuit Beaker to frame for each pole. The measurement should be greater then 20K ohms.
5. Measure the resistance of the bottom (UPS side) of the DC Breaker to frame for each pole. The measurement should be greater then 20K ohms.
6. Measure the resistance of the Main transformer output to frame to each phase. The measurement should be greater then 20K ohms.
7. Before turning on the Input Circuit Breaker (CB1) record the input voltage in the table below and ensure that it is per the system label.

	Input Voltage Unit OFF (CB1 OFF, CB2 OFF, CB3 OFF)		
	Phase A (L-N or L-G)	Phase B (L-N or L-G)	Phase C (L-N or L-G)
Actual			

See Tables at end of Document for limits

8. Turn ON the Input Circuit Breaker (CB1) and record the input voltage in the table below in the row marked Actual. After the system has gone though its initial checks and is displaying "Battery Breaker is Open – Ready to Close" use the Menu Forward and Menu Reverse" buttons to fine the input voltage readings, and record in the table below in the row marked Display Readings.

	Input Voltage Unit On SBS Utility (CB1 ON, CB2 OFF, CB3 OFF)		
	Phase A	Phase B	Phase C
Actual			
Display readings			

See tables at end of document for limits.

9. Verify the input voltage is in forward rotation (ABC) at the top of the Input Terminal Blocks

10. Turn ON the Output Circuit Breaker (CB3) to connect the customer loads to the unit. Record the input voltage and current in the table below in the row marked Actual Voltage and Actual Current. Use the Menu Forward and Menu Reverse" Buttons to find the input voltage readings, and record in the table below in the row marked Display Readings.

	Input Voltage and Current Unit On SBS Utility, With Load (CB1 ON, CB2 OFF, CB3 ON)		
	Phase A	Phase B	Phase C
Actual Voltage			
Display Input Voltage readings			
Actual Current			

See Tables at end of Document for limits

11. Record the actual output Voltage and Current in the table below in the row marked Actual Voltage and Actual Current. Use the Menu Forward and Menu Reverse" Buttons to find the output voltage and current readings and record in the table below in the rows marked Display Voltage Readings and Display Current Readings.

	Output Voltage and Current Unit On SBS Utility (CB1 ON, CB2 OFF, CB3 On)		
	Phase A	Phase B	Phase C
Actual Voltage			
Display Voltage readings			
Actual Current			
Display Current Readings			

See Tables at end of Document for limits

12. Using the Menu Forward and Menu Reverse buttons record the displayed KW of the unit in the table below. Using the following formula, Voltage (measured phase to ground) times current (on same phase), calculate the watts for each phase and record in the row marked Actual. Add the actual values to get the Total.

	Output KVA Unit On SBS Utility (CB1 ON, CB2 OFF, CB3 ON)			
	Phase A (Volts * Current)	Phase B (Volts * Current)	Phase C (Volts * Current)	Total
Actual				
Display readings (Kva)				

13. Verify that the Actual Watts does not exceed the rating of the unit. The max allowed for each phase will be the total Watts for the unit divided by three (3).

14. Record the DC bus voltage in the table below as measured at the bottom and top of the Battery Circuit Breaker (CB2). Then using the Menu Forward and Menu Reverse Buttons to find the DC Voltage reading, record in the table below in the row marked Displayed Reading.

	DC Bus Voltage Unit On SBS Utility (CB1 ON, CB2 OFF, CB3 ON)	
	Charger Voltage at Bottom of CB	Battery Voltage Top of CB
Actual		
Displayed Reading		

See Tables at end of Document for limits

15. Verify that the polarity of the DC voltage at top and bottom of the Battery Circuit Breaker (CB2) are the same.
16. Press the MNI Button on the µProcessor PCB, and ensure there is a “T” displayed in the bottom right corner of the display.

17. Turn on the Battery Circuit Breaker (CB2) and record the DC bus voltage in the table below as measured at the bottom of the Battery Breaker. Then using the Menu Forward and Menu Reverse Buttons to find the DC Voltage reading, record in the table below in the row marked Displayed Reading.

	DC Bus Voltage, Unit on SBS Utility (CB1 ON, CB2 ON, CB3 ON)
	DC Voltage
Actual	
Displayed Reading	

See Tables at end of Document for limits

18. Turn OFF the Battery Circuit Breaker (CB2)
19. Press the MNI Button on the µProcessor PCB, and ensure there is "*" displayed in the bottom right corner of the display.

Startup / Trouble shooting tool

Inverter ON

20. Turn on the Battery Circuit Breaker (CB2) and then turn OFF the Battery Circuit Breaker (CB2) after 2 seconds
21. After the inverter goes through its checks and displays “Load is on Inverter – Rectifier Operational” record the AC input voltages and currents in the tables below. Then using the Menu Forward and Menu Reverse Buttons to find the Input Voltage reading, record in the table below in the row marked Displayed Reading.

	Input Vac and Current, Unit on Inverter with load, no battery charge current (CB1 ON, CB2 OFF, CB3 ON)		
	Phase A	Phase B	Phase C
Actual voltage			
Display Voltage readings			
Actual Current			

22. Verify that the input current does not exceed the Input Circuit Breaker (CB1) current rating.

23. Turn OFF the output Circuit Breaker (CB3) and turn ON the Battery Circuit Breaker (CB2) and then record the AC input Voltages and Currents in the table below. Then using the Menu Forward and Menu Reverse Buttons to find the Input Voltage reading, record in the table below in the row marked Displayed Reading.

	Input Vac and Current Unit on inverter with No Load, and with Battery charge Current (CB1 ON, CB2 ON, CB3 OFF)		
	Phase A	Phase B	Phase C
Actual Voltage			
Display Voltage readings			
Actual Current			

24. Verify that the input current does not exceed the Input Circuit Breaker (CB1) current rating.

25. Turn on the Output Circuit Breaker (CB3) and record the AC input voltages and current in the tables below. Then using the Menu Forward and Menu Reverse Buttons to find the input voltage reading, record in the table below in the row marked Displayed Readings

	Input Vac and Current, Unit on Inverter with load, and battery charge current (CB1 ON, CB2 ON CB3 ON)		
	Phase A	Phase B	Phase C
Actual voltage			
Display Voltage readings			
Actual Current			

26. If the current balance is not with 10% perform the SBS/Rec PCG current balancing adjustment.

27. Verify that the input current does not exceed the Input Circuit Breaker (CB1) current rating.

28. Turn OFF the Output Circuit Breaker (CB3) and the Battery Circuit Breaker (CB2) then record the AC output voltages in the table below. Then using the Menu Forward and Menu Reverse Buttons to find the Output AC Voltage reading, record in the table below in the row marked Displayed Reading.

	Output Vac Unit on Inverter, No charge current, No Load (CB1 On, CB2 OFF, CB3 OFF)		
	Phase A	Phase B	Phase C
Actual			
Display readings			

29. Verify that the Output Voltage(s) are within 3% of the Voltage(s) as per the System Label.

30. Turn ON the Battery Circuit Breaker (CB2) and Turn OFF the Input Circuit Breaker (CB1). Then record the Output Voltage in the table below. Then using the Menu Forward and Menu Reverse Buttons to find the Output Voltage reading, record in the table below in the row marked Displayed Reading.

	Output Vac Unit Batteries, No Load (CB1 OFF, CB2 ON, CB3 OFF)		
	Phase A	Phase B	Phase C
Actual			
Display readings			

31. Verify that the Output Voltage(s) are within the 3% of the voltage(s) as per the System Label.

32. Turn ON the Output Circuit Breaker (CB3) and record the Output Voltages and Currents in the table below in the rows marked Actual. Then using the Menu Forward and Menu Reverse Buttons to find the Output Voltage and Current reading, record in the table below in the row marked Displayed Reading.

	Output Vac and Current Unit On Batteries, With Load (CB1 OFF, CB2 ON, CB3 ON)		
	Phase A	Phase B	Phase C
Actual Voltage			
Display Voltage readings			
Actual Current			
Display Current Readings			

33. Using the Menu Forward and Menu Reverse buttons record the displayed KW of the unit in the table below. Using the following formula, Voltage (measured phase to ground) times current (on same phase), calculate the watts for each phase and record in the row marked Actual. Add the actual values to get the Total.

	Output KW Unit On SBS Utility (CB1 ON, CB2 OFF, CB3 ON)			
	Phase A (Volts * Current)	Phase B (Volts * Current)	Phase C (Volts * Current)	Total
Actual				
Display readings (Kva)				

34. Verify that the Actual Watts does not exceed the rating of the unit. The max allowed for each phase will be the total Watts for the unit divided by three (3).

35. Startup is now complete, verify with DSPM field service the entry of the Startup Code into the µProcessor by the following steps.
    a. Press both the Increase and Decrease Buttons at the same time till the screens says to enter the password mode
    b. Press Second Button from the left until an “X” appears in the screen.
    c. Press Third Button form the left until an “X” appears on the screen.
    d. Press the Fourth Button form the left until an “X” appears on the screen.
    e. Press the Fifth Button from the left until an “X”
    f. Waiting about 10 seconds the screen will change to a “P” in the lower right corner of the unit.
    g. Using the Menu Reverse or Menu Reverse button go to the screen that says screen variable
    h. Using the Increase and Decrease Keys changed the displayed number to the number that has been issued to you by DSPM for this system.
    i. Press the First Button from the left and ensure that it says “57” in the top left corner and KeyCodeOK.
    j. Release of the button will change the “P” in the bottom left corner to an “*”

Steps 1 thru 5

	Input Voltage Limits				
Vac	120	208	240	277	480
Low	108	187.2	216	249.3	432
High	132	228.8	264	304.7	528

Steps 8a and 11

	Battery Charger Voltage Low/High Limits				
No. of Batteries	2	4	6	8	10
Low Limit	26.4	52.8	79.2	105.6	132
High Limit	27.6	55.2	82.8	110.4	138
No. of Batteries	12	14	16	18	19
Low Limit	158.4	184.8	211.2	237.6	250.8
High Limit	165.6	193.2	220.8	248.4	262.2
No. of Batteries	20	21	22	40	41
Low Limit	264	277.2	290.4	528	541.2
High Limit	276	289.8	303.6	552	565.8
No. of Batteries	42	43	44	45	46
Low Limit	554.4	567.6	580.8	594	607.2
High Limit	579.6	593.4	607.2	621	634.8

Note: Value Measured is Vdc and is not Decreasing

Step 8b

	Battery Voltage Low Limits				
No. of Batteries	2	4	6	8	10
Low Limit	22	44	66	88	110
No. of Batteries	12	14	16	18	19
Low Limit	132	154	176	198	209
No. of Batteries	20	21	22	40	41
Low Limit	220	231	242	440	451
No. of Batteries	42	43	44	45	46
Low Limit	462	473	484	495	506