Lithium power BMS manual

BMS-20S

AA Portable Power Corp.

1: Product intro and system setting

1.1: composeition and function of products

BMS-20S battery management is made up of a GTBMS 005A-MC8 management host two BMS-20S voltage/current/temperature module, can measuring all voltage of single batteries, total current of pile, environment temperature.. Detailed performance as follows:

1. Management host consists of black and white LCD and management calculator, first page displays of battery group total voltage and total current max voltage and battery number, mm voltage and battery number; second page displays capacity(adds while is charging, subtract while is discharging, save while power cut, clear). consume Walt-hour. ,max temperature of all measuring points and mm temperature; press key display every battery voltage.

2. Sampling module adopts master-slave mode. Master sampling module manages ten batteries1 one current and one temperature, slave sampling module manages ten batteries and one temperature.

3. Master sampling module provides one sampling current, current sensor is current hail sensor.

4. The number of batteries that is managed by sampling module can be set from l— N (N<<lO) through management host, connection mode adopts N+l.

5. Management host has two alarm interfaces, switch of voltage upper limit1 aural and visual alarm, high temperature switch. aural and visual alarm, switch of high temperature.. aural and visual alarm, switch of over current1 aural and visual alarm. Max voltage alarm and high temperature alarm share the same gronp interface, voltage lower limit alarm and over current alarm share the same group interface.

6. Host has two keys: "first" and "set". Select "first", screen displays first page information, press "set" key you can search all information except that of the first page; under the first page state, keep pressing "first "key for five seconds to get into parameter set menu; under the first page state, keep pressing "set" key for

five seconds to get into running parameter set menu. Get into the second page, keep pressing "first" key for five seconds to clear capacity value ,keep pressing "set" key for five seconds to clear waif value; When the system gets into alarm state, it will provide flashing light. buzzer and a group of relay contacts to alarm. System running parameters include: the number of batteries that each sampling module manages. voltage upper /lower limit, voltage cut lower limit temperature cut upper limit. etc.
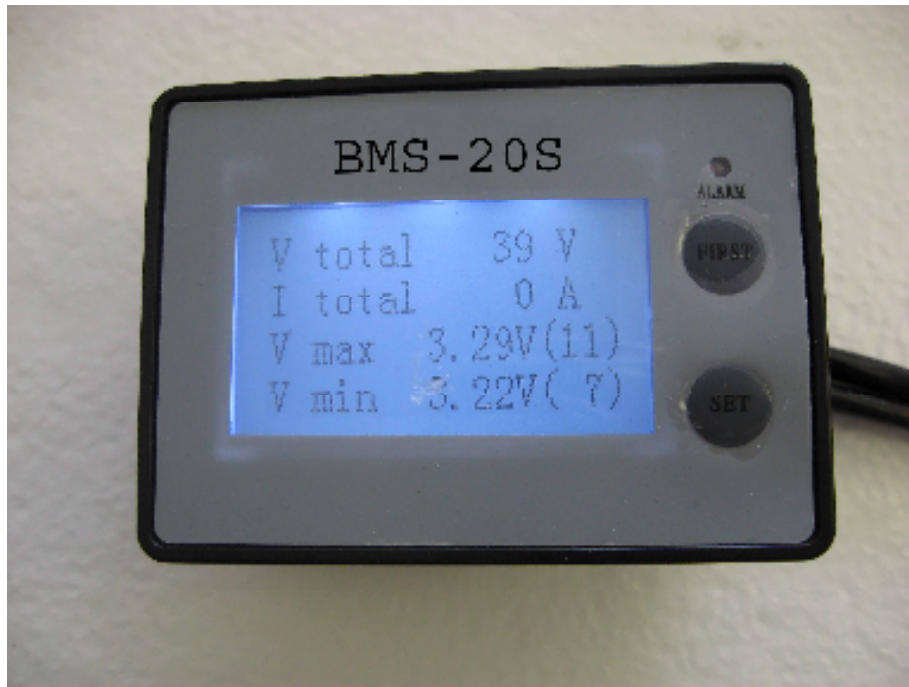
1.2 Main Technical Parameters

Voltage measuring range -- 0 ~ +5V

Voltage measuring accuracy --- ± (0.3%RD+0.2%FS)

Voltage display accuracy -- l mV

Temperature measuring range -- 10----+85°C

Temperature measuring accuracy------------------------------------- +1 C

Minimum sample cycle (voltage) ------------------------------------- 0.5s

Accumulated capacity cycle --- 0.5s

Capacity display accuracy -- 1 Ah

Capacity measuring upper limit ------------------------------------- <999Ah

Alarm contacts index

　　Maximum switch voltage --------------------------------------- 30Vdc

　　Maximum switch current -------------------------------------- 1 A

LCD

Black and white screen

White back lighting Display region --------------------------------- 47mm x 26mm

1.3 system setting

1. VCT sampling module set

* Address set: When the battery number is no more than ten, only one VCT module is enough, and this module is master module, master module can manage less than ten batteries, and provide a loop of temperature and current.

* When the number of batteries is more than ten, the system will need two VCT modules, onc is mastcr module (not necd to bc set) and another is set as slave module. Master module can manage less than ten batteries, and provide a loop of temperature and current. Slave module can manage no more than ten batteries, and provide a loop of temperature0 There cannot be two slave sampling modules in the system at the same time. Master

module is connected from high position of battery group, detailed connection method and slave set method see attach page.

Main controller has two press keys, FIRST key and SET key; a ALARM indicator light
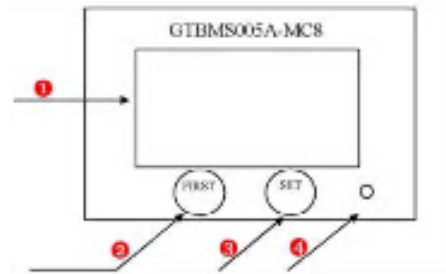
Display region ----------------- 1
First page key ------------------ 2
Function key ------------------- 3
Alarm light --------------------- 4

1. First page key: display first page information, includes: total voltage, total current single battery max voltage and its number. Single battery min voltage and its number.

2. Set key: display all information except first page information, includes capacity, consumed watt-hour, max temperature and its number, mm temperature and its number, voltage of each battery.

3. Alarm light: flashes while alarms.
a) System parameter setting
Under the first page state, keep pressing "SET" key for five seconds to get into system running parameter set menu. Enter the password before getting into this menu, customers password is marked at the main controller back. System parameter include: the number of batteries that each sampling module manages, voltage upper limit1 voltage lower limit, voltage cut lower limit, temperature cut upper limit current cut upper, etc.

System parameter should be set once after being installed and will save parameter automatically, and will monitor and alarm according to parameter that is set.

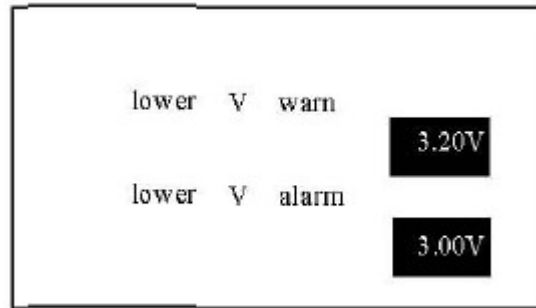## System running parameters diagram as follows:

Figure 1-3-2 system parameters

Module: BMS-20 sampling module address: #1 master module, #2 is slave module.
Battery: The number of battery. If the number of batteries is less than ten, #2 must set as "0"

Black frame is current editing content, "SET" key add 1, "FIRST" key is "ok"; Press "FIRST" key, black frame will automatically move below. After setting #2 value, press "FIRST" key to confirm, press "FIRST" key and "SET" key simultaneity to get into next menu0 Diagram as follows:
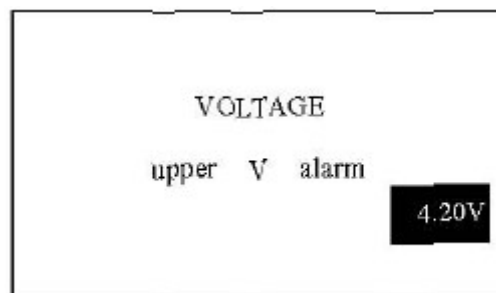

Figure 1-3-3

Upper V alarm : When any battery voltage is larger than the value, system lightens the LCD and provides a group of relay contacts to alarm. Normally , relay common contracts arc 5 switched on with N.C. contacts and cut off with N.O. contacts. When it's alarming, common contracts are switched on with NO. Contacts and cut off with N.C. contacts. If

the largest cell voltage drop and is l5mv lower than the value, the alarm will stop. Press "SET" to add 1, press "FIRST" to subtract 1; if press "FIRST" and "SET" key at the same time to get into the next menu. Diagram as follows:
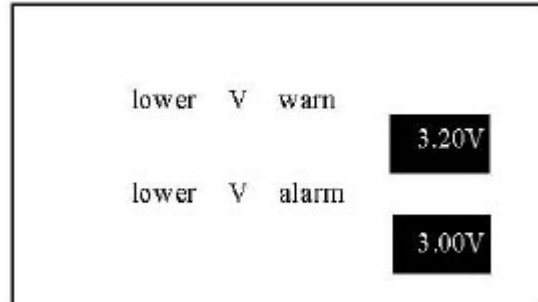
lower   V   warn
3.20V

lower   V   alarm
3.00V

Figure l-3-4 system parameter

Lower V warning: If any cell voltage is lower than the value, system will Lighten the LCD and buzzer to alarm. If the largest cell voltage drops and is l5mv lower than the value, the alarm will stop.

Lower V alarm: If any cell voltage is lower than the value, system will lighten the LCD. buzzer and provide a group of relay contacts to alarm. Normally, relay common contracts are switched on with N.C. contacts and cut off with NO contacts. When it's alarming, common contracts are switched on with NO contacts and cut off with N.C. contacts. The alarm won't stop unless shut off the power. Press SET" key to 1, press "FIRST " key to subtract 1; Simultaneity press "FIRST" key and "SET" key get into next menu. Diagram as follows:

upper   I   alarm
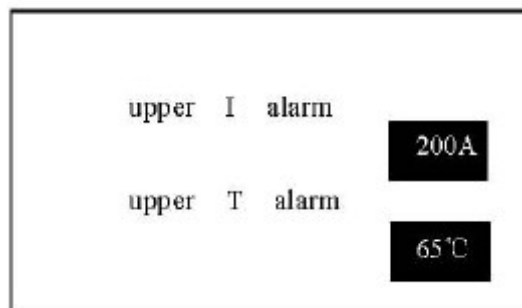200A

upper   T   alarm
65°C

Figure l-3-5system parameter

Upper I alarm When total current is larger than the value, system will lighten the. LCD buzzer and provide a group of contacts to alarm. The alarm and "lower V alarm" share with the same group of relay contacts.

Upper T alarm: When the nods temperature is higher than the value, system will lighten. The LCD buzzer and provide a group of contacts to alarm. When the highest temperature drops and is 5°C lower than the value, the alarm will stop. The alarm and "lower V alarm" share with the same group of relay contacts. Press "SET" key to add 1, press "FIRST" key to subtract 1; simultaneity press "FIRST" key and "SET" key back to home page.

b) System initialization settings notice:
You must setup system running parameter once before using. System will memory it automatically, without the need of set when you use it next time. But if you change the main controller, you need to set the parameter again.
System will display first page information after being switched with the power, press "set" key get into the next page, the information includes capacity, consumed watt-hour, max temperature and its number, mm temperature and its number, voltage of each battery, press "FIRST" key back to first page.

2 Connection with chargers controller

2.1 interface and connection and motor controller
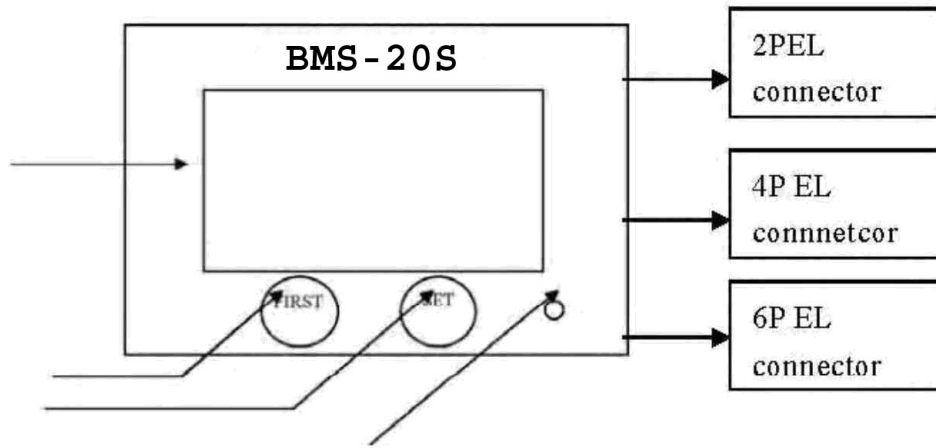
Figure 2-1-1 interface diagram
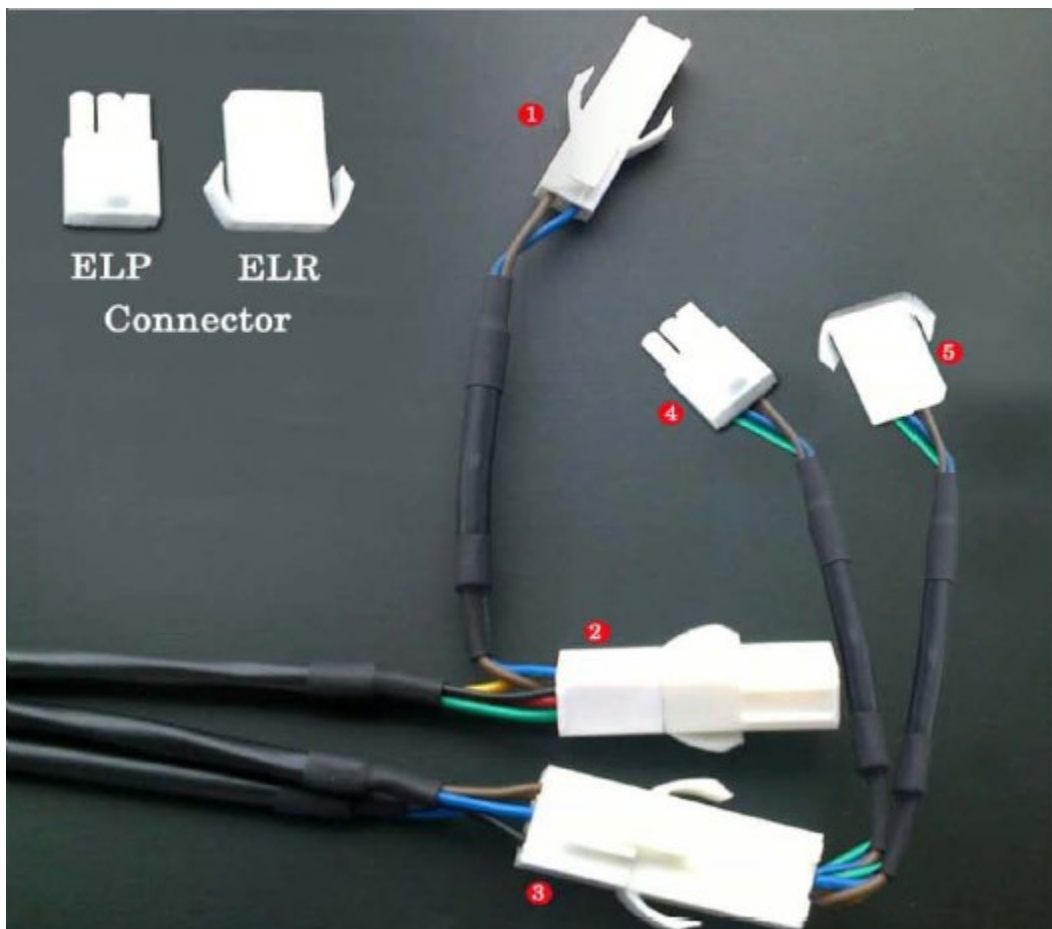
Figure 2-1-2 interface diagram

1: 2P EL interface connect with DC power.

2: 4P EL connect with data collection modules.

3: 6PEL separated two interfaces 3P 4.5, connect with chargers and motor controller.

4: connect with charger.

5: connect with motor controller.

Notice: (we make wires according to battery distribution) we provide users with ELP, ELR connector. Motor controller, chargers, must use the same way of relay.

2.2 System working principle

BMS—MC8 adopts relay switch to connect with circuit. When the voltage, current, temperature, etc. reach the value set. Relay protects the battery through connection and disconnection.

BMS (MC8) Management strategy
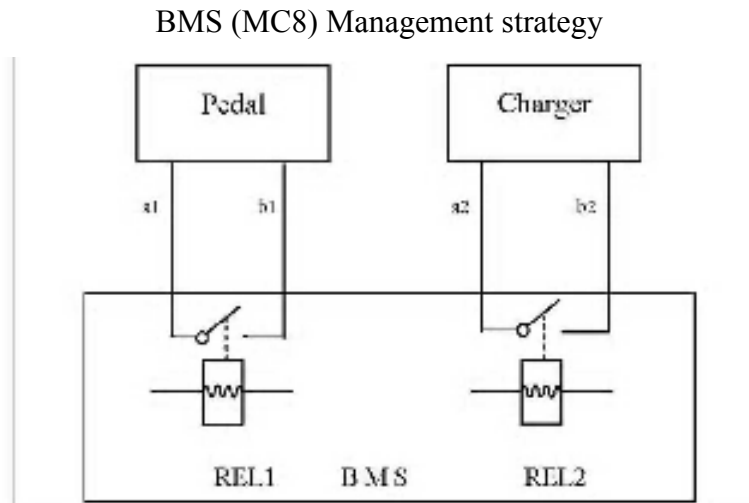
BMS(MC8)can provide two relay node(no source)as alarm output.

When charging, One cell reach upper limit voltage alarm value(can set),BMS control REL2 to shut.a2 and b2 connect, chargers can identify the signal. Then, chargers begin to adjust output current. It will minish. With reduced current, voltage drops. When UMS

detects all battery voltage less than upper limit alarm voltage, BMS control REL 2 cut. Chargers can detect the signal. Chargers don't minish current then with the current goes on charging. Cycling the process until chargers stop out put. Through the way, BMS can protect battery from over charging. But, charges can identify the switch signal.

When discharging, we connect another replay with pedal circuit. BMS judges battery group status, if normal, REL1 shut. Al and Bl connect, electric vehicle can run. When running, single cell voltage lower than lower limit alarm voltage (can set, Lithium iron phosphate battery suggest 2.8V).BMS screen alarm light can gleam and beep. Drivers should reduce speed (minish battery current output).If the speed is not high, we should charge battery. With the speed lower, voltage will rise again. When EMS detect all battery voltage higher than lower limit alarm voltage(can set), alarm stops. When EMS alarms, drivers don't take steps, it will make battery below lower limit alarm voltage sostenuto, BMS will cut REL1.al and Bl will disconnect. Throttle will stop working. The electric vehicle can't run. The alarms can't stop until we cut down the EMS power.

3 Notice and Contact

3.1 Notice

A. System initialization settings notice:

You must setup system running parameter once before using. System will memory it automatically, without the need of set when you use it next time. But if you change the main controller, you need to set the parameter again.

System will display first page information after being switched with the power, press "set" key get into the next page, the information includes capacity, consumed watt-hour, max temperature and its number, mm temperature and its number, voltage of each battery, press "FIRST" key back to first page.

B. Connect wires notice:

(We make wires according to battery distribution) we provide users with ELP ELR connector0 Motor controller , chargers, must use the same way of relay. They can connect with BMS. So that DMS protects batteries when charging and discharging. Notice the connecting wires. According to stall definition of Figure strictly.

Sample Wiring Diagram
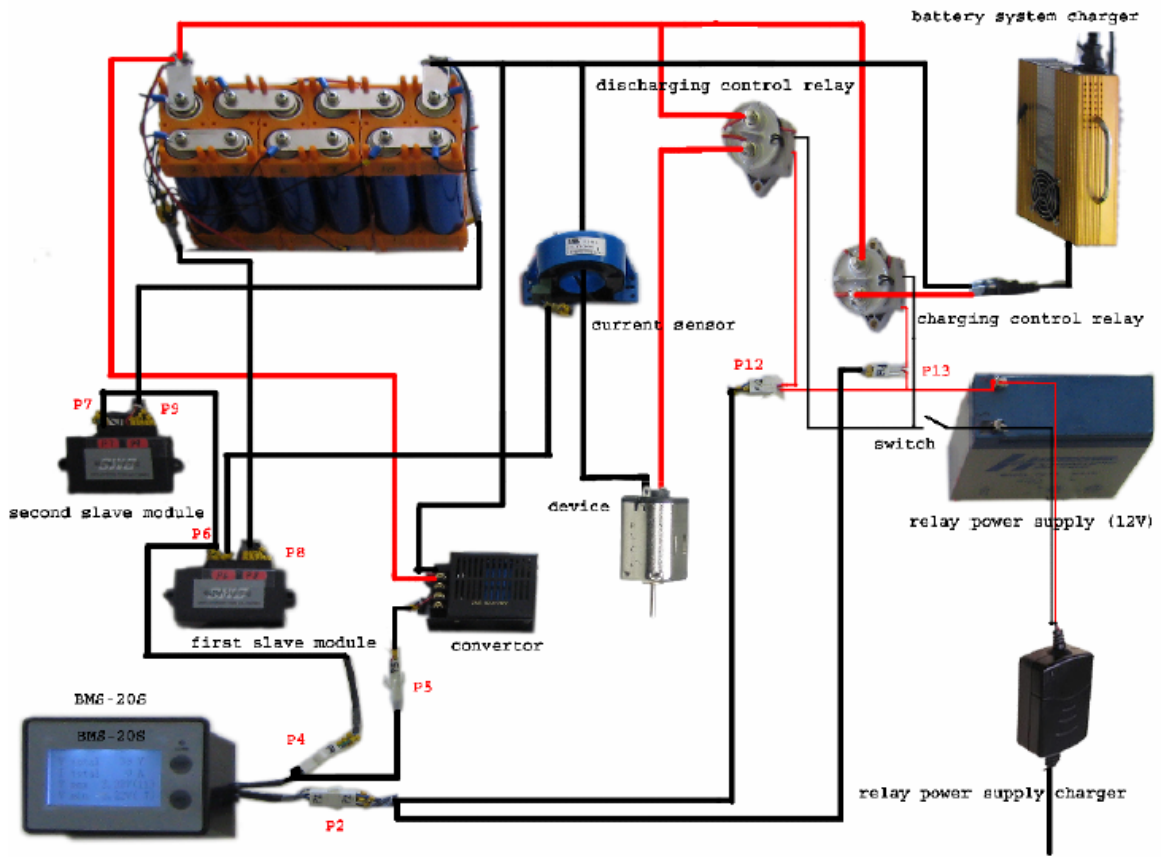
BMS-20S CONNECTOR DEFINITION

P13

Cable # 6	1	HIGH V ALARM -- OPEN NODE
Cable # 7	2	HIGH V ALARM -- COM NODE
Cable # 8	3	HIGH V ALARM -- CLOSE NODE

3P EL LINKER (MALE)

P2

Cable # 3	1	4	Cable # 6
Cable # 4	2	5	Cable # 7
Cable # 5	3	6	Cable # 8

6 PIN EL CONNECTOR (FEMALE)

P12

HIGH V ALARM -- OPEN NODE	1	Cable # 3
HIGH V ALARM -- COM NODE	2	Cable # 4
HIGH V ALARM -- CLOSE NODE	3	Cable # 5

3P EL LINKER (MALE)

P4 — 4PIN EL CONNECTOR(FEMALE)

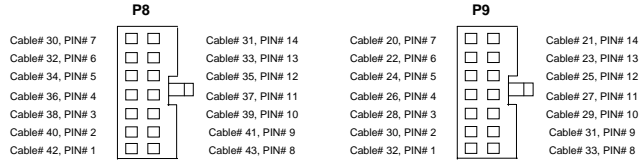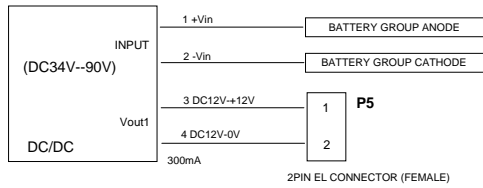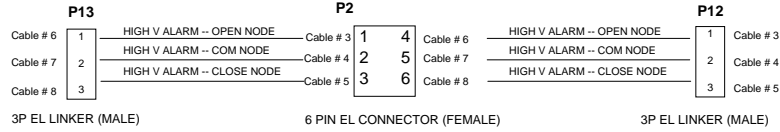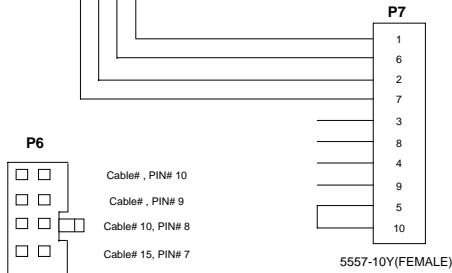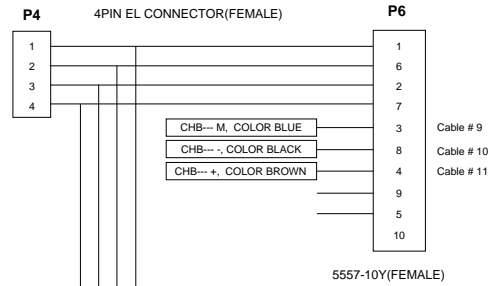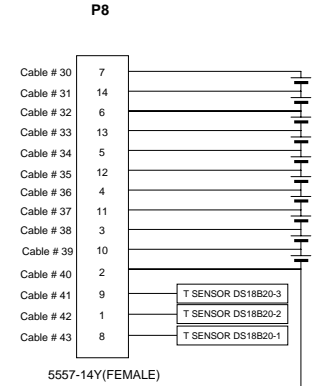| 1 |
| 2 |
| 3 |
| 4 |

P6

1	
6	
2	
7	
3	CHB--- M, COLOR BLUE — Cable # 9
8	CHB--- -, COLOR BLACK — Cable # 10
4	CHB--- +, COLOR BROWN — Cable # 11
9	
5	
10	

5557-10Y(FEMALE)

P8

Cable # 30	7
Cable # 31	14
Cable # 32	6
Cable # 33	13
Cable # 34	5
Cable # 35	12
Cable # 36	4
Cable # 37	11
Cable # 38	3
Cable # 39	10
Cable # 40	2
Cable # 41	9	T SENSOR DS18B20-3
Cable # 42	1	T SENSOR DS18B20-2
Cable # 43	8	T SENSOR DS18B20-1

5557-14Y(FEMALE)

DC/DC — INPUT (DC34V--90V), Vout1, 300mA

1 +Vin	BATTERY GROUP ANODE
2 -Vin	BATTERY GROUP CATHODE
3 DC12V-+12V	**P5** 1
4 DC12V-0V	2

2PIN EL CONNECTOR (FEMALE)

P7

| 1 |
| 6 |
| 2 |
| 7 |
| 3 |
| 8 |
| 4 |
| 9 |
| 5 |
| 10 |

5557-10Y(FEMALE)

P9

Cable # 20	7
Cable # 21	14
Cable # 22	6
Cable # 23	13
Cable # 24	5
Cable # 25	12
Cable # 26	4
Cable # 27	11
Cable # 28	3
Cable # 29	10
Cable # 30	2
Cable # 31	9	T SENSOR DS18B20-3
Cable # 32	1	T SENSOR DS18B20-2
Cable # 33	8	T SENSOR DS18B20-1

5557-14Y(FEMALE)

P8

Cable# 30, PIN# 7	Cable# 31, PIN# 14
Cable# 32, PIN# 6	Cable# 33, PIN# 13
Cable# 34, PIN# 5	Cable# 35, PIN# 12
Cable# 36, PIN# 4	Cable# 37, PIN# 11
Cable# 38, PIN# 3	Cable# 39, PIN# 10
Cable# 40, PIN# 2	Cable# 41, PIN# 9
Cable# 42, PIN# 1	Cable# 43, PIN# 8

5557-14Y(FEMALE) LINKER

P9

Cable# 20, PIN# 7	Cable# 21, PIN# 14
Cable# 22, PIN# 6	Cable# 23, PIN# 13
Cable# 24, PIN# 5	Cable# 25, PIN# 12
Cable# 26, PIN# 4	Cable# 27, PIN# 11
Cable# 28, PIN# 3	Cable# 29, PIN# 10
Cable# 30, PIN# 2	Cable# 31, PIN# 9
Cable# 32, PIN# 1	Cable# 33, PIN# 8

5557-14Y(FEMALE) LINKER

P6

Cable# , PIN# 5	Cable# , PIN# 10
Cable# 11, PIN# 4	Cable# , PIN# 9
Cable# 9, PIN# 3	Cable# 10, PIN# 8
Cable# 14, PIN# 2	Cable# 15, PIN# 7
Cable# 12, PIN# 1	Cable# 13, PIN# 6

CURRENT SENSOR CHB-

- + Cable# 11, COLOR BROWN
- -- Cable# 10, COLOR BLACK
- M Cable# 9, COLOR BLUE

BMS-20S SYSTEM PRINCIPLE

BMS-20S

P2

P12

LOW V, OVER I, OVER T ALARM OUT

MAIN CONTROLLER

BLACK & WHITE SCREEN MONTITOR

HIGH V ALARM OUT

P13

BMS-20S-VCT

CURRENT SENSOR

P4

P6

T SENSOR

VCT
MAIN SAMPLE MODULE

P8

BAT-1
BAT-2
BAT-3
BAT-4
BAT-5
BAT-6
BAT-7
BAT-8
BAT-9
BAT-10

P5

BAT-1
BAT-2
BAT-3
BAT-4
BAT-5
BAT-6
BAT-7
BAT-8
BAT-9
BAT-10

BMS-20S-VCT

P7

VCT
SUBORDINATE MODULE

P9

T SENSOR

BMS-20S-PW2

(INPUT: 34V -- 90V)

INPUT

2 -Vin

1 +Vin

DC 12V-+12v

DC 12V - 0V

Vout

DC/DC