FIG. 1

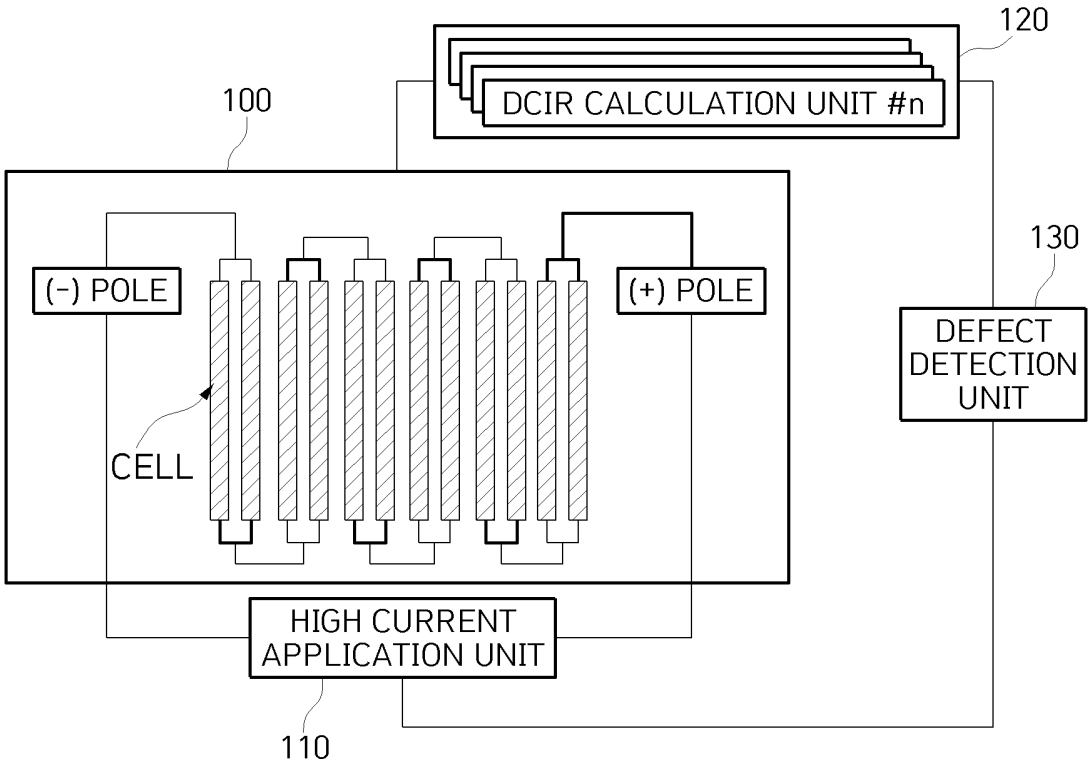

120
DCIR CALCULATION UNIT #n
100
130
(-) POLE
(+) POLE
DEFECT DETECTION UNIT
CELL
HIGH CURRENT APPLICATION UNIT
110

FIG. 2

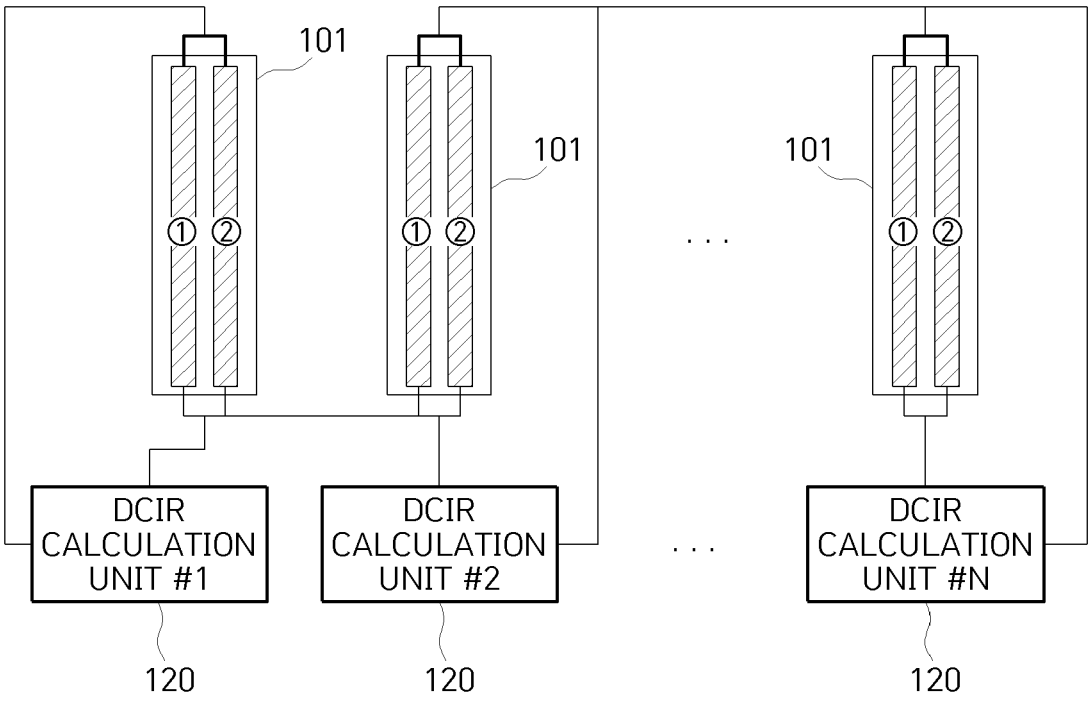

101
101
101
①
②
①
②
①
②
. . .
DCIR CALCULATION UNIT #1
DCIR CALCULATION UNIT #2
DCIR CALCULATION UNIT #N
. . .
120
120
120

FIG. 3

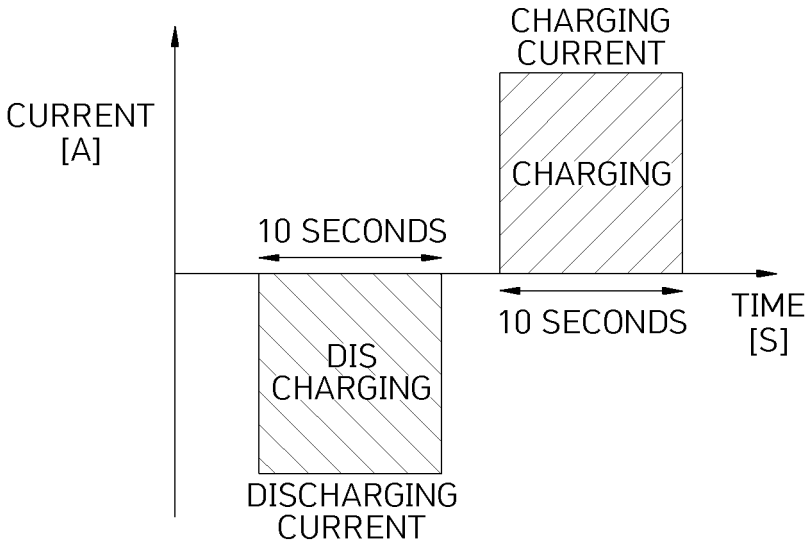

CHARGING
CURRENT
CURRENT
[A]
CHARGING
10 SECONDS
TIME
[S]
10 SECONDS
DIS
CHARGING
DISCHARGING
CURRENT

FIG. 4

ITEM	CHARGING	DISCHARGING
OCV(V)	OCV AFTER 10-SECOND 10C PULSE CHARGING	OCV AFTER 10-SECOND 10C PULSE CHARGING
DCIR(Ω)	$\frac{\Delta V \text{ VOLTAGE DROP (V)}}{\text{APPLIED CURRENT (A)}}$	
OUTPUT(W)	$\frac{\text{Vmax(Vmax - OCV)}}{\text{CHARGING DCIR (Ω)}}$	$\frac{\text{Vmin(Vmin - OCV)}}{\text{DISCHARGING DCIR (Ω)}}$

FIG. 5

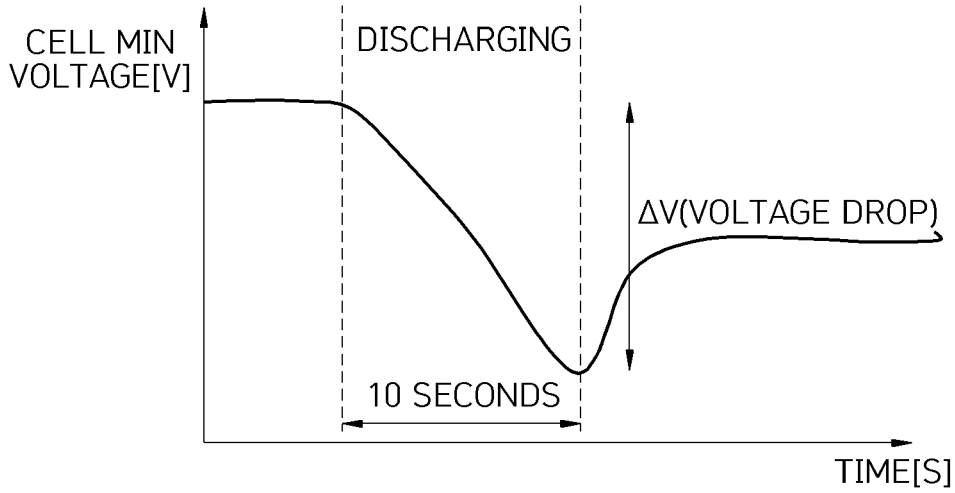

CELL MIN
VOLTAGE[V]
DISCHARGING
ΔV(VOLTAGE DROP)
10 SECONDS
TIME[S]

FIG. 6

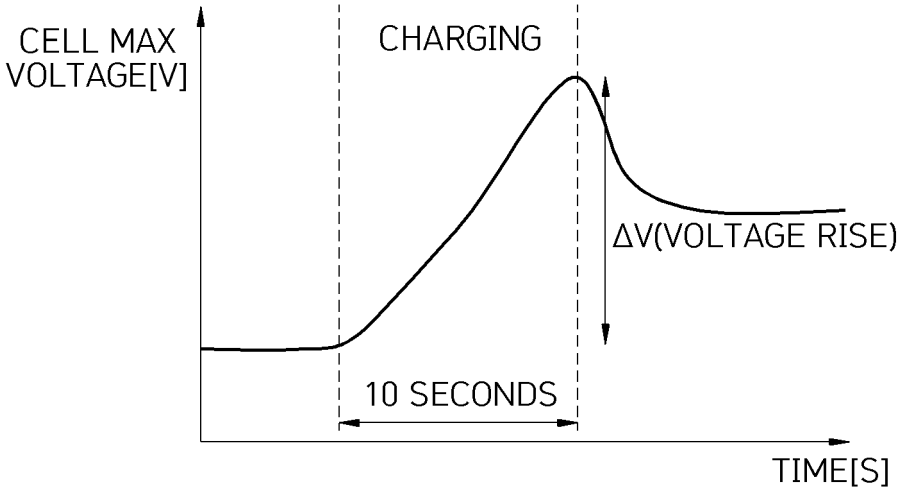

CELL MAX
VOLTAGE[V]
CHARGING
ΔV(VOLTAGE RISE)
10 SECONDS
TIME[S]

FIG. 7

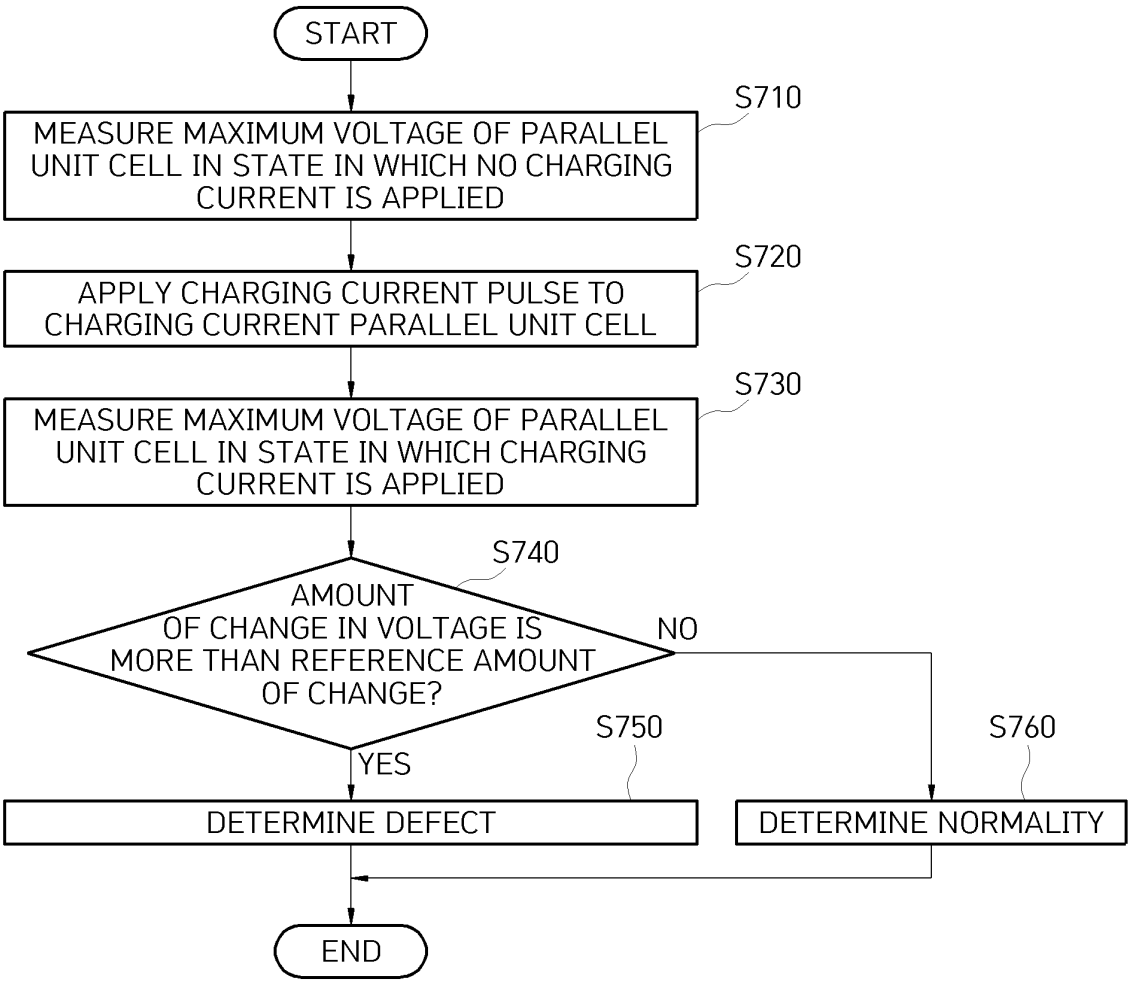

START
S710
MEASURE MAXIMUM VOLTAGE OF PARALLEL UNIT CELL IN STATE IN WHICH NO CHARGING CURRENT IS APPLIED
S720
APPLY CHARGING CURRENT PULSE TO CHARGING CURRENT PARALLEL UNIT CELL
S730
MEASURE MAXIMUM VOLTAGE OF PARALLEL UNIT CELL IN STATE IN WHICH CHARGING CURRENT IS APPLIED
S740
AMOUNT OF CHANGE IN VOLTAGE IS MORE THAN REFERENCE AMOUNT OF CHANGE?
NO
YES
S750
DETERMINE DEFECT
S760
DETERMINE NORMALITY
END

FIG. 8

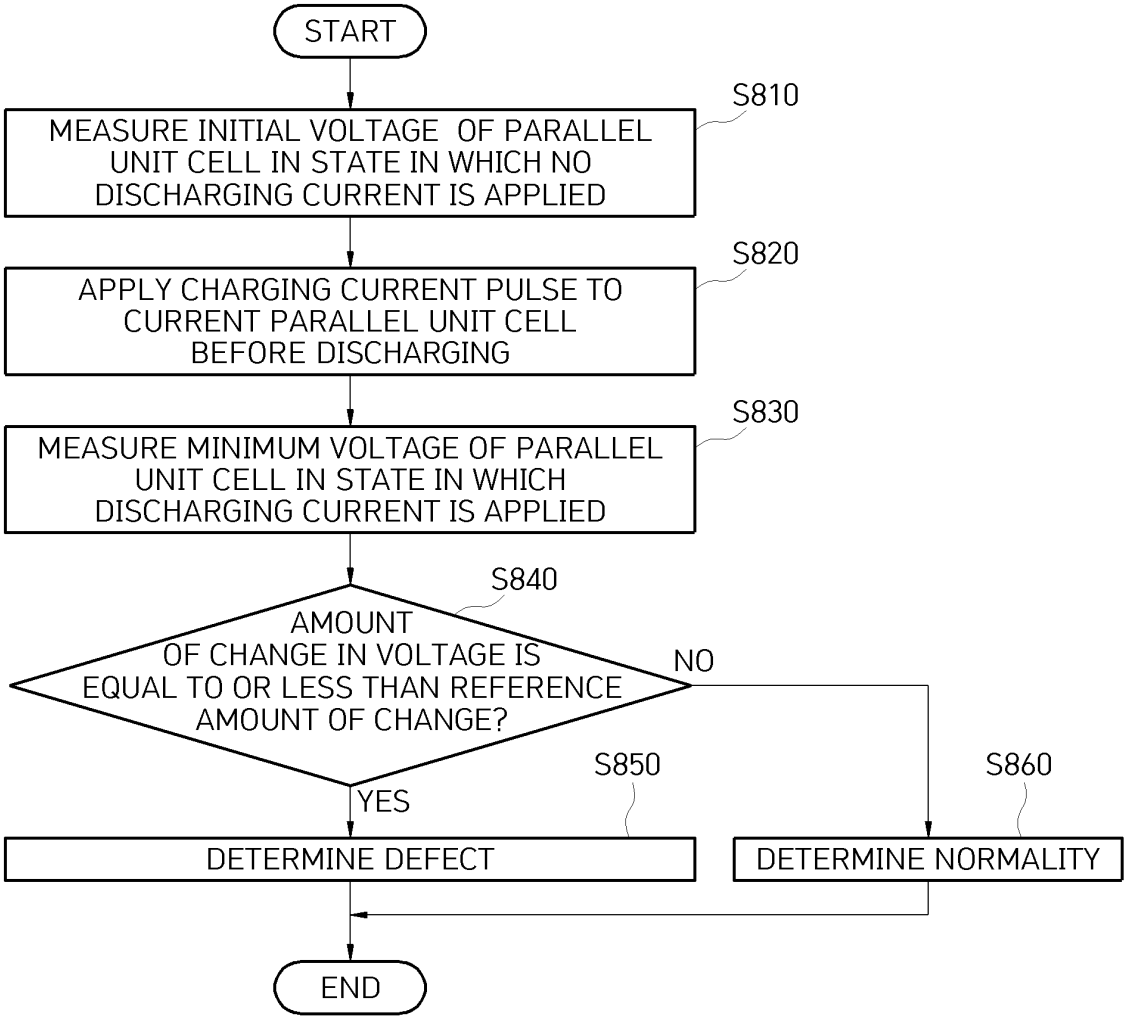
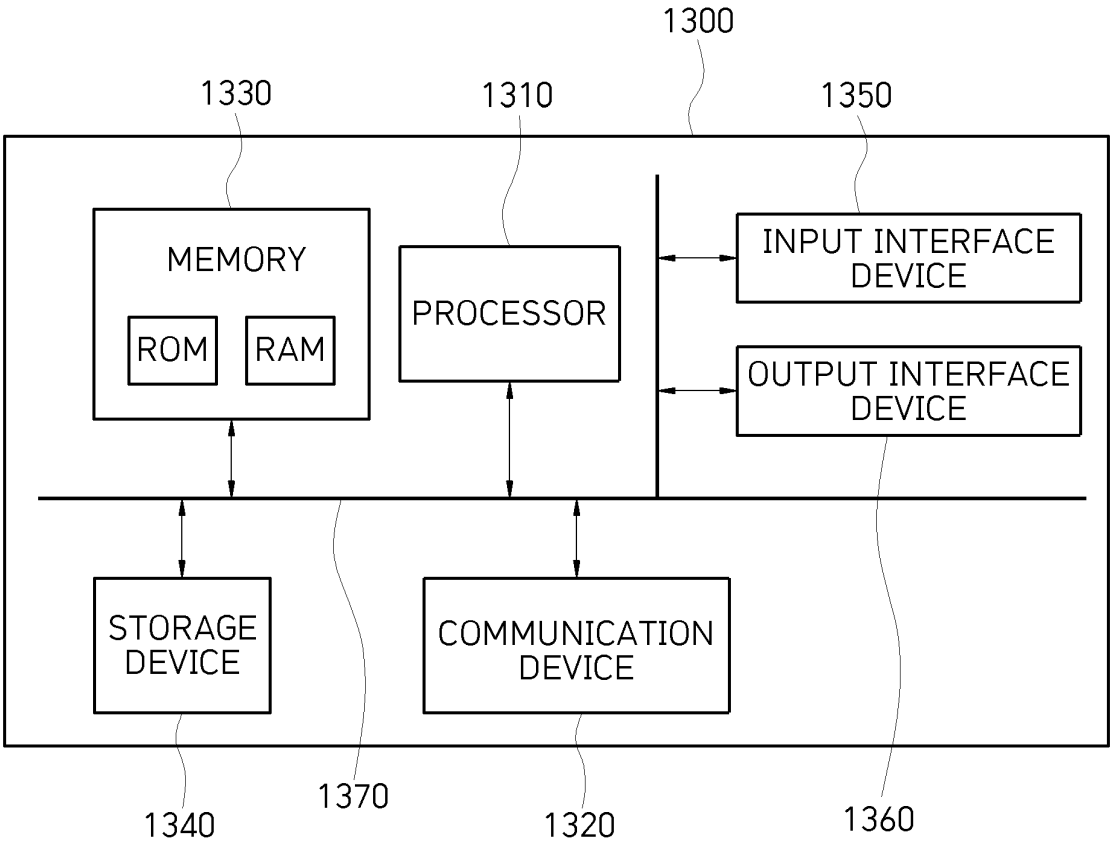

START
S810
MEASURE INITIAL VOLTAGE OF PARALLEL UNIT CELL IN STATE IN WHICH NO DISCHARGING CURRENT IS APPLIED
S820
APPLY CHARGING CURRENT PULSE TO CURRENT PARALLEL UNIT CELL BEFORE DISCHARGING
S830
MEASURE MINIMUM VOLTAGE OF PARALLEL UNIT CELL IN STATE IN WHICH DISCHARGING CURRENT IS APPLIED
S840
AMOUNT OF CHANGE IN VOLTAGE IS EQUAL TO OR LESS THAN REFERENCE AMOUNT OF CHANGE?
NO
YES
S850
DETERMINE DEFECT
S860
DETERMINE NORMALITY
END

FIG. 9


1300
1330
1310
1350
MEMORY
ROM
RAM
PROCESSOR
INPUT INTERFACE DEVICE
OUTPUT INTERFACE DEVICE
STORAGE DEVICE
COMMUNICATION DEVICE
1340
1370
1320
1360