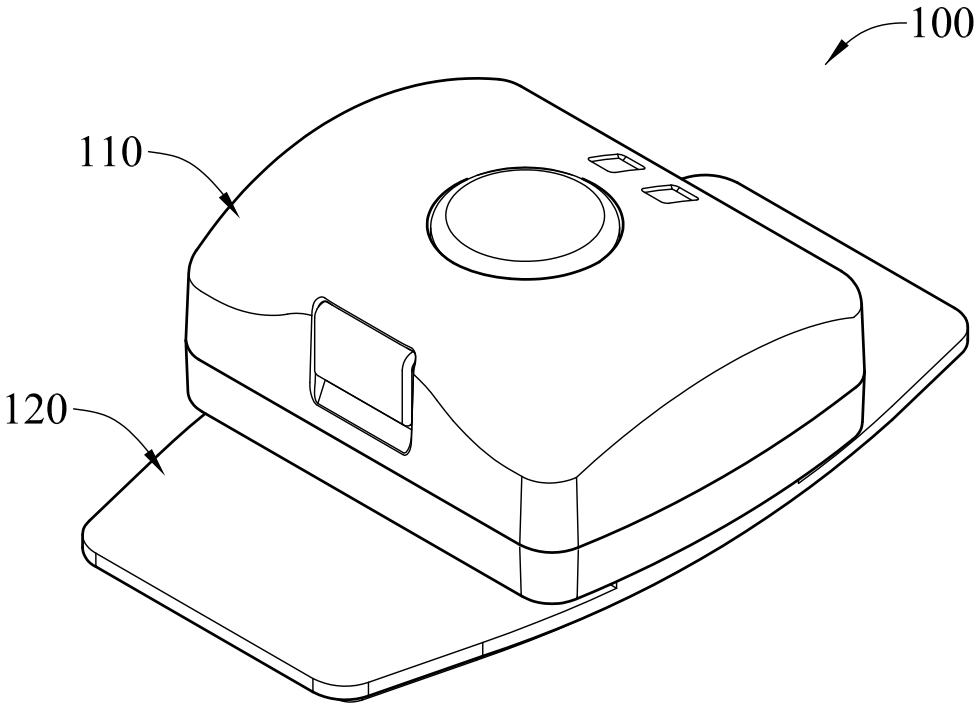


FIG. 1A

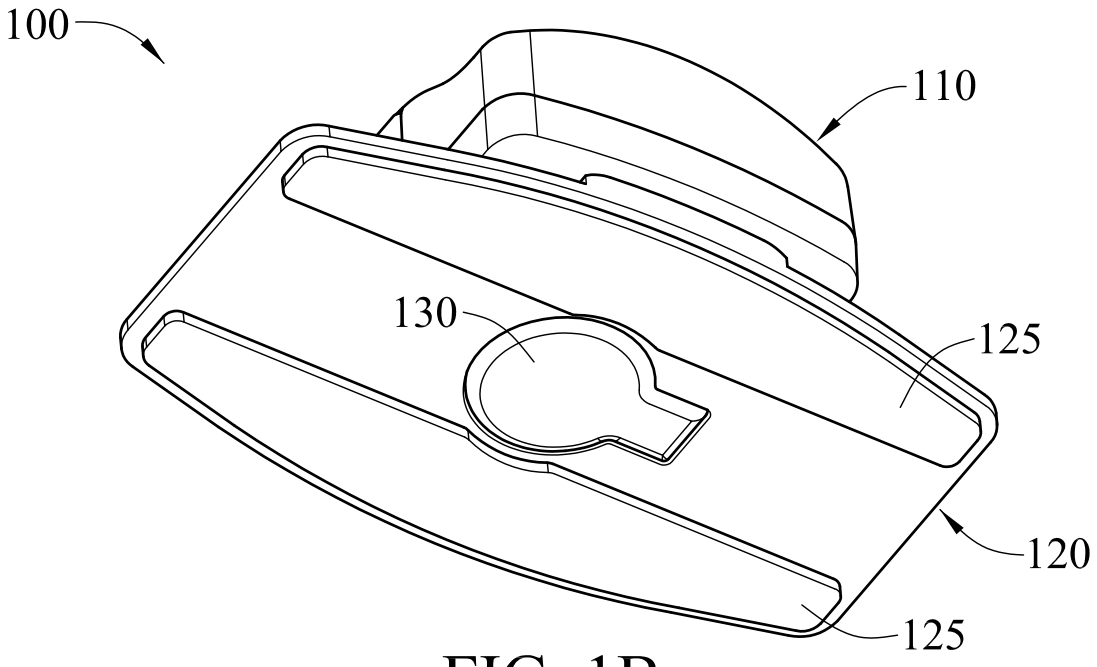


FIG. 1B

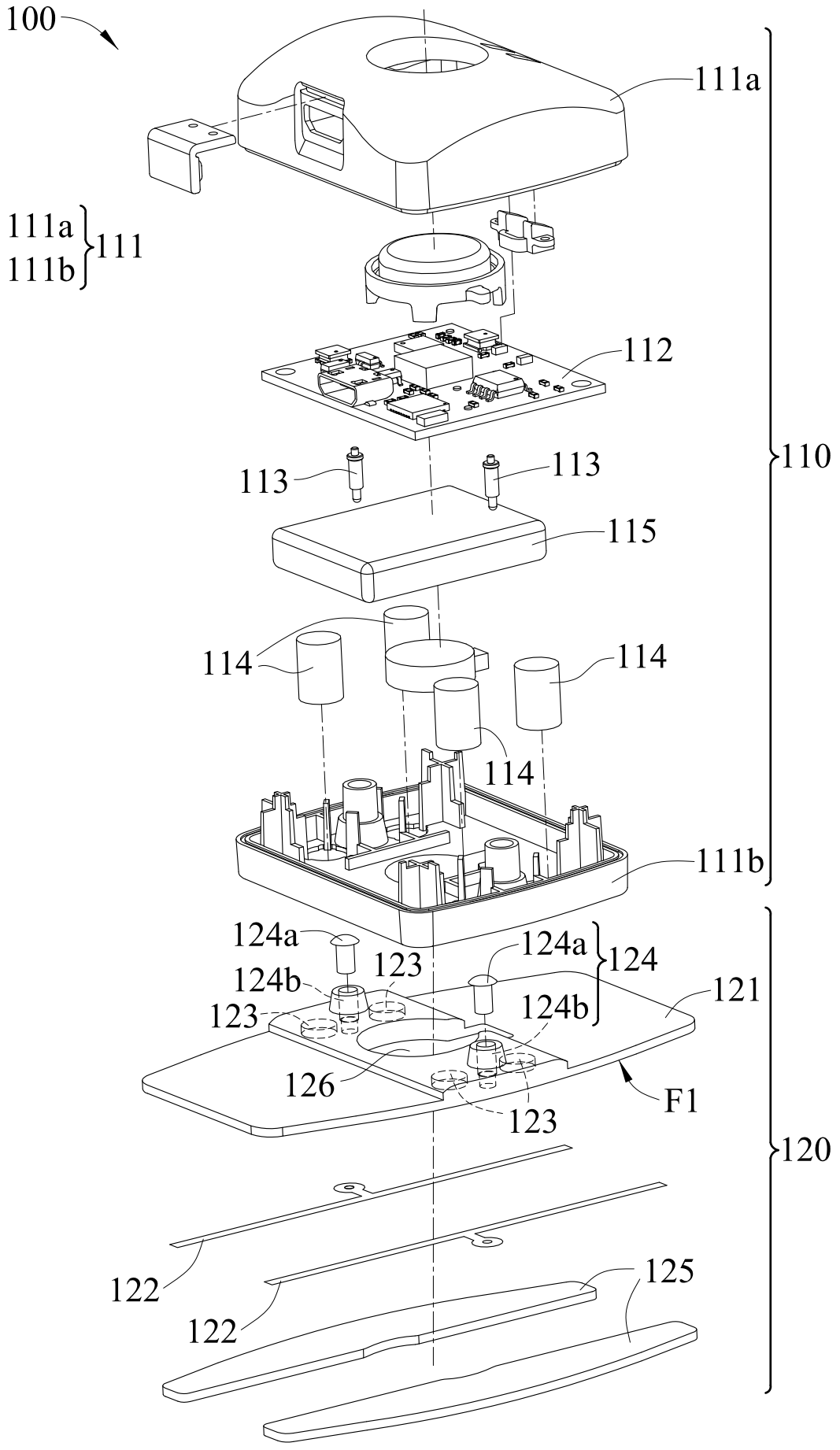

100
111a
111
111b
111a
112
113
113
110
115
114
114
114
111b
124a
124a
124
123
124b
121
123
124b
126
F1
123
120
122
125
122

FIG. 1C

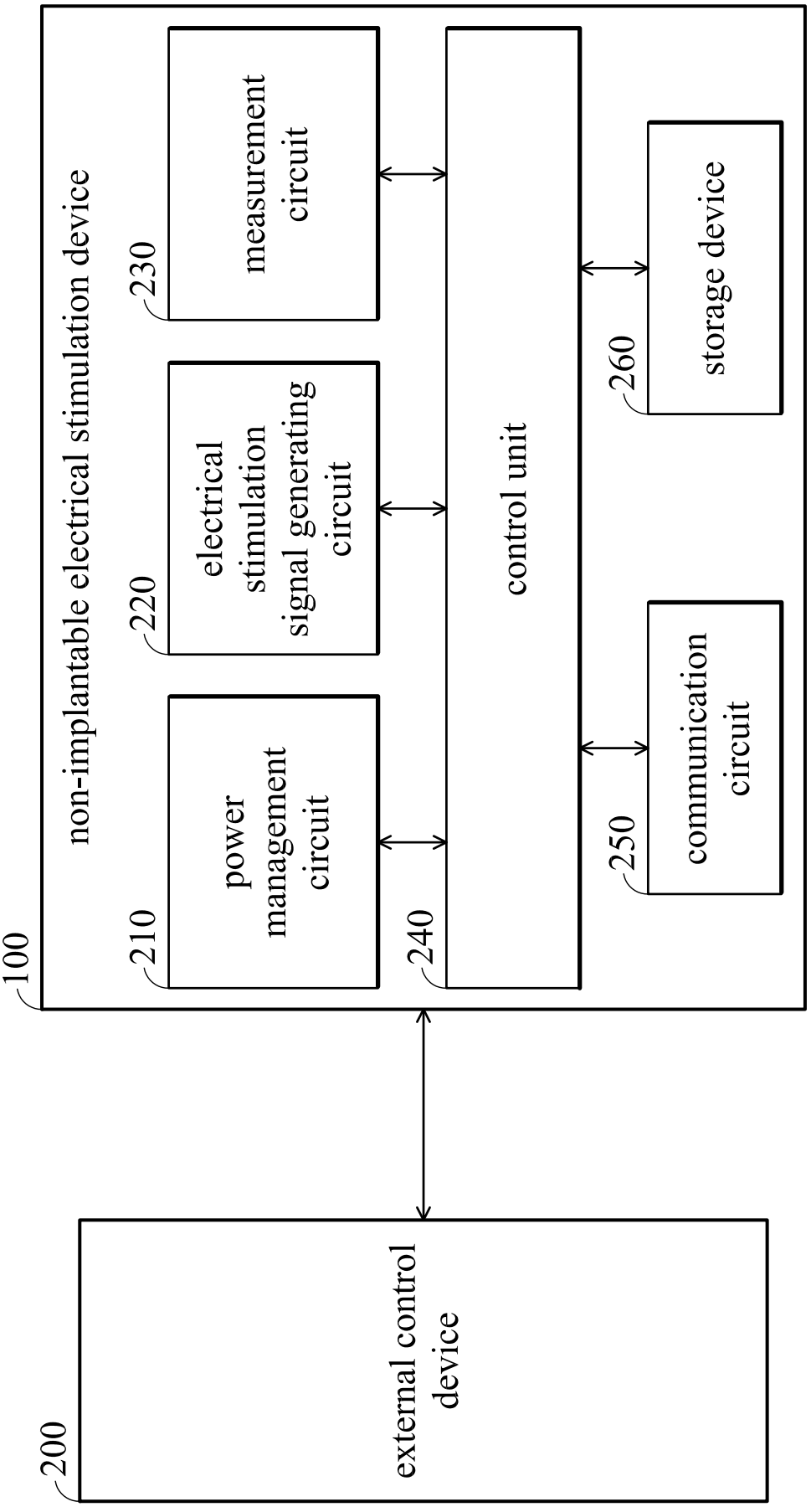

100
non-implantable electrical stimulation device
210
power management circuit
220
electrical stimulation signal generating circuit
230
measurement circuit
240
control unit
250
communication circuit
260
storage device
200
external control device

FIG. 2

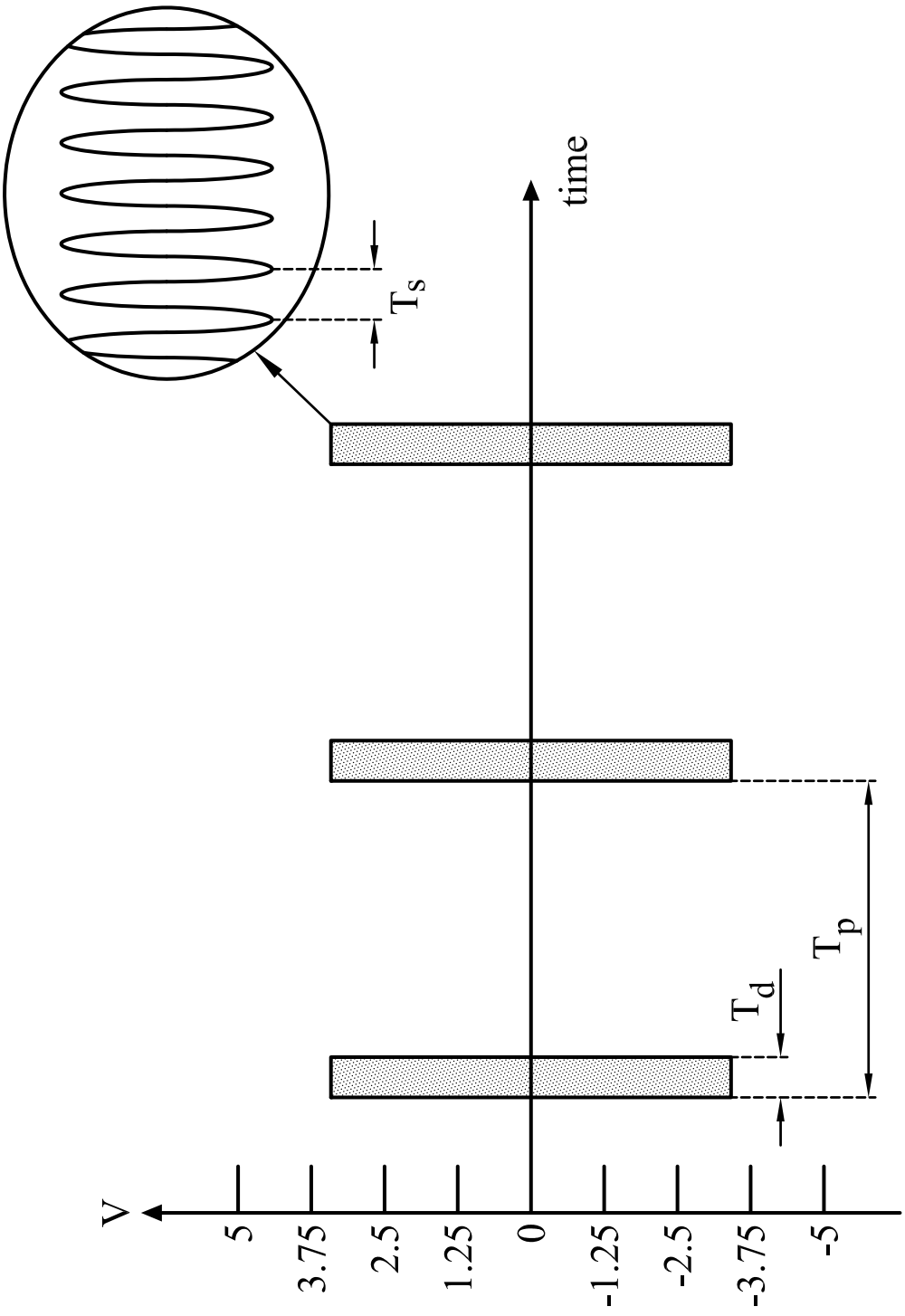


FIG. 3

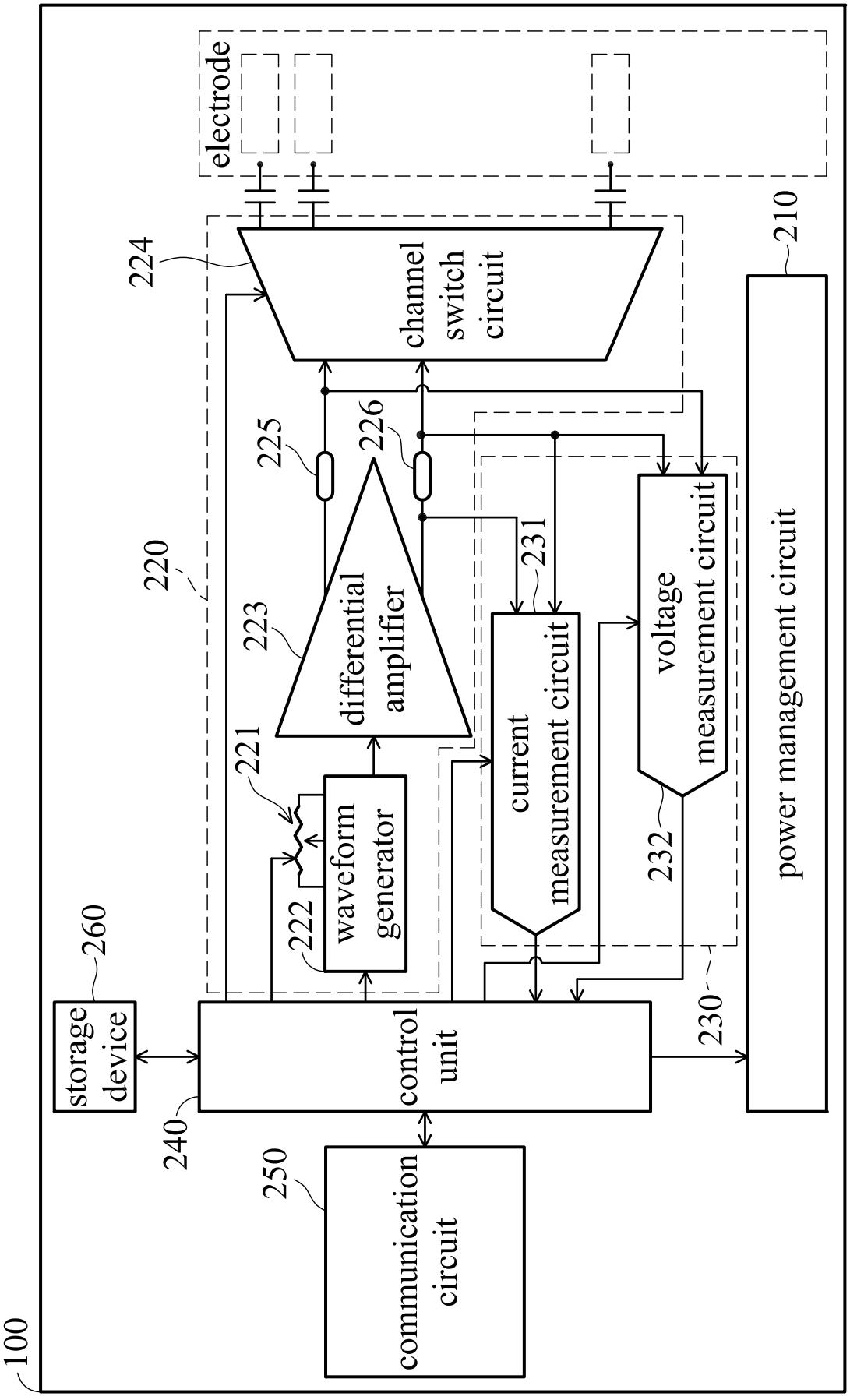

100
electrode
224
channel switch circuit
210
power management circuit
225
226
220
231
223
differential amplifier
221
waveform generator
222
current measurement circuit
voltage measurement circuit
232
260
storage device
control unit
230
240
250
communication circuit

FIG. 4

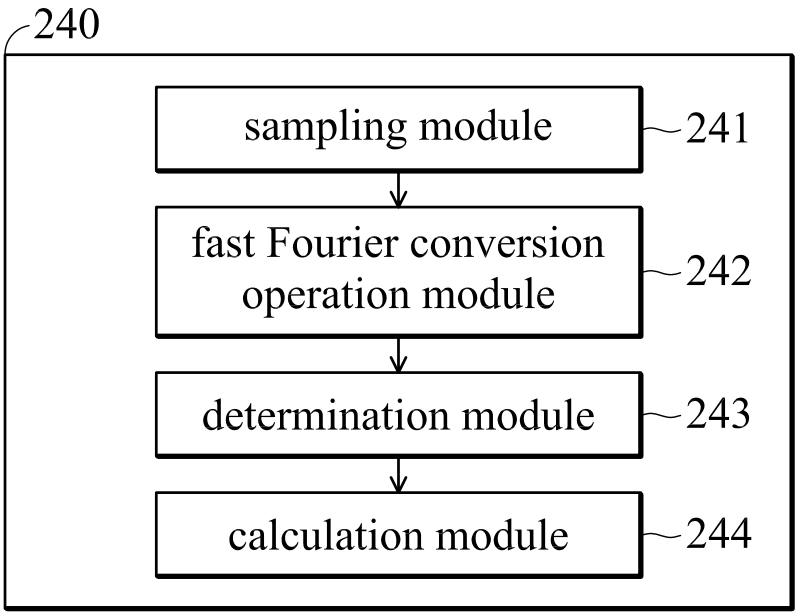

240
sampling module
241
fast Fourier conversion operation module
242
determination module
243
calculation module
244

FIG. 5

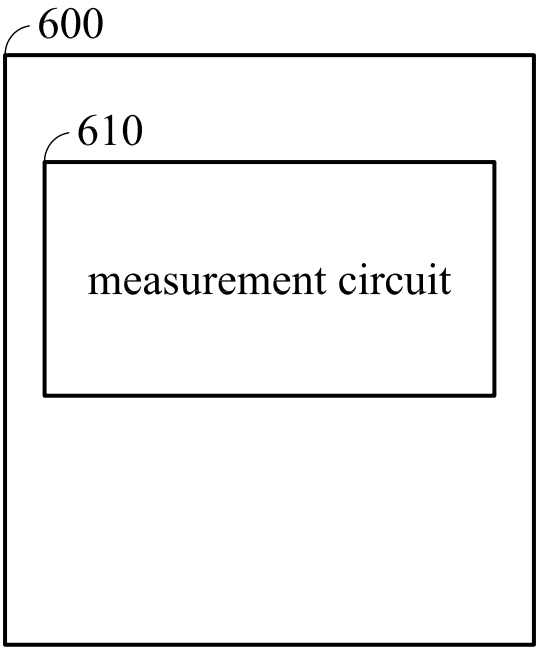

600
610
measurement circuit

FIG. 6

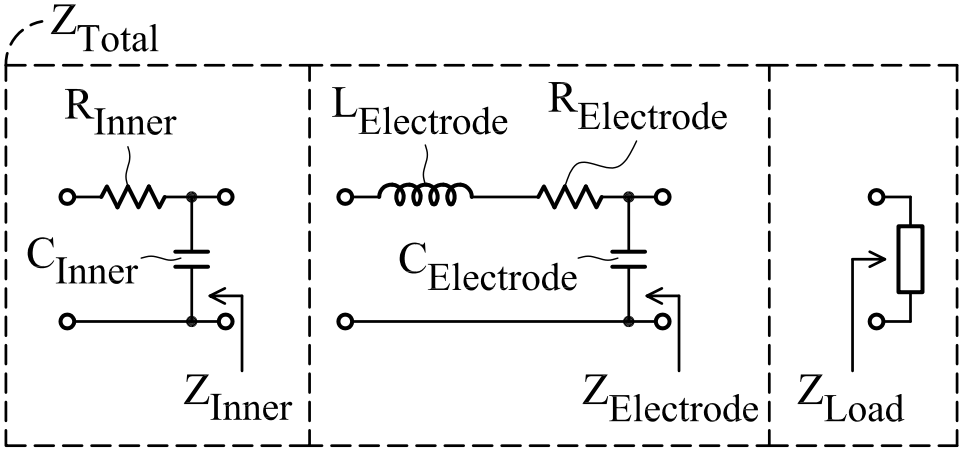

Z Total
R Inner
C Inner
Z Inner
L Electrode
R Electrode
C Electrode
Z Electrode
Z Load

FIG. 7

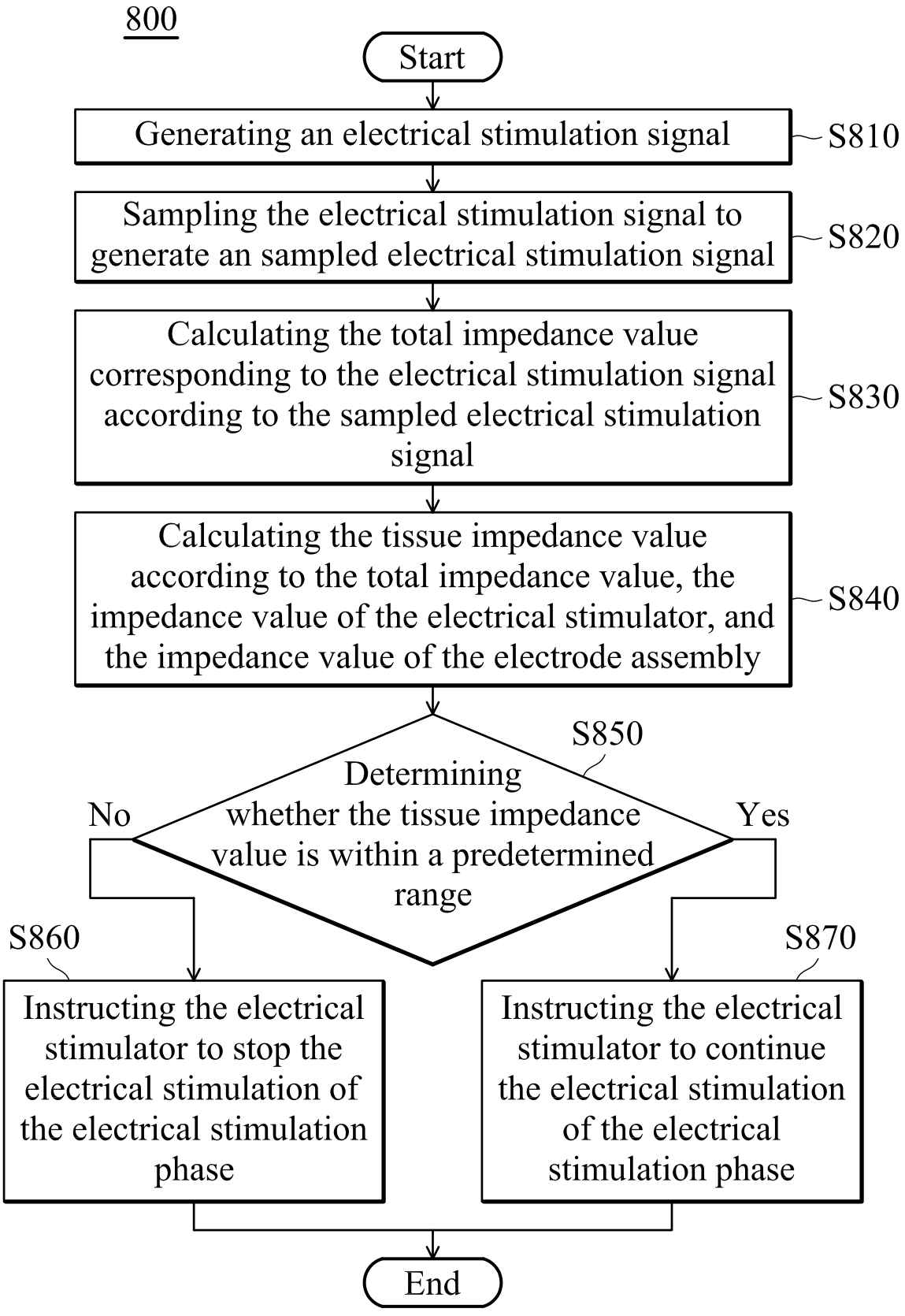

800
Start
Generating an electrical stimulation signal
S810
Sampling the electrical stimulation signal to generate an sampled electrical stimulation signal
S820
Calculating the total impedance value corresponding to the electrical stimulation signal according to the sampled electrical stimulation signal
S830
Calculating the tissue impedance value according to the total impedance value, the impedance value of the electrical stimulator, and the impedance value of the electrode assembly
S840
S850
Determining whether the tissue impedance value is within a predetermined range
No
Yes
S860
Instructing the electrical stimulator to stop the electrical stimulation of the electrical stimulation phase
S870
Instructing the electrical stimulator to continue the electrical stimulation of the electrical stimulation phase
End

FIG. 8

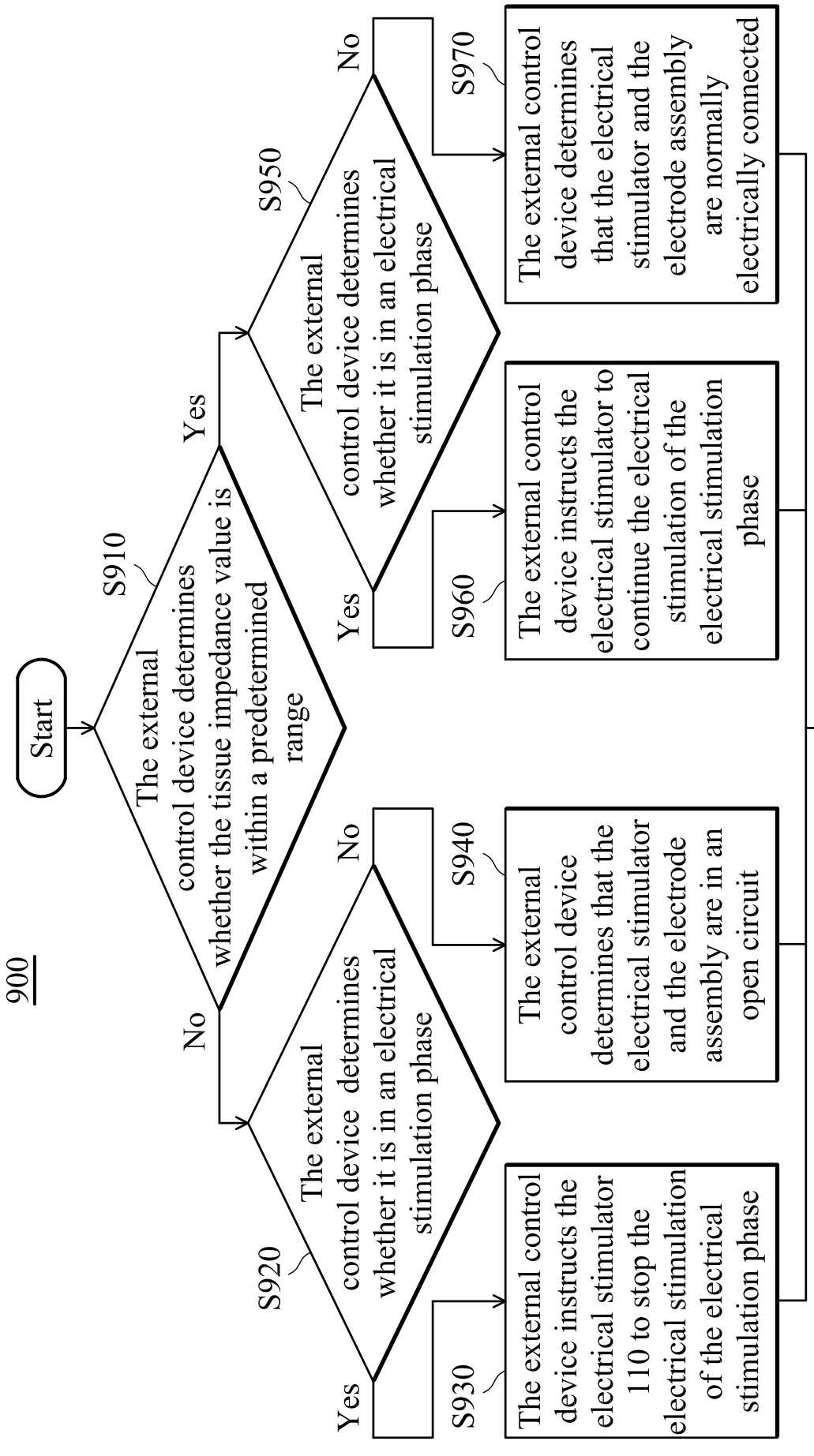

900
Start
S910
The external control device determines whether the tissue impedance value is within a predetermined range
No
Yes
S920
The external control device determines whether it is in an electrical stimulation phase
No
Yes
S930
The external control device instructs the electrical stimulator 110 to stop the electrical stimulation of the electrical stimulation phase
S940
The external control device determines that the electrical stimulator and the electrode assembly are in an open circuit
S950
The external control device determines whether it is in an electrical stimulation phase
No
Yes
S960
The external control device instructs the electrical stimulator to continue the electrical stimulation of the electrical stimulation phase
S970
The external control device determines that the electrical stimulator and the electrode assembly are normally electrically connected
End

FIG. 9

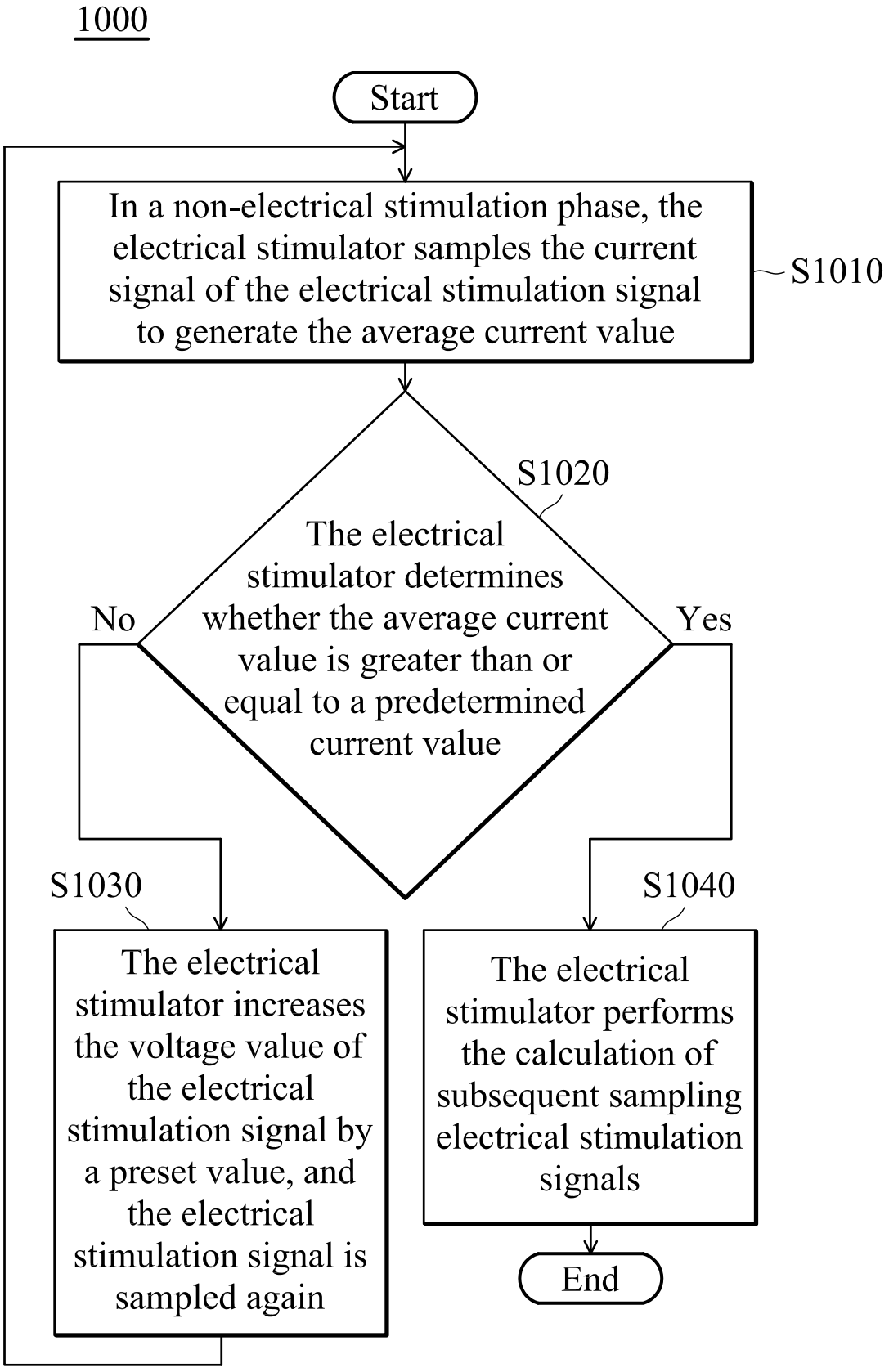

1000
Start
In a non-electrical stimulation phase, the electrical stimulator samples the current signal of the electrical stimulation signal to generate the average current value
S1010
S1020
The electrical stimulator determines whether the average current value is greater than or equal to a predetermined current value
No
Yes
S1030
The electrical stimulator increases the voltage value of the electrical stimulation signal by a preset value, and the electrical stimulation signal is sampled again
S1040
The electrical stimulator performs the calculation of subsequent sampling electrical stimulation signals
End

FIG. 10

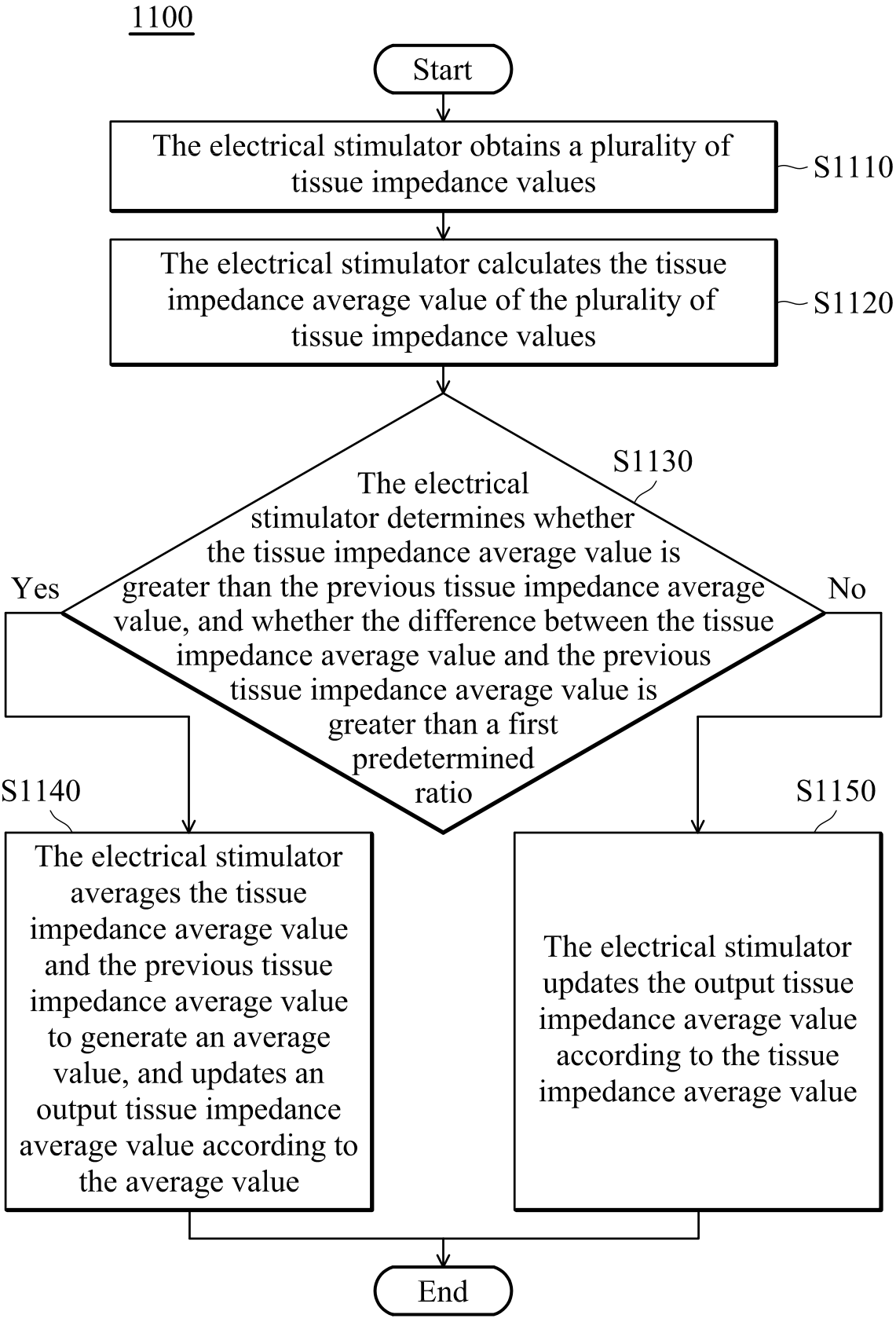

1100
Start
The electrical stimulator obtains a plurality of tissue impedance values
S1110
The electrical stimulator calculates the tissue impedance average value of the plurality of tissue impedance values
S1120
S1130
The electrical stimulator determines whether the tissue impedance average value is greater than the previous tissue impedance average value, and whether the difference between the tissue impedance average value and the previous tissue impedance average value is greater than a first predetermined ratio
Yes
No
S1140
The electrical stimulator averages the tissue impedance average value and the previous tissue impedance average value to generate an average value, and updates an output tissue impedance average value according to the average value
S1150
The electrical stimulator updates the output tissue impedance average value according to the tissue impedance average value
End

FIG. 11

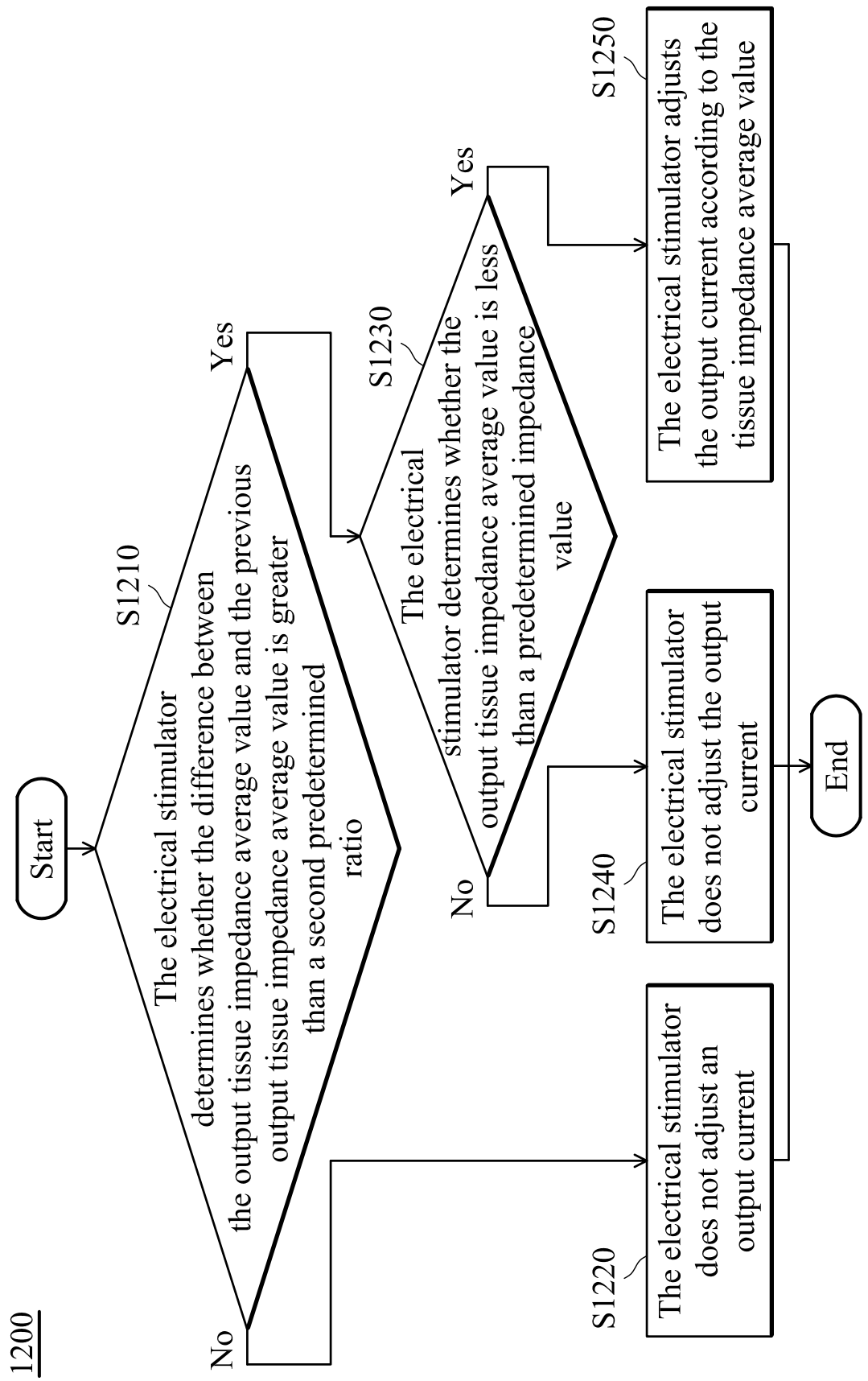

1200
Start
S1210
The electrical stimulator determines whether the difference between the output tissue impedance average value and the previous output tissue impedance average value is greater than a second predetermined ratio
Yes
No
S1220
The electrical stimulator does not adjust an output current
S1230
The electrical stimulator determines whether the output tissue impedance average value is less than a predetermined impedance value
Yes
No
S1240
The electrical stimulator does not adjust the output current
S1250
The electrical stimulator adjusts the output current according to the tissue impedance average value
End

FIG. 12