FIG. 1

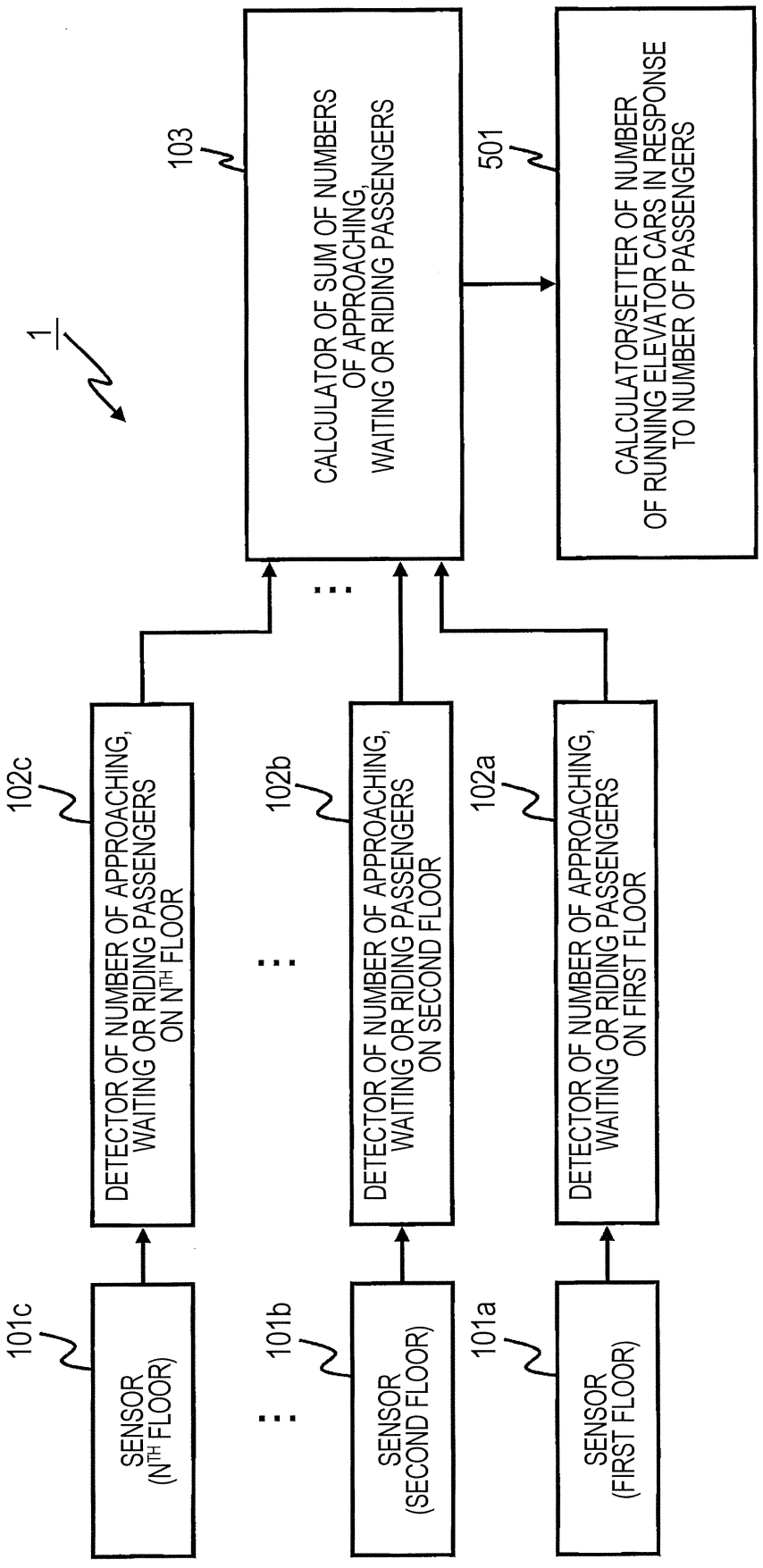

1
103
CALCULATOR OF SUM OF NUMBERS OF APPROACHING, WAITING OR RIDING PASSENGERS
501
CALCULATOR/SETTER OF NUMBER OF RUNNING ELEVATOR CARS IN RESPONSE TO NUMBER OF PASSENGERS
102c
DETECTOR OF NUMBER OF APPROACHING, WAITING OR RIDING PASSENGERS ON N^TH FLOOR
102b
DETECTOR OF NUMBER OF APPROACHING, WAITING OR RIDING PASSENGERS ON SECOND FLOOR
102a
DETECTOR OF NUMBER OF APPROACHING, WAITING OR RIDING PASSENGERS ON FIRST FLOOR
101c
SENSOR (N^TH FLOOR)
101b
SENSOR (SECOND FLOOR)
101a
SENSOR (FIRST FLOOR)

FIG. 2

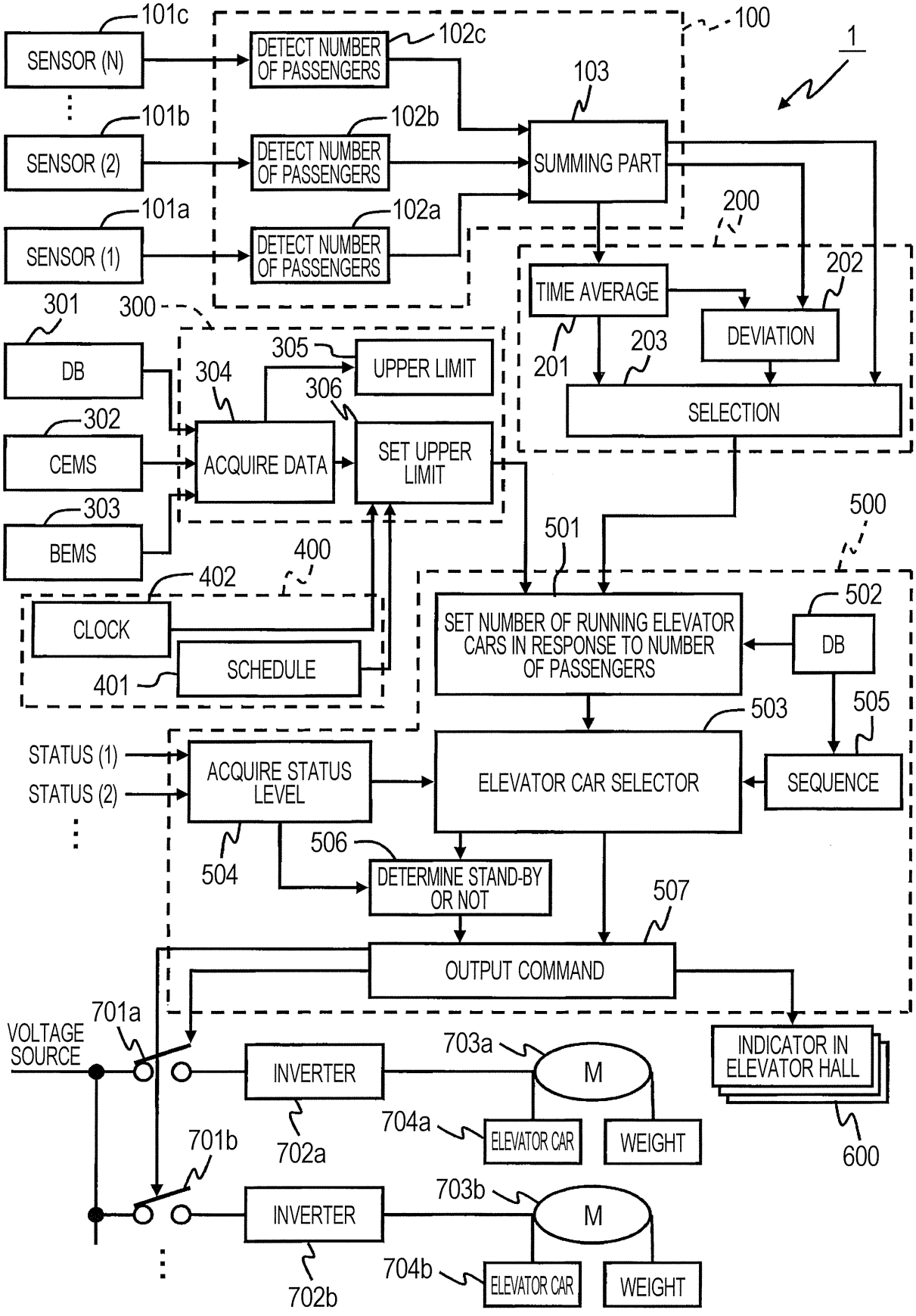
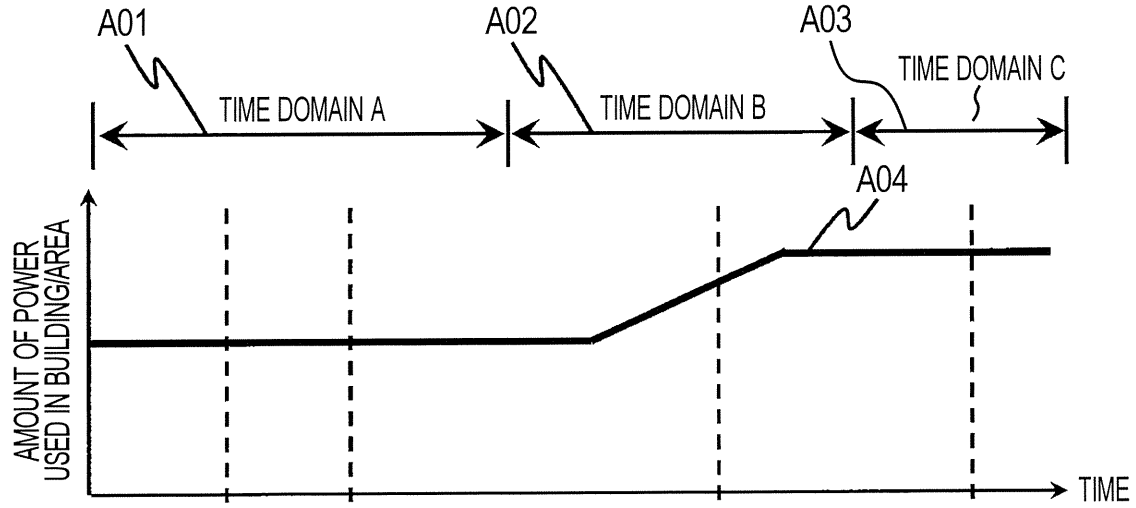
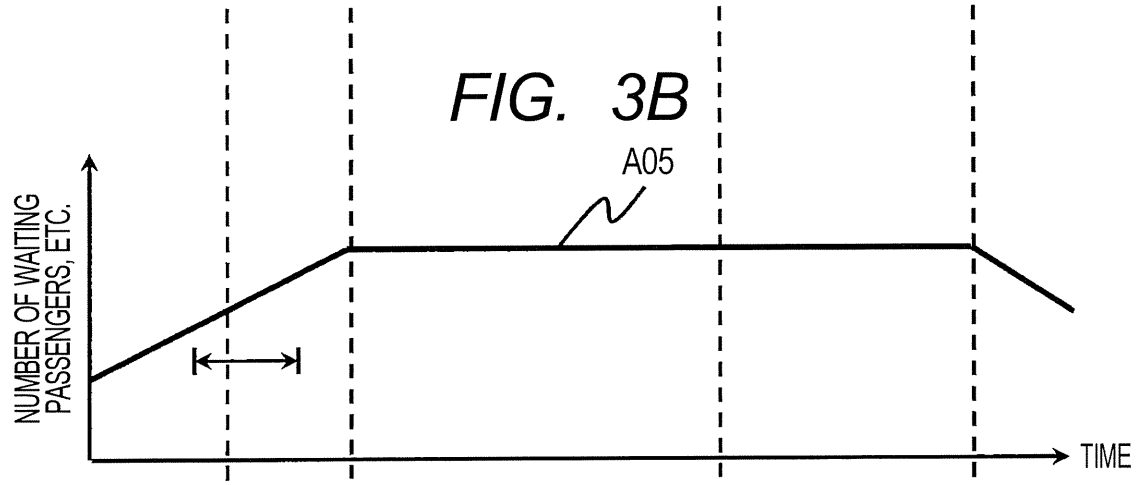

101c
SENSOR (N)
101b
SENSOR (2)
101a
SENSOR (1)
DETECT NUMBER OF PASSENGERS
102c
DETECT NUMBER OF PASSENGERS
102b
DETECT NUMBER OF PASSENGERS
102a
100
1
103
SUMMING PART
200
TIME AVERAGE
201
202
DEVIATION
203
SELECTION
301
300
DB
305
UPPER LIMIT
304
306
302
CEMS
ACQUIRE DATA
SET UPPER LIMIT
303
BEMS
400
402
CLOCK
SCHEDULE
401
500
501
SET NUMBER OF RUNNING ELEVATOR CARS IN RESPONSE TO NUMBER OF PASSENGERS
502
DB
503
505
SEQUENCE
STATUS (1)
STATUS (2)
ACQUIRE STATUS LEVEL
ELEVATOR CAR SELECTOR
504
506
DETERMINE STAND-BY OR NOT
507
OUTPUT COMMAND
701a
VOLTAGE SOURCE
INVERTER
703a
M
INDICATOR IN ELEVATOR HALL
704a
ELEVATOR CAR
WEIGHT
600
701b
702a
INVERTER
703b
M
704b
ELEVATOR CAR
WEIGHT
702b

FIG. 3A



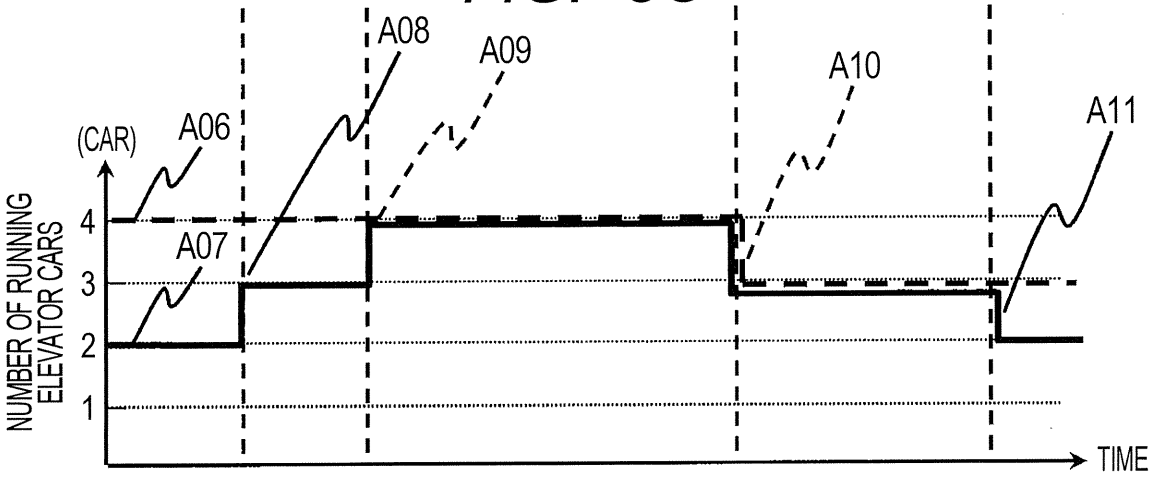

TIME VARYING AMOUNT OF POWER USED

FIG. 3B




TIME VARYING NUMBER OF WAITING PASSENGERS, ETC.

FIG. 3C




CONTROL STATUS OF NUMBER OF RUNNING ELEVATOR CARS

FIG. 4

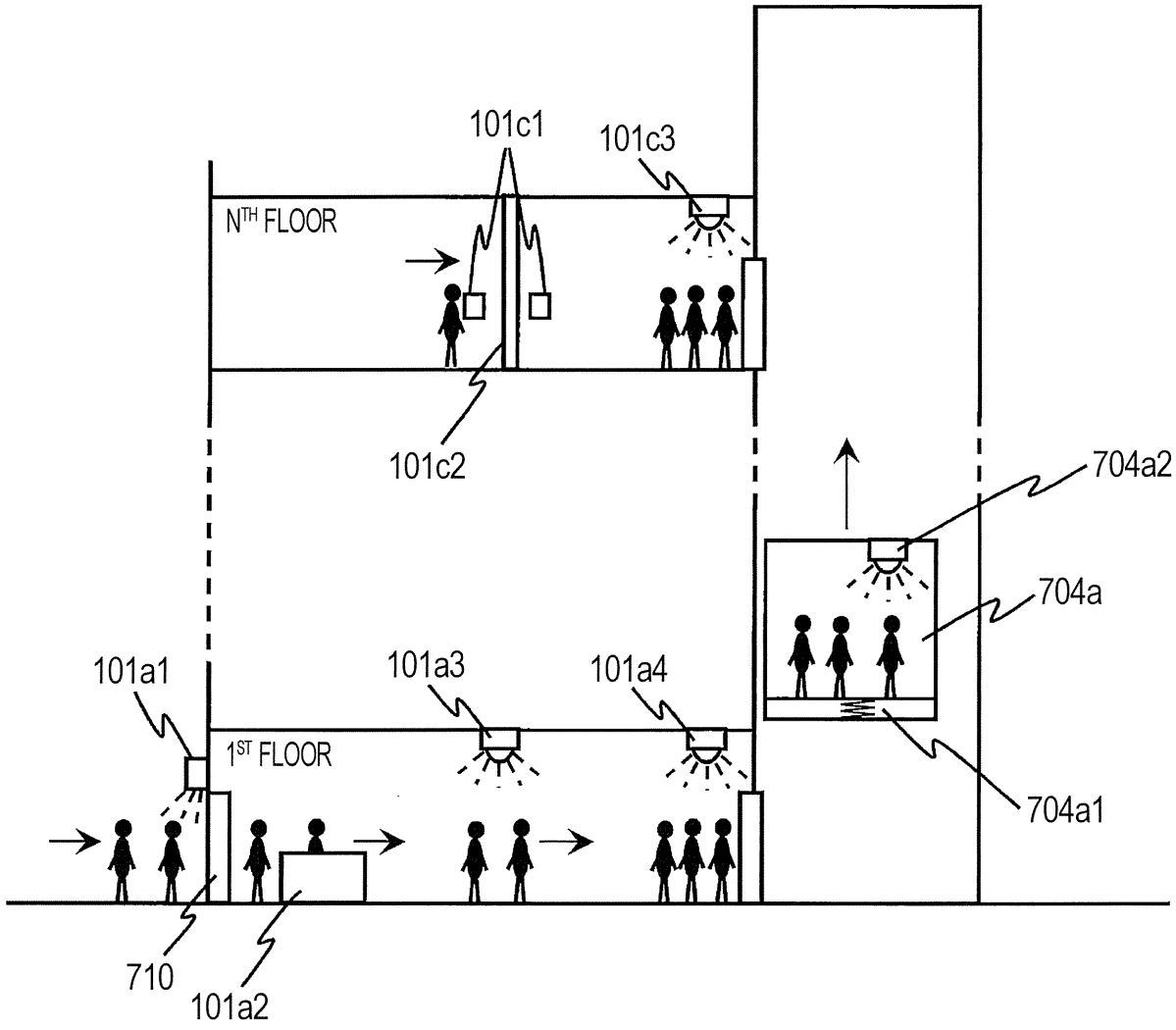

101c1
101c3
N^TH FLOOR
101c2
704a2
704a
101a1
101a3
101a4
1^ST FLOOR
704a1
710
101a2

FIG. 5

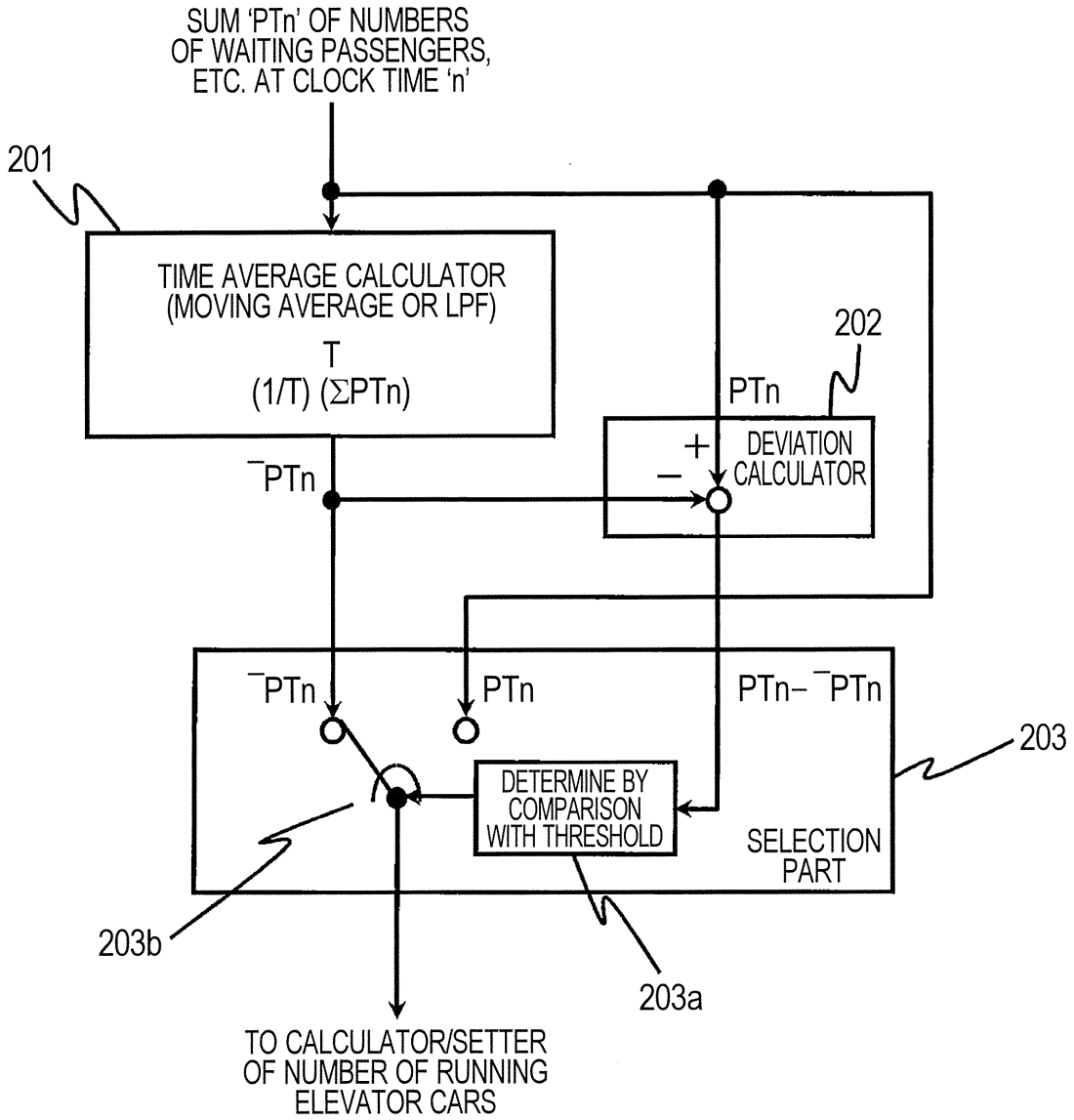

SUM 'PTn' OF NUMBERS OF WAITING PASSENGERS, ETC. AT CLOCK TIME 'n'
201
TIME AVERAGE CALCULATOR (MOVING AVERAGE OR LPF)
T
(1/T) (ΣPTn)
202
PTn
+
−
DEVIATION CALCULATOR
¯PTn
¯PTn
PTn
PTn− ¯PTn
203
DETERMINE BY COMPARISON WITH THRESHOLD
SELECTION PART
203b
203a
TO CALCULATOR/SETTER OF NUMBER OF RUNNING ELEVATOR CARS

FIG. 6

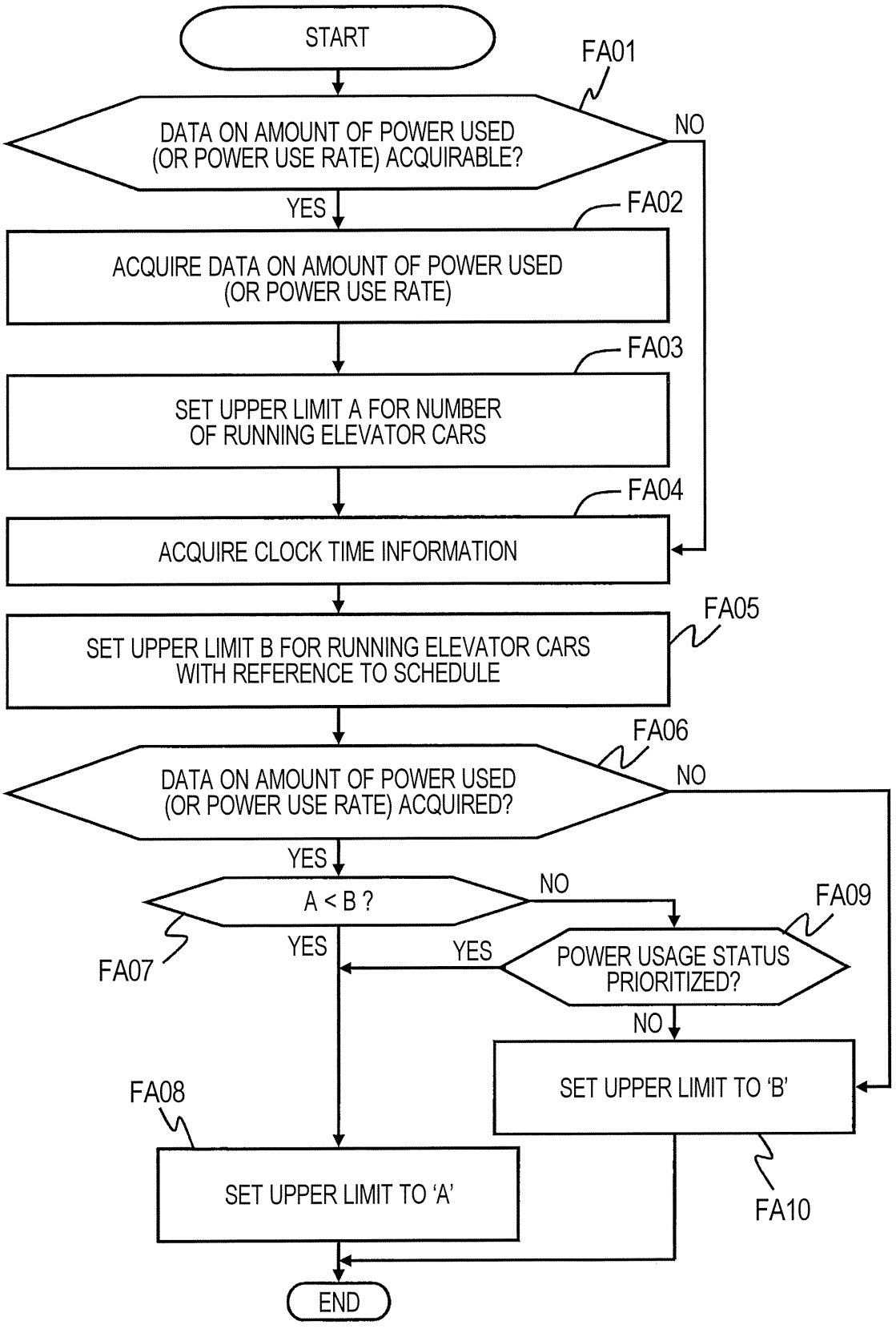

START
FA01
DATA ON AMOUNT OF POWER USED (OR POWER USE RATE) ACQUIRABLE?
NO
YES
FA02
ACQUIRE DATA ON AMOUNT OF POWER USED (OR POWER USE RATE)
FA03
SET UPPER LIMIT A FOR NUMBER OF RUNNING ELEVATOR CARS
FA04
ACQUIRE CLOCK TIME INFORMATION
FA05
SET UPPER LIMIT B FOR RUNNING ELEVATOR CARS WITH REFERENCE TO SCHEDULE
FA06
DATA ON AMOUNT OF POWER USED (OR POWER USE RATE) ACQUIRED?
NO
YES
A < B ?
NO
FA09
FA07
YES
YES
POWER USAGE STATUS PRIORITIZED?
NO
SET UPPER LIMIT TO 'B'
FA08
SET UPPER LIMIT TO 'A'
FA10
END

FIG. 7A UPPER LIMIT TABLE

CAUTION LEVEL ⟷ WARNING LEVEL ⟷

| POWER USE RATE IN POWER SYSTEM (%) | 0～75 | 75～80 | 80～90 | 90～95 | 95～100 |
|---|---|---|---|---|---|
| UPPER LIMIT FOR RUNNING ELEVATOR CARS | 4 | 3 | 2 | 1 | 0 |

FIG. 7B CHARACTERISTIC GRAPH OF UPPER LIMIT

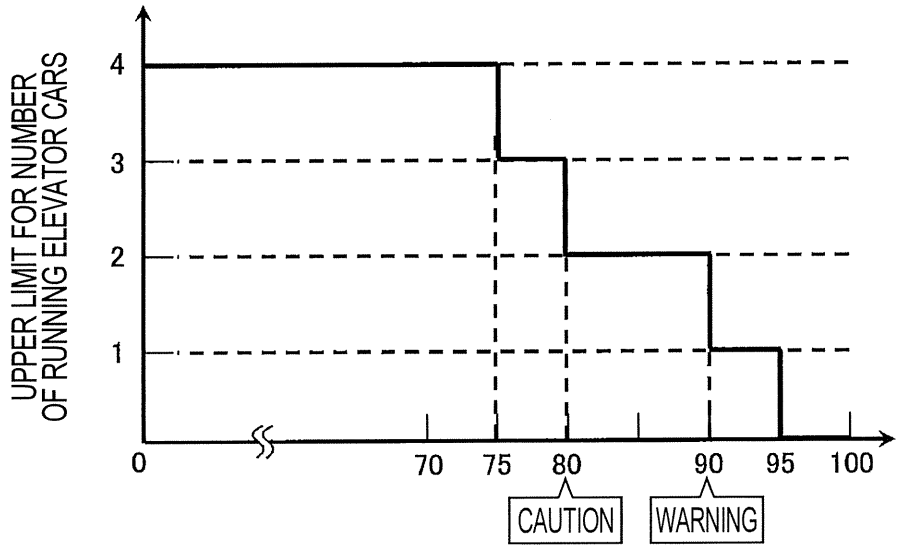


FIG. 8A SCHEDULE OF UPPER LIMIT FOR NUMBER OF RUNNING ELEVATOR CARS

| CLOCK TIME (Hr) | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UPPER LIMIT FOR NUMBER OF RUNNING ELEVATOR CARS | 4 | 4 | 4 | 3 | 3 | 2 | 2 | 3 | 4 | 4 | 4 | 4 | 4 |

FIG. 8B CHARACTERISTIC GRAPH OF SCHEDULE OF UPPER LIMIT FOR NUMBER OF RUNNING ELEVATOR CARS

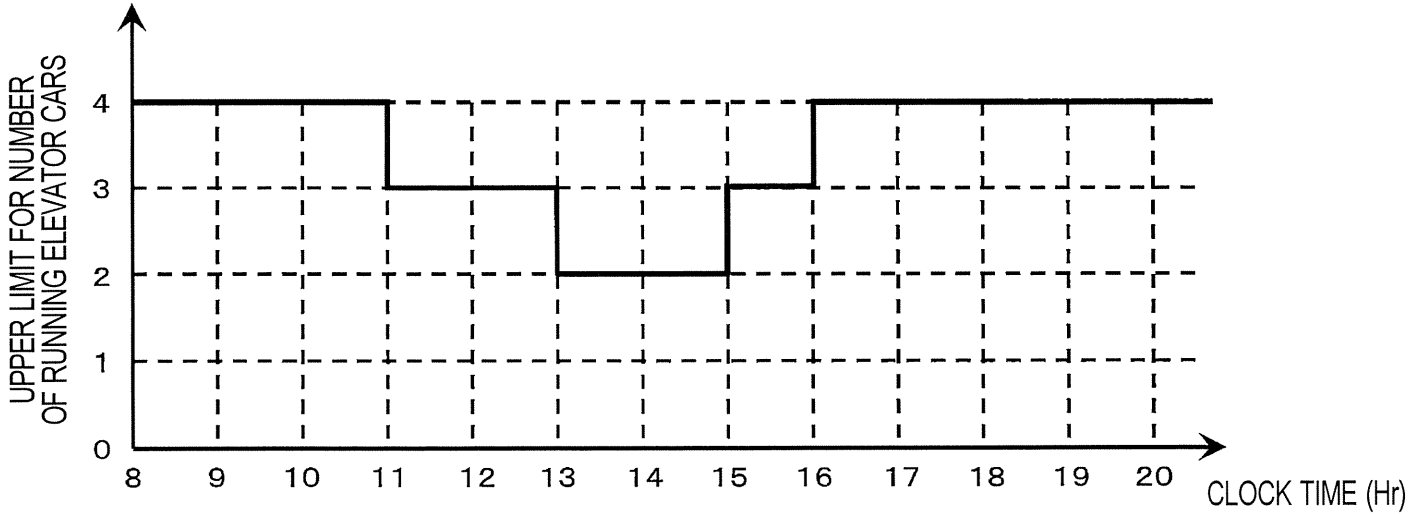


FIG. 9

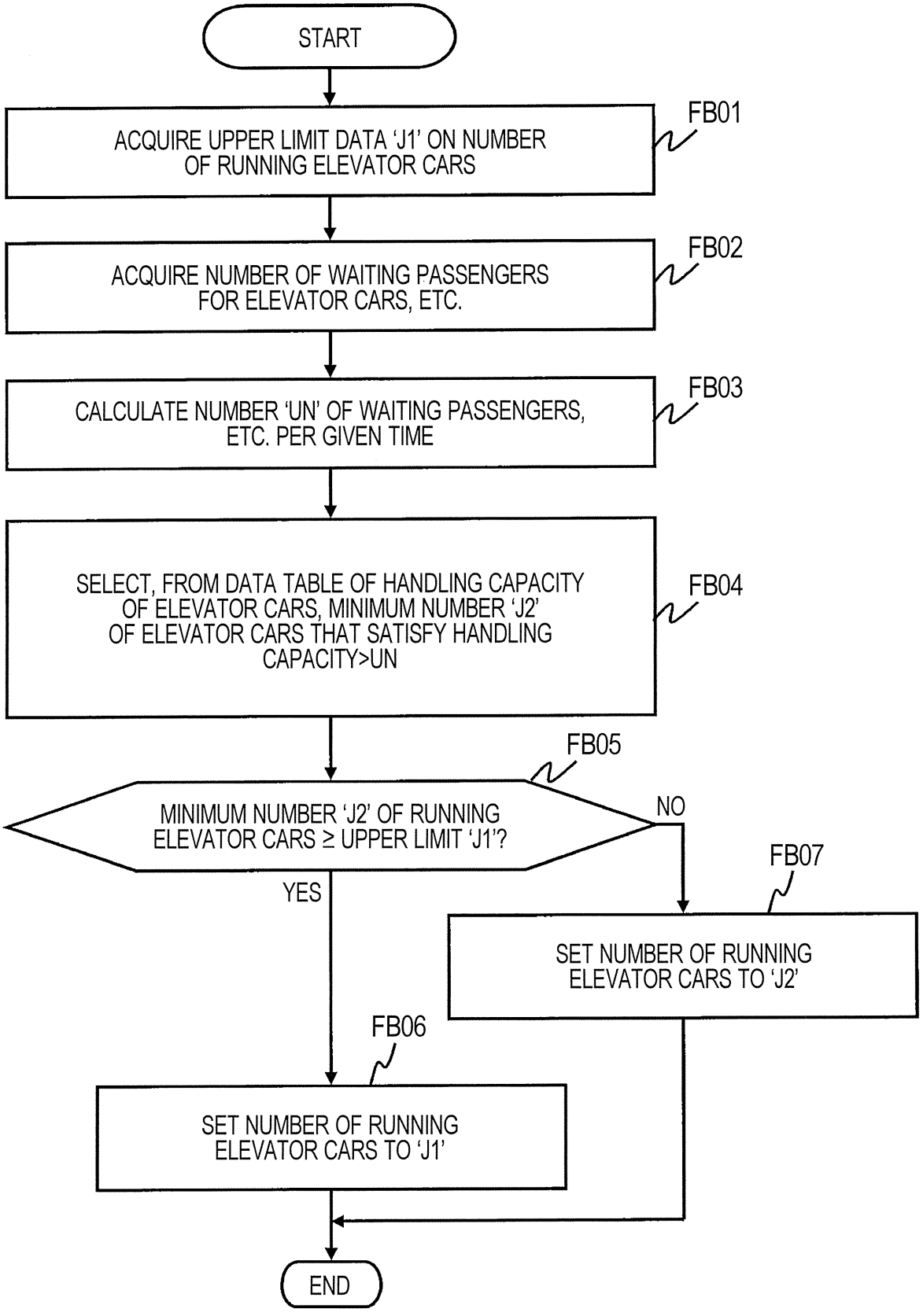

START
ACQUIRE UPPER LIMIT DATA 'J1' ON NUMBER OF RUNNING ELEVATOR CARS
FB01
ACQUIRE NUMBER OF WAITING PASSENGERS FOR ELEVATOR CARS, ETC.
FB02
CALCULATE NUMBER 'UN' OF WAITING PASSENGERS, ETC. PER GIVEN TIME
FB03
SELECT, FROM DATA TABLE OF HANDLING CAPACITY OF ELEVATOR CARS, MINIMUM NUMBER 'J2' OF ELEVATOR CARS THAT SATISFY HANDLING CAPACITY>UN
FB04
FB05
MINIMUM NUMBER 'J2' OF RUNNING ELEVATOR CARS ≥ UPPER LIMIT 'J1'?
NO
YES
FB07
SET NUMBER OF RUNNING ELEVATOR CARS TO 'J2'
FB06
SET NUMBER OF RUNNING ELEVATOR CARS TO 'J1'
END

FIG. 10

| NUMBER OF RUNNING ELEVATOR CARS | HANDLING CAPACITY OF ELEVATOR CARS (PASSENGER NUMBER/5 MINUTE PERIOD) |
|---|---|
| 1 | X X (PASSENGER NUMBER/5 MINUTE PERIOD) |
| 2 | X X (PASSENGER NUMBER/5 MINUTE PERIOD) |
| 3 | X X (PASSENGER NUMBER/5 MINUTE PERIOD) |
| 4 | X X X (PASSENGER NUMBER/5 MINUTE PERIOD) |
| 5 | X X X (PASSENGER NUMBER/5 MINUTE PERIOD) |
| 6 | X X X (PASSENGER NUMBER/5 MINUTE PERIOD) |

FIG. 11

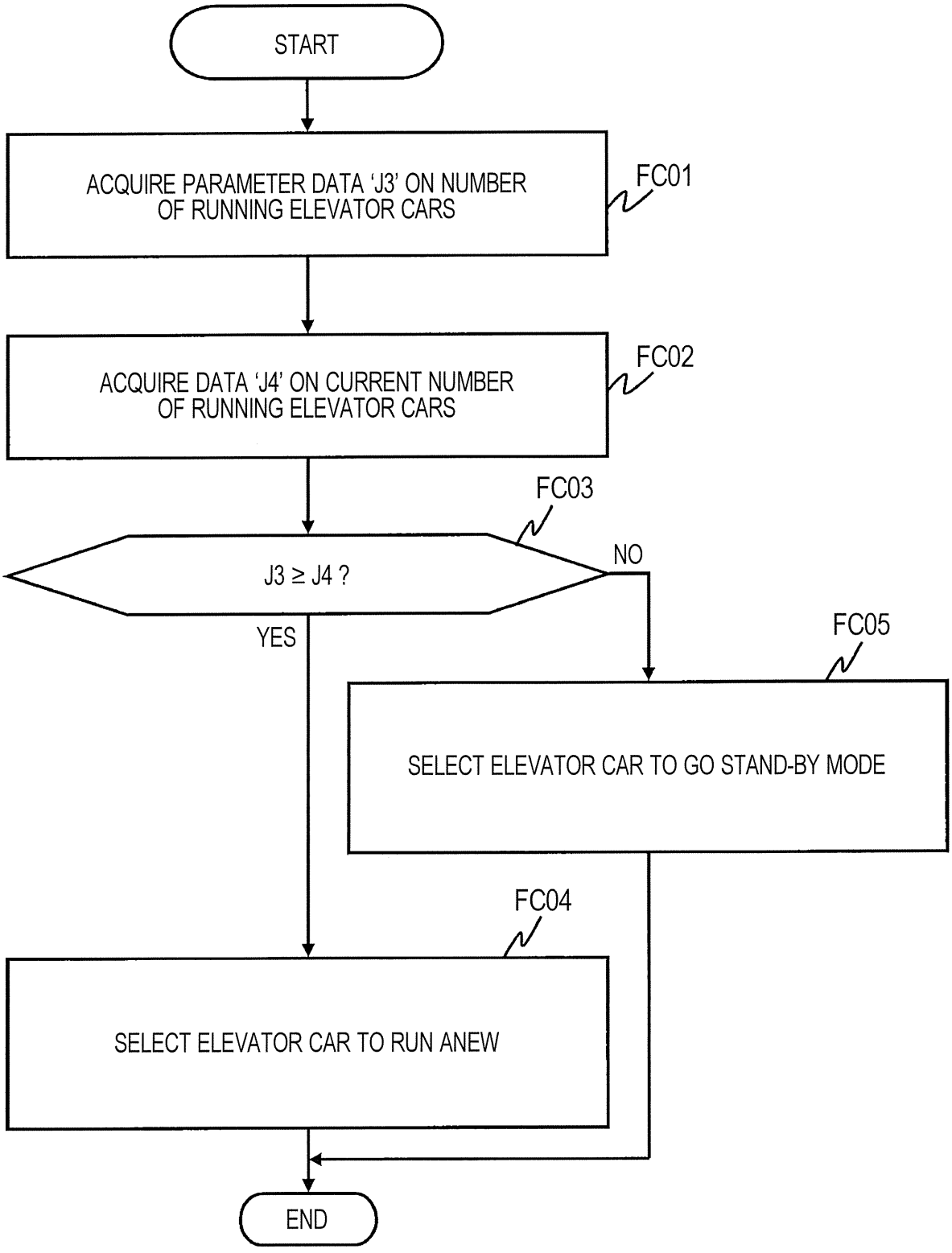
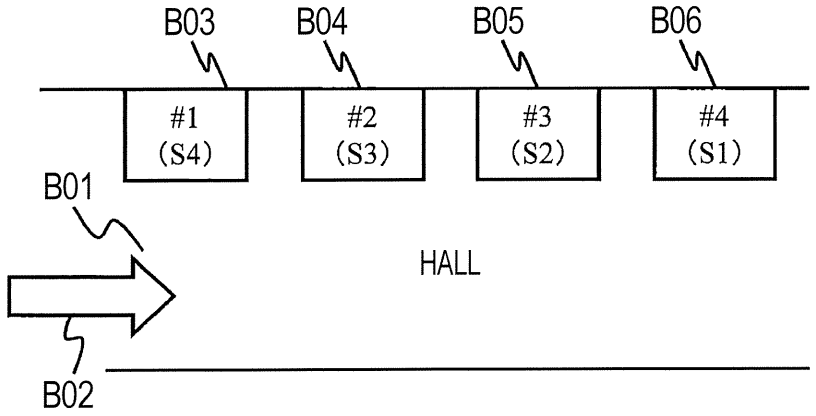

START
ACQUIRE PARAMETER DATA 'J3' ON NUMBER OF RUNNING ELEVATOR CARS
FC01
ACQUIRE DATA 'J4' ON CURRENT NUMBER OF RUNNING ELEVATOR CARS
FC02
FC03
J3 ≥ J4 ?
NO
YES
FC05
SELECT ELEVATOR CAR TO GO STAND-BY MODE
FC04
SELECT ELEVATOR CAR TO RUN ANEW
END

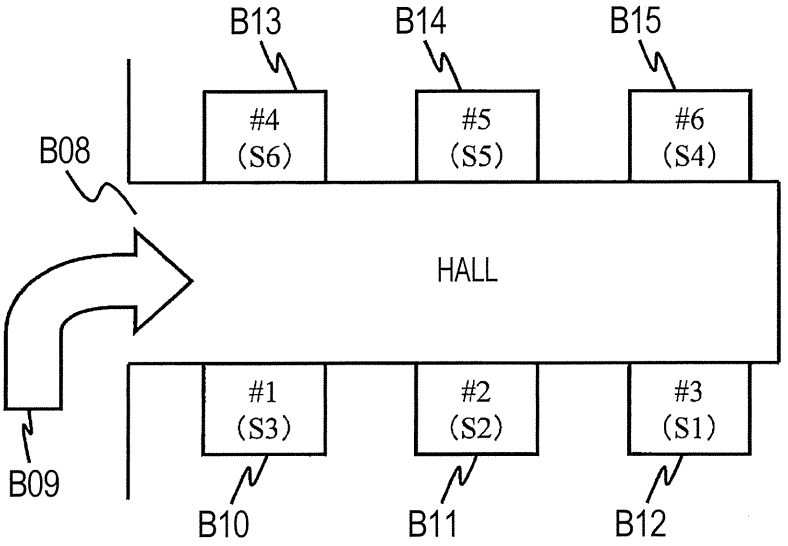
FIG. 12A ONE-SIDED LAYOUT




B07

| OFF | # |
|---|---|
| S1 | 4 |
| S2 | 3 |
| S3 | 2 |
| S4 | 1 |

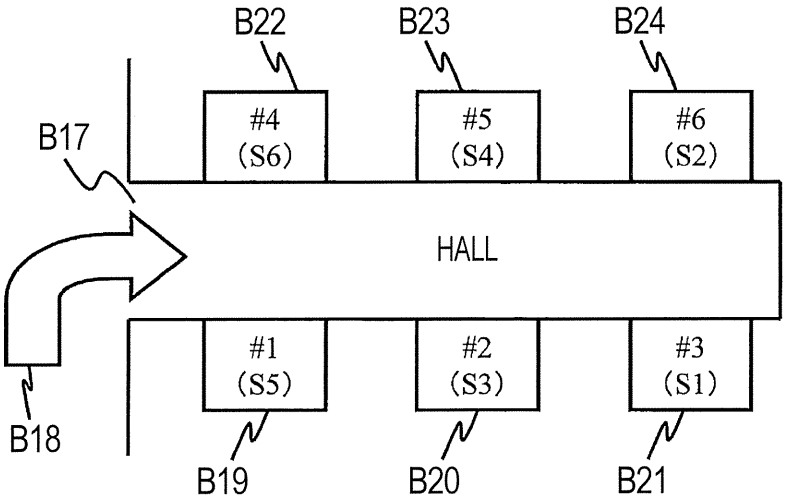
FIG. 12B FACE-TO-FACE LAYOUT




B16

| OFF | # |
|---|---|
| S1 | 3 |
| S2 | 2 |
| S3 | 1 |
| S4 | 6 |
| S5 | 5 |
| S6 | 4 |

FIG. 12C FACE-TO-FACE LAYOUT




B25

| OFF | # |
|---|---|
| S1 | 3 |
| S2 | 6 |
| S3 | 2 |
| S4 | 5 |
| S5 | 1 |
| S6 | 4 |

FIG. 13

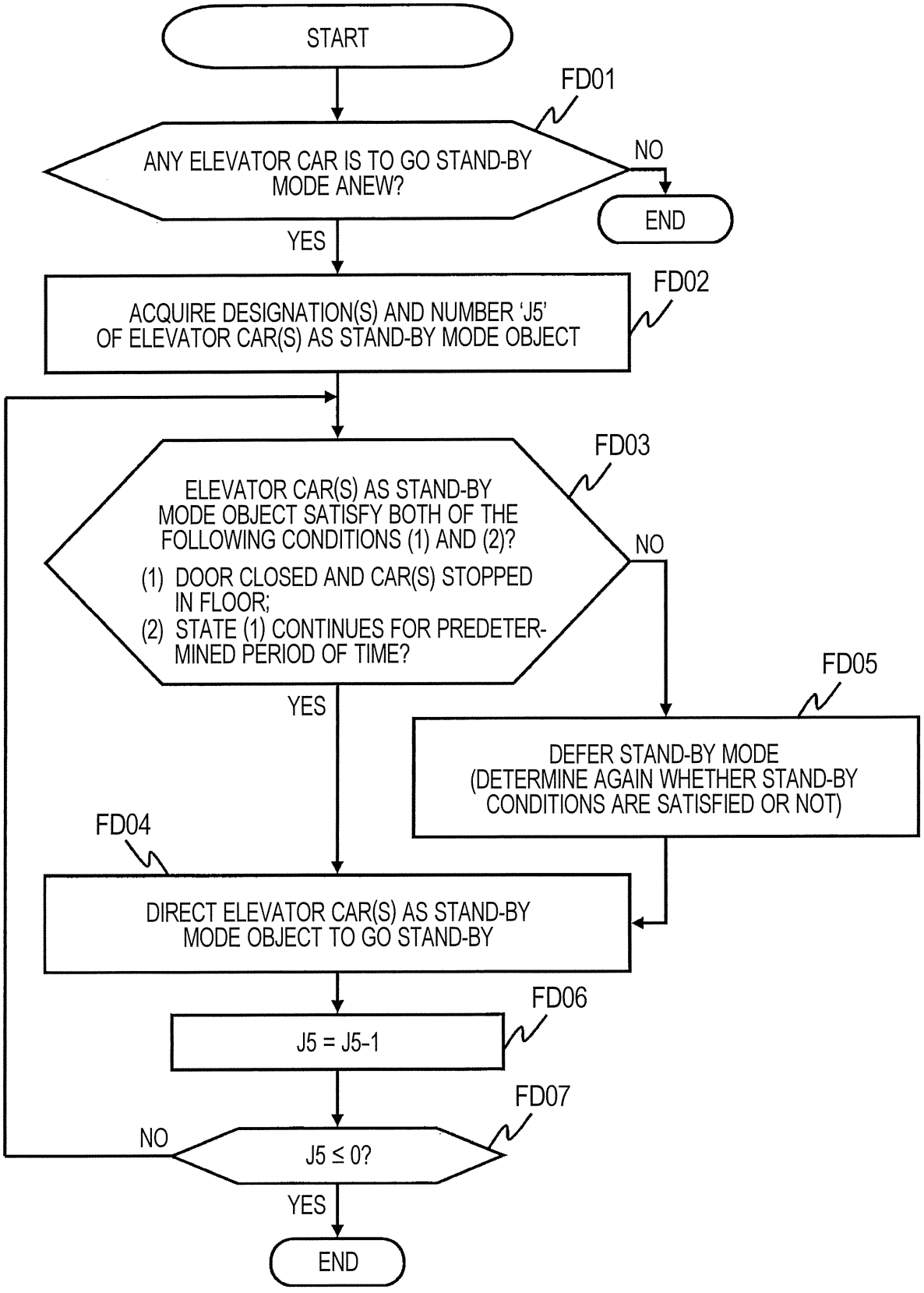

START
FD01
ANY ELEVATOR CAR IS TO GO STAND-BY MODE ANEW?
NO
END
YES
FD02
ACQUIRE DESIGNATION(S) AND NUMBER 'J5' OF ELEVATOR CAR(S) AS STAND-BY MODE OBJECT
FD03
ELEVATOR CAR(S) AS STAND-BY MODE OBJECT SATISFY BOTH OF THE FOLLOWING CONDITIONS (1) AND (2)?
(1) DOOR CLOSED AND CAR(S) STOPPED IN FLOOR;
(2) STATE (1) CONTINUES FOR PREDETERMINED PERIOD OF TIME?
NO
YES
FD05
DEFER STAND-BY MODE (DETERMINE AGAIN WHETHER STAND-BY CONDITIONS ARE SATISFIED OR NOT)
FD04
DIRECT ELEVATOR CAR(S) AS STAND-BY MODE OBJECT TO GO STAND-BY
FD06
J5 = J5-1
FD07
NO
J5 ≤ 0?
YES
END

FIG. 14A COLLECTIVE DISPLAY OF STATUSES OF ALL ELEVATOR CARS

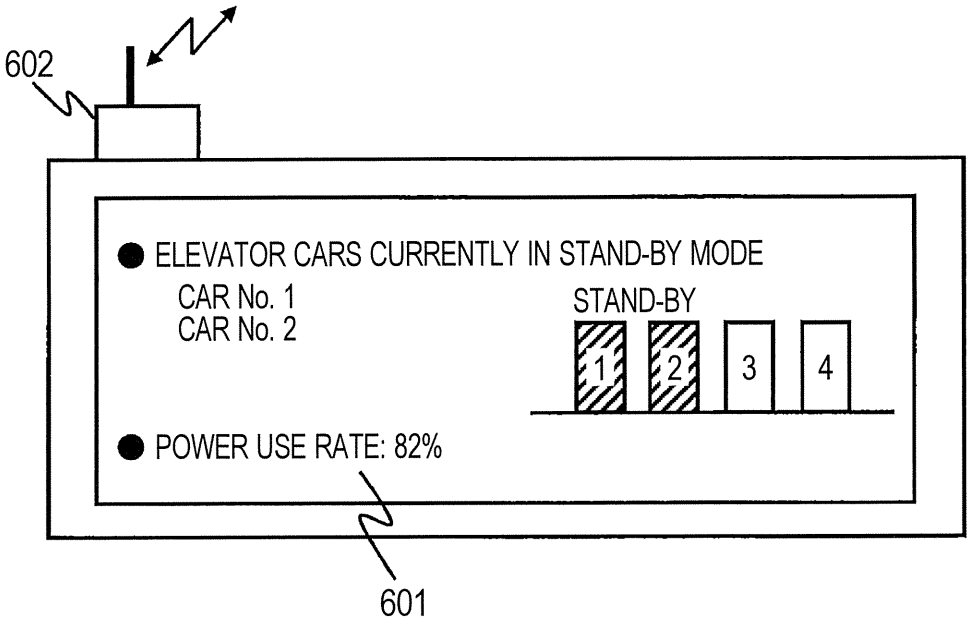



FIG. 14B INDIVIDUAL DISPLAYS OF STATUSES OF ELEVATOR CARS

