FIG. 1

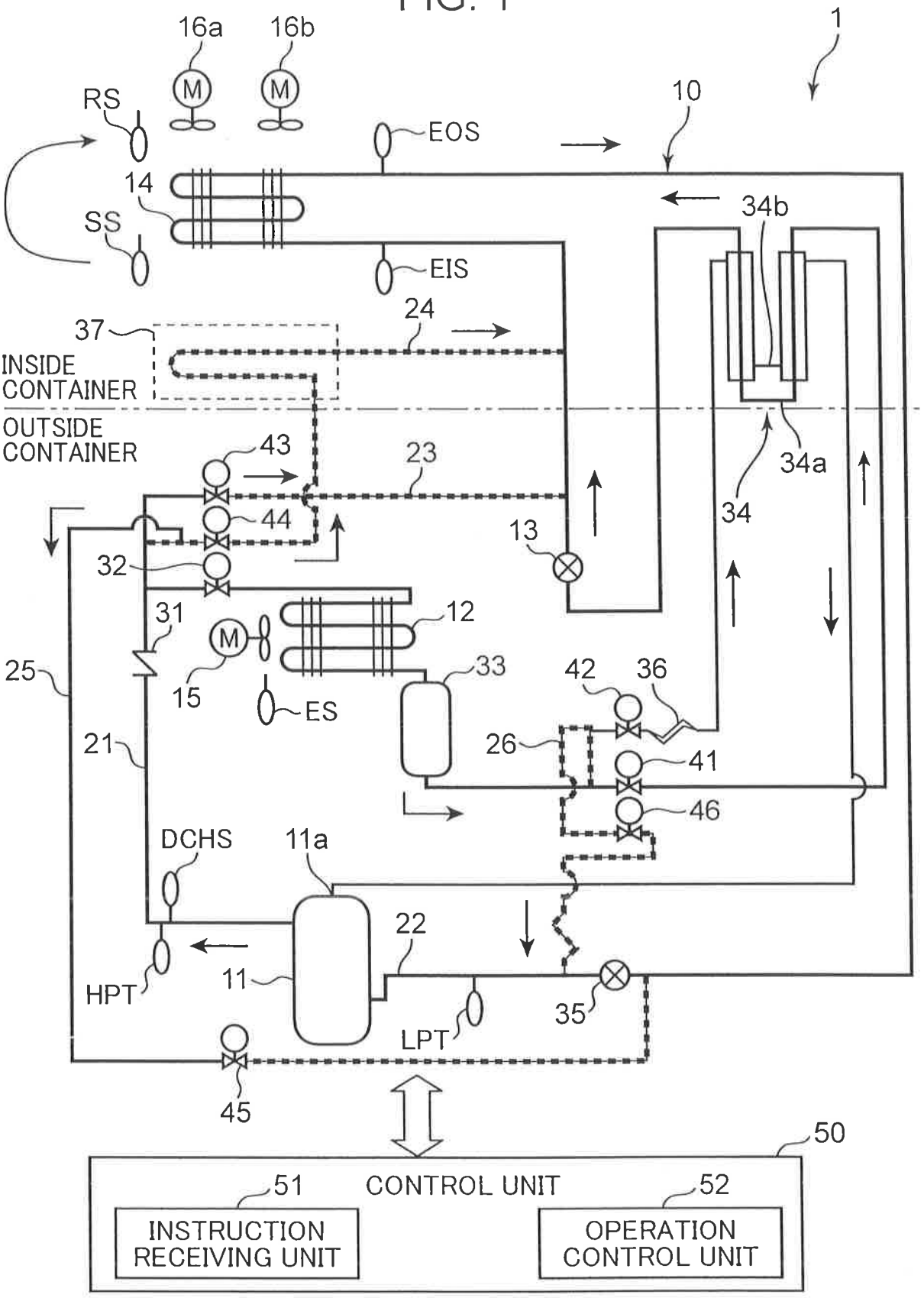

16a
16b
1
RS
10
EOS
14
34b
SS
EIS
24
37
INSIDE CONTAINER
OUTSIDE CONTAINER
43
23
34a
44
34
13
32
31
12
25
33
42
36
15
ES
26
41
21
46
DCHS
11a
22
HPT
11
35
LPT
45
50
51
CONTROL UNIT
52
INSTRUCTION RECEIVING UNIT
OPERATION CONTROL UNIT

FIG. 2A

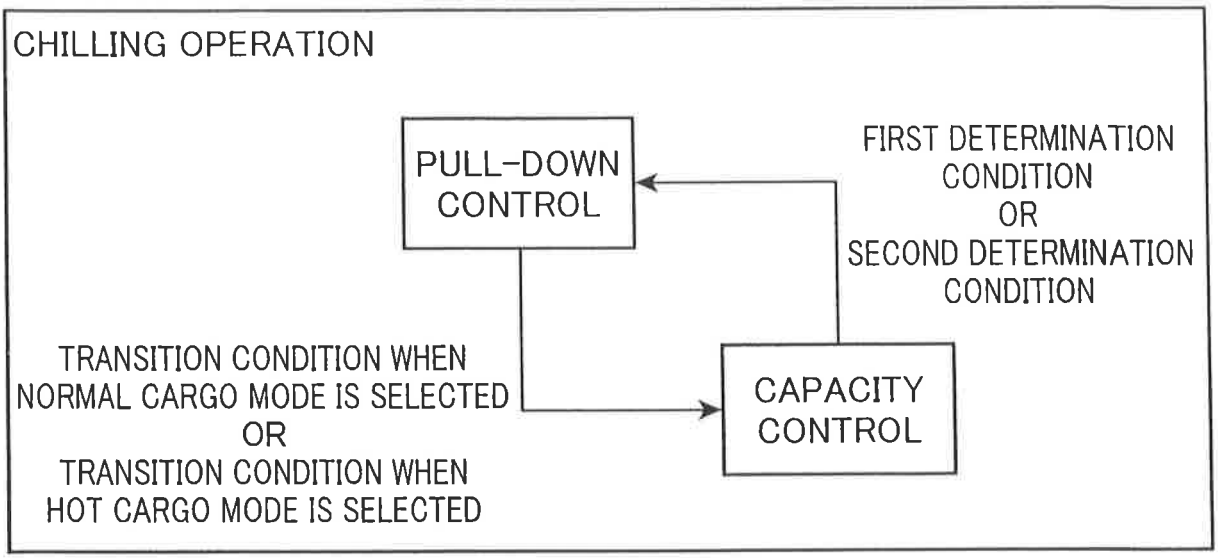

CHILLING OPERATION
PULL-DOWN CONTROL
FIRST DETERMINATION CONDITION
OR
SECOND DETERMINATION CONDITION
TRANSITION CONDITION WHEN NORMAL CARGO MODE IS SELECTED
OR
TRANSITION CONDITION WHEN HOT CARGO MODE IS SELECTED
CAPACITY CONTROL

FIG. 2B

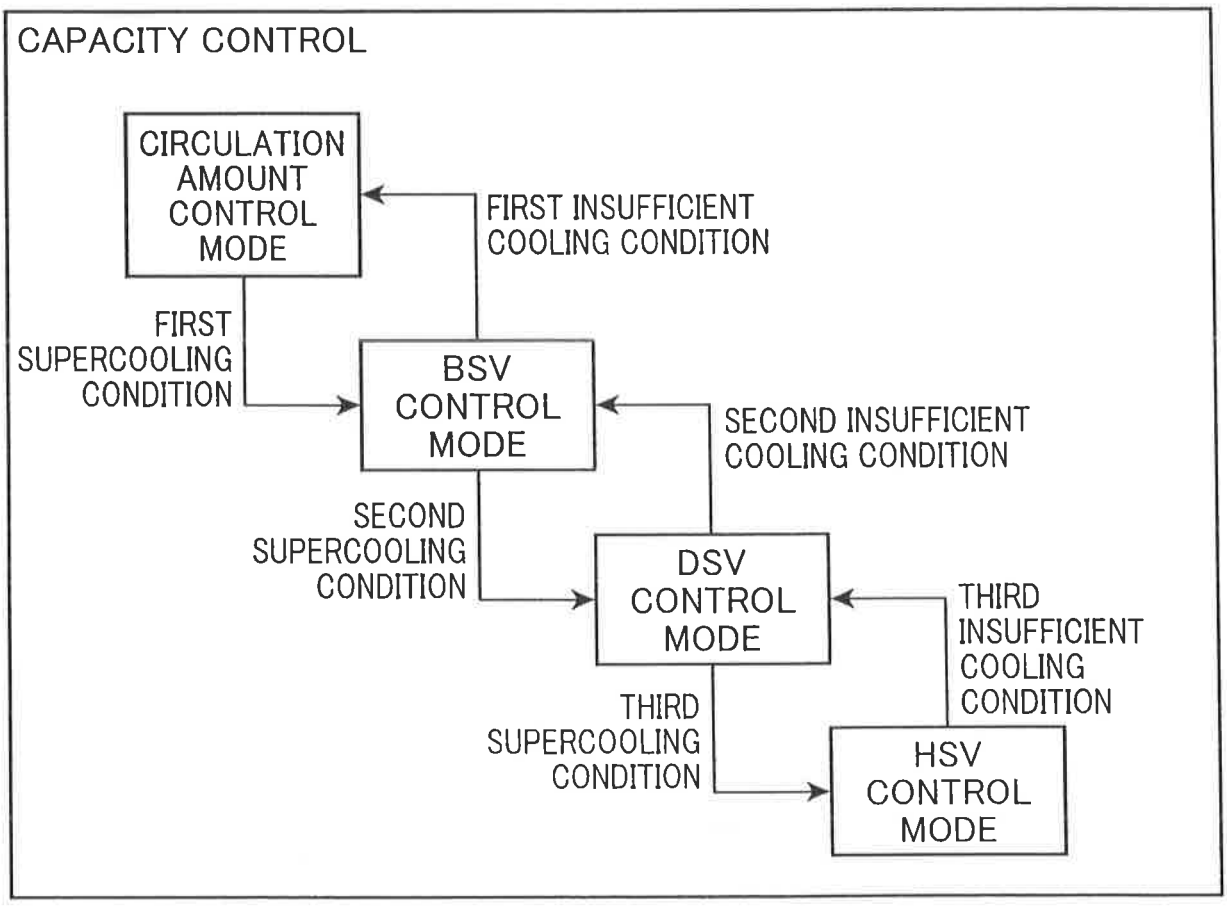

CAPACITY CONTROL
CIRCULATION AMOUNT CONTROL MODE
FIRST INSUFFICIENT COOLING CONDITION
FIRST SUPERCOOLING CONDITION
BSV CONTROL MODE
SECOND INSUFFICIENT COOLING CONDITION
SECOND SUPERCOOLING CONDITION
DSV CONTROL MODE
THIRD INSUFFICIENT COOLING CONDITION
THIRD SUPERCOOLING CONDITION
HSV CONTROL MODE

FIG. 3

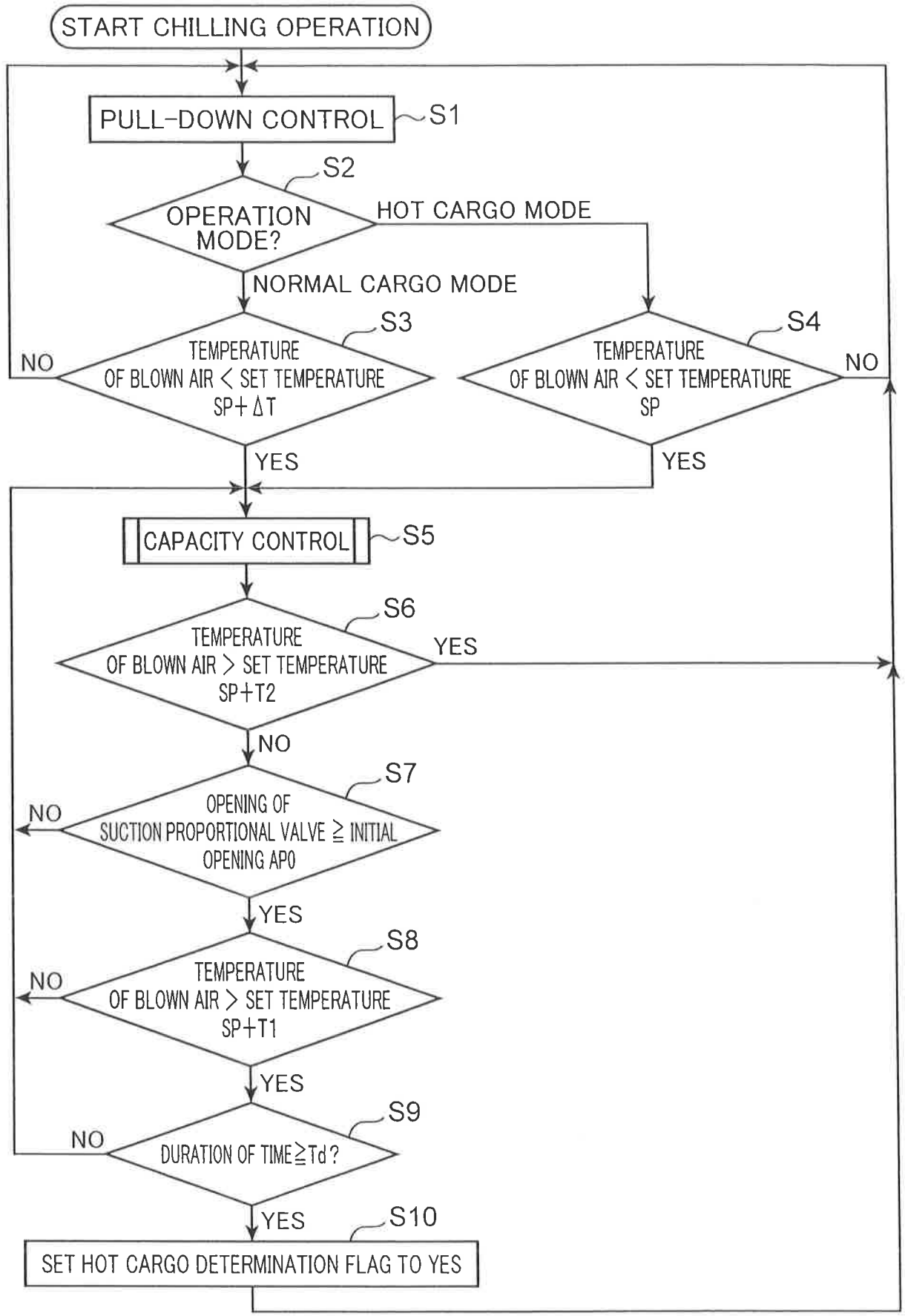

START CHILLING OPERATION
PULL-DOWN CONTROL
S1
S2
OPERATION MODE?
HOT CARGO MODE
NORMAL CARGO MODE
S3
TEMPERATURE OF BLOWN AIR < SET TEMPERATURE SP+ΔT
NO
YES
S4
TEMPERATURE OF BLOWN AIR < SET TEMPERATURE SP
NO
YES
CAPACITY CONTROL
S5
S6
TEMPERATURE OF BLOWN AIR > SET TEMPERATURE SP+T2
YES
NO
S7
OPENING OF SUCTION PROPORTIONAL VALVE ≧ INITIAL OPENING AP0
NO
YES
S8
TEMPERATURE OF BLOWN AIR > SET TEMPERATURE SP+T1
NO
YES
S9
DURATION OF TIME≧Td ?
NO
YES
S10
SET HOT CARGO DETERMINATION FLAG TO YES

FIG. 4

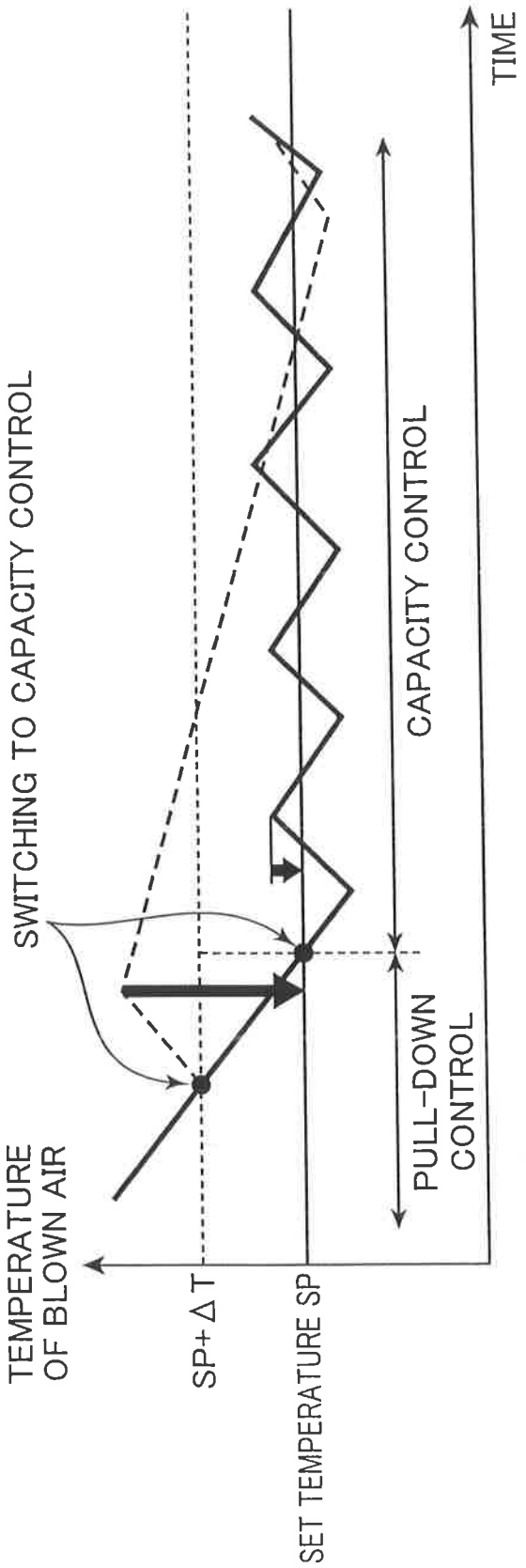

TEMPERATURE OF BLOWN AIR
SWITCHING TO CAPACITY CONTROL
SP+ Δ T
SET TEMPERATURE SP
PULL-DOWN CONTROL
CAPACITY CONTROL
TIME

FIG. 5

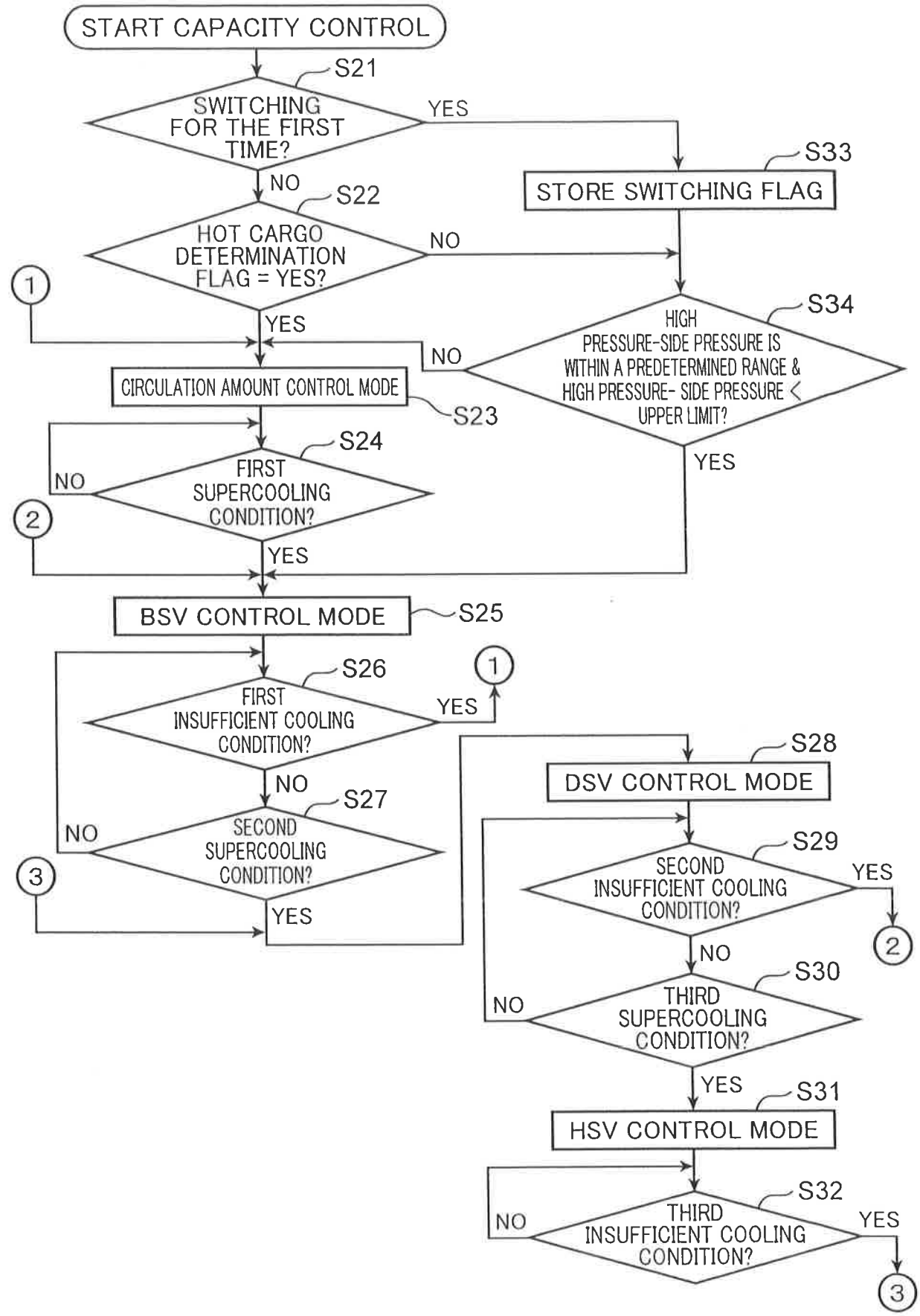

START CAPACITY CONTROL
S21
SWITCHING FOR THE FIRST TIME?
YES
NO
S33
STORE SWITCHING FLAG
S22
HOT CARGO DETERMINATION FLAG = YES?
NO
YES
1
S34
HIGH PRESSURE-SIDE PRESSURE IS WITHIN A PREDETERMINED RANGE & HIGH PRESSURE- SIDE PRESSURE < UPPER LIMIT?
NO
YES
CIRCULATION AMOUNT CONTROL MODE
S23
S24
FIRST SUPERCOOLING CONDITION?
NO
2
YES
BSV CONTROL MODE
S25
S26
FIRST INSUFFICIENT COOLING CONDITION?
YES
1
NO
S27
SECOND SUPERCOOLING CONDITION?
NO
3
YES
S28
DSV CONTROL MODE
S29
SECOND INSUFFICIENT COOLING CONDITION?
YES
2
NO
S30
THIRD SUPERCOOLING CONDITION?
NO
YES
S31
HSV CONTROL MODE
S32
THIRD INSUFFICIENT COOLING CONDITION?
NO
YES
3

FIG. 6A

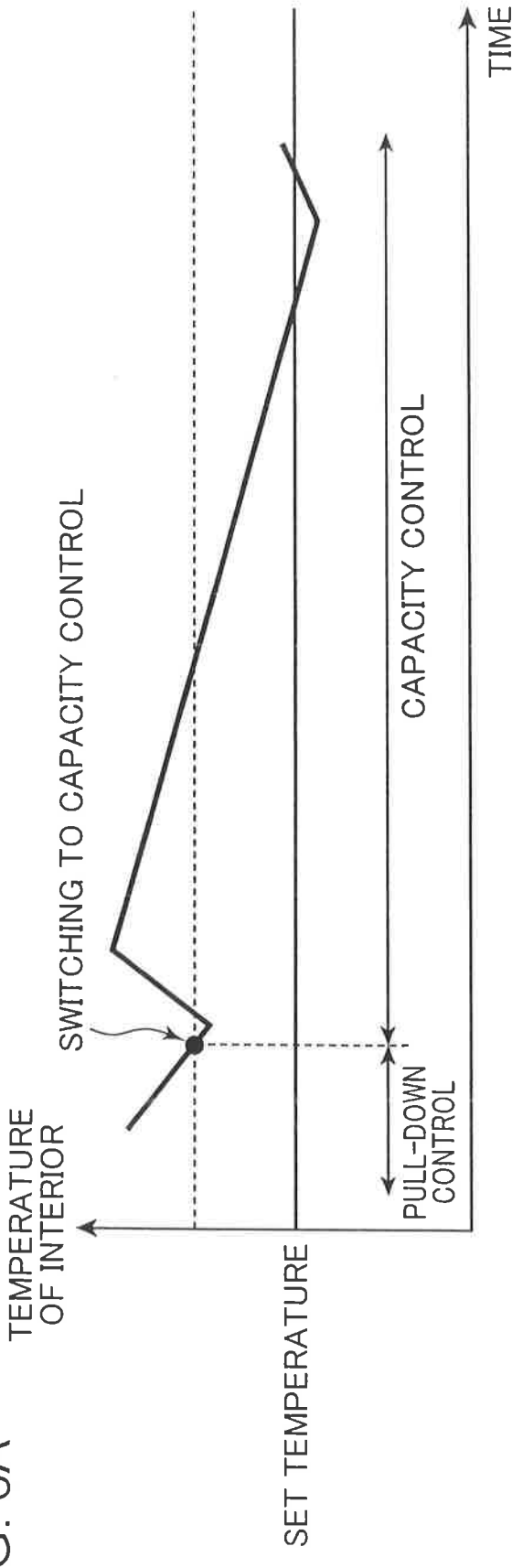

TEMPERATURE OF INTERIOR
SWITCHING TO CAPACITY CONTROL
SET TEMPERATURE
PULL-DOWN CONTROL
CAPACITY CONTROL
TIME

FIG. 6B

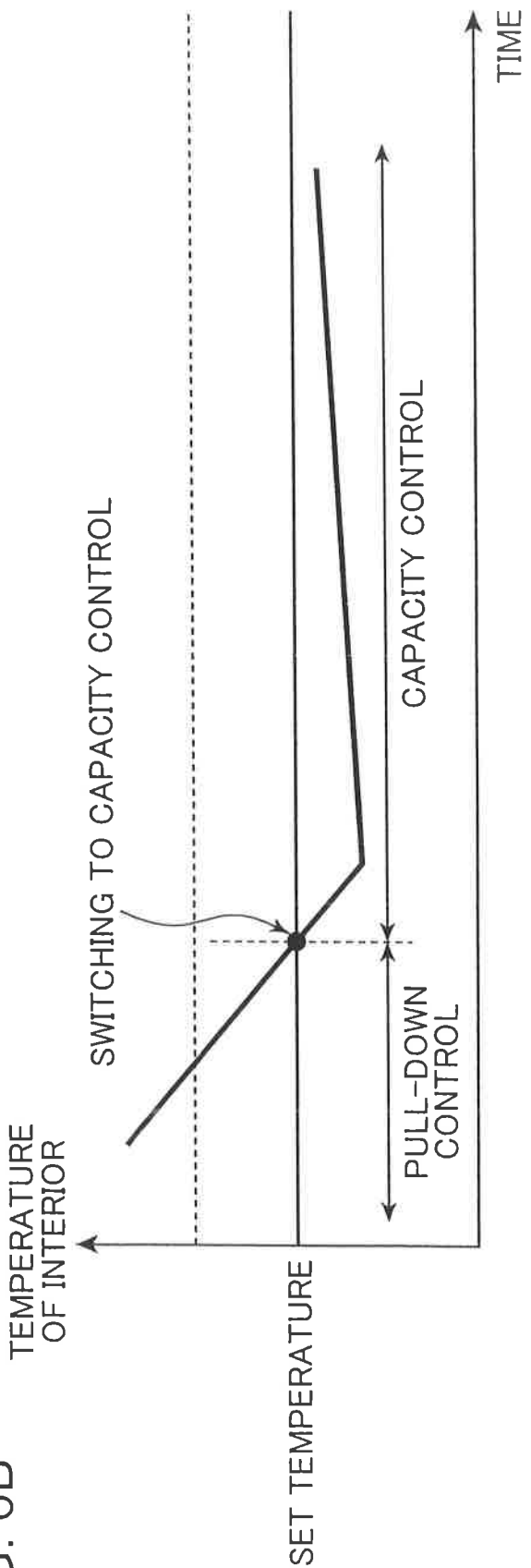

TEMPERATURE OF INTERIOR
SWITCHING TO CAPACITY CONTROL
SET TEMPERATURE
PULL-DOWN CONTROL
CAPACITY CONTROL
TIME

FIG. 7

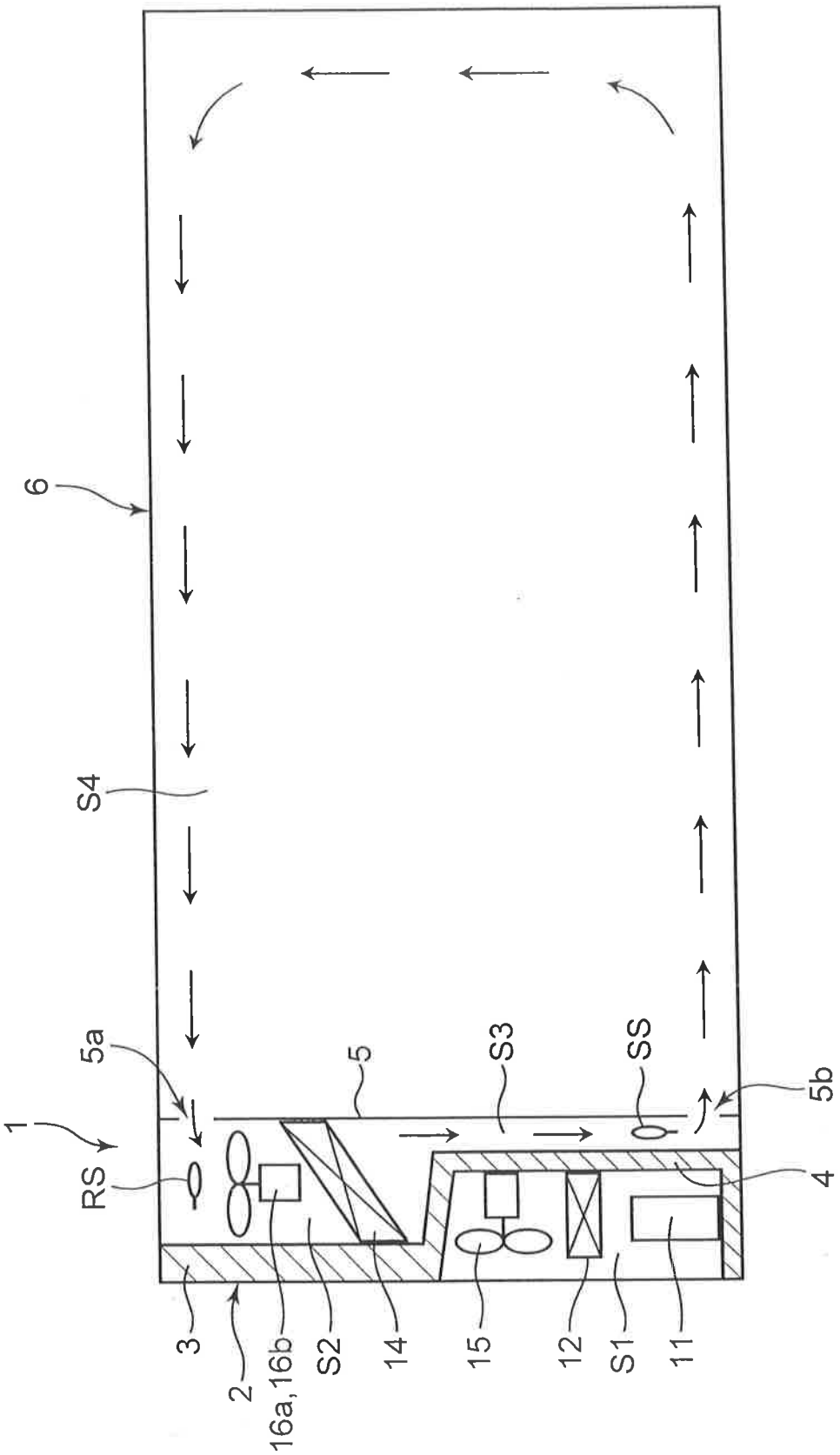


FIG. 8

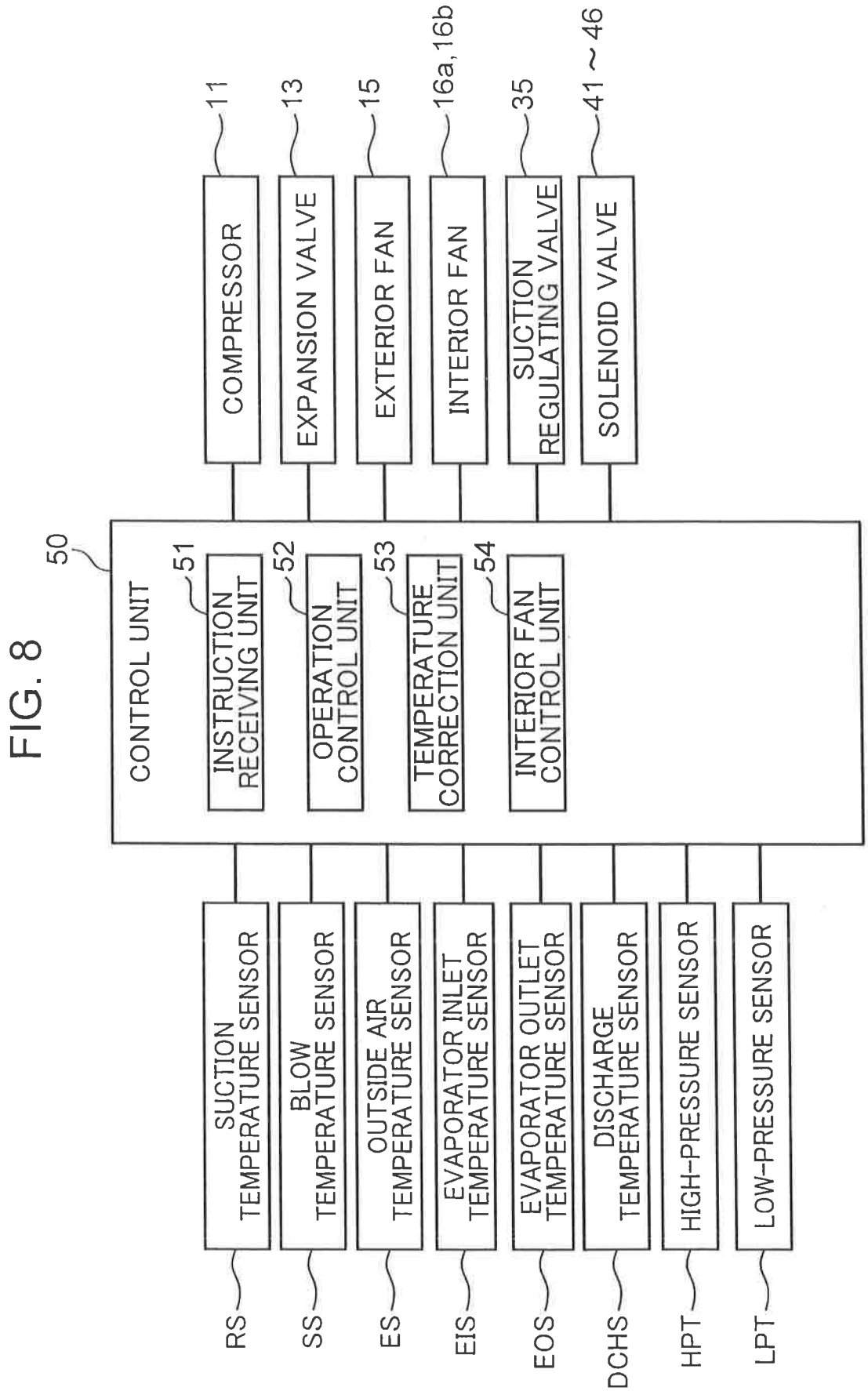

50
CONTROL UNIT
51
INSTRUCTION RECEIVING UNIT
52
OPERATION CONTROL UNIT
53
TEMPERATURE CORRECTION UNIT
54
INTERIOR FAN CONTROL UNIT
11
COMPRESSOR
13
EXPANSION VALVE
15
EXTERIOR FAN
16a, 16b
INTERIOR FAN
35
SUCTION REGULATING VALVE
41 ~ 46
SOLENOID VALVE
SUCTION TEMPERATURE SENSOR
BLOW TEMPERATURE SENSOR
OUTSIDE AIR TEMPERATURE SENSOR
EVAPORATOR INLET TEMPERATURE SENSOR
EVAPORATOR OUTLET TEMPERATURE SENSOR
DISCHARGE TEMPERATURE SENSOR
HIGH-PRESSURE SENSOR
LOW-PRESSURE SENSOR
RS
SS
ES
EIS
EOS
DCHS
HPT
LPT

FIG. 9

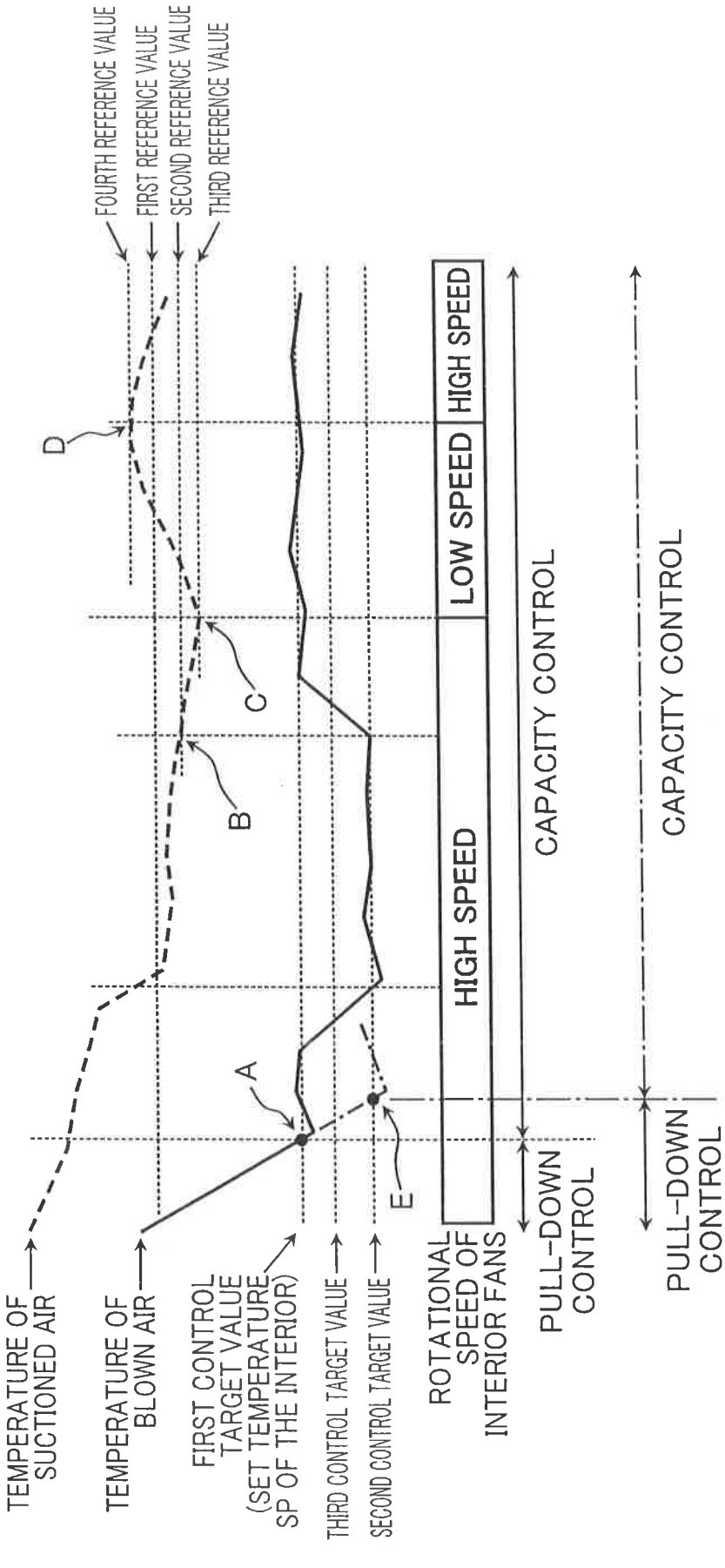
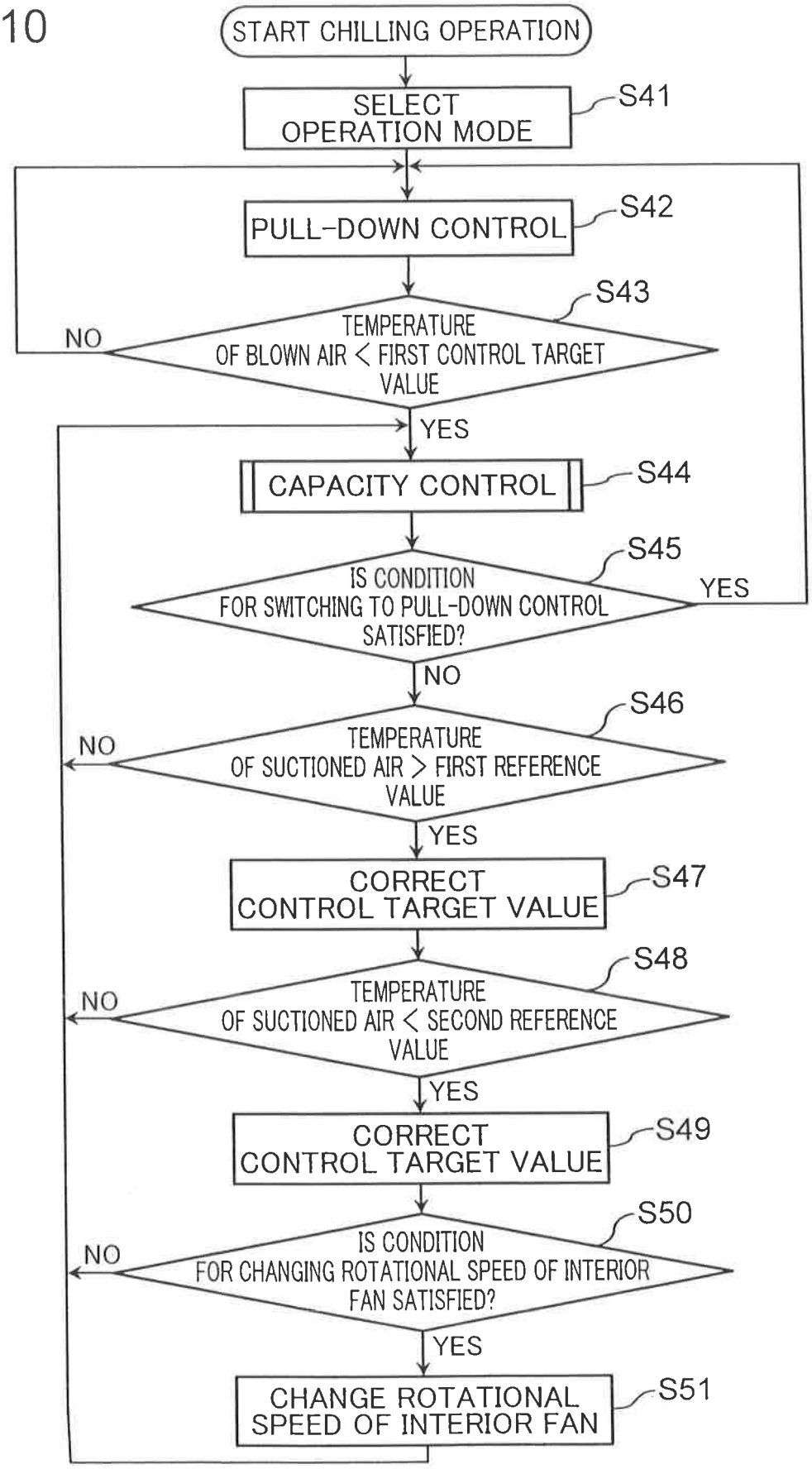

FOURTH REFERENCE VALUE
FIRST REFERENCE VALUE
SECOND REFERENCE VALUE
THIRD REFERENCE VALUE
D
C
B
A
E
TEMPERATURE OF SUCTIONED AIR
TEMPERATURE OF BLOWN AIR
FIRST CONTROL TARGET VALUE (SET TEMPERATURE SP OF THE INTERIOR)
THIRD CONTROL TARGET VALUE
SECOND CONTROL TARGET VALUE
ROTATIONAL SPEED OF INTERIOR FANS
HIGH SPEED
LOW SPEED
HIGH SPEED
CAPACITY CONTROL
PULL-DOWN CONTROL
CAPACITY CONTROL
PULL-DOWN CONTROL

FIG. 10


START CHILLING OPERATION
SELECT OPERATION MODE
S41
PULL-DOWN CONTROL
S42
S43
TEMPERATURE OF BLOWN AIR < FIRST CONTROL TARGET VALUE
NO
YES
CAPACITY CONTROL
S44
S45
IS CONDITION FOR SWITCHING TO PULL-DOWN CONTROL SATISFIED?
YES
NO
S46
TEMPERATURE OF SUCTIONED AIR > FIRST REFERENCE VALUE
NO
YES
CORRECT CONTROL TARGET VALUE
S47
S48
TEMPERATURE OF SUCTIONED AIR < SECOND REFERENCE VALUE
NO
YES
CORRECT CONTROL TARGET VALUE
S49
S50
IS CONDITION FOR CHANGING ROTATIONAL SPEED OF INTERIOR FAN SATISFIED?
NO
YES
CHANGE ROTATIONAL SPEED OF INTERIOR FAN
S51