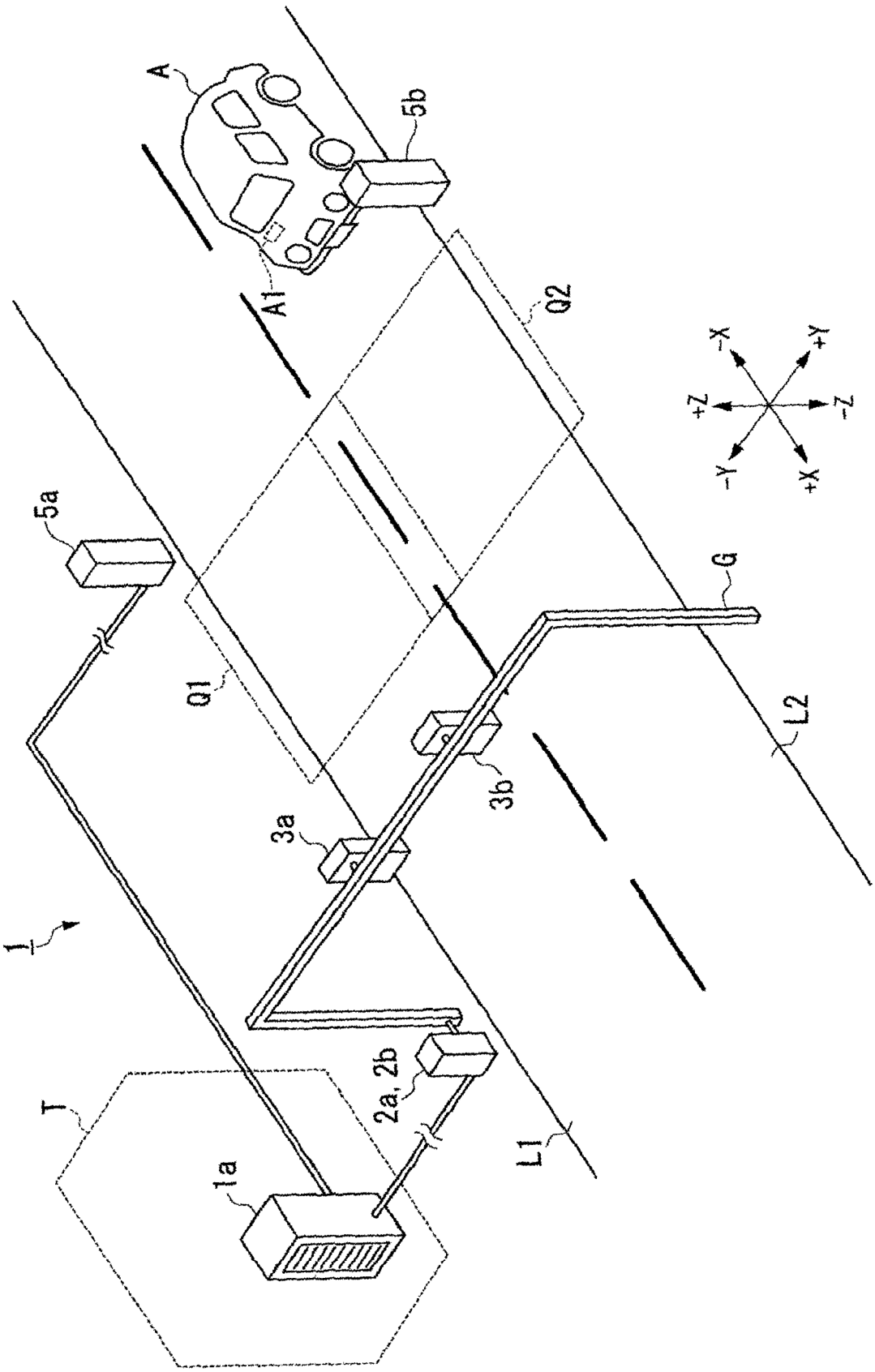

FIG. 1

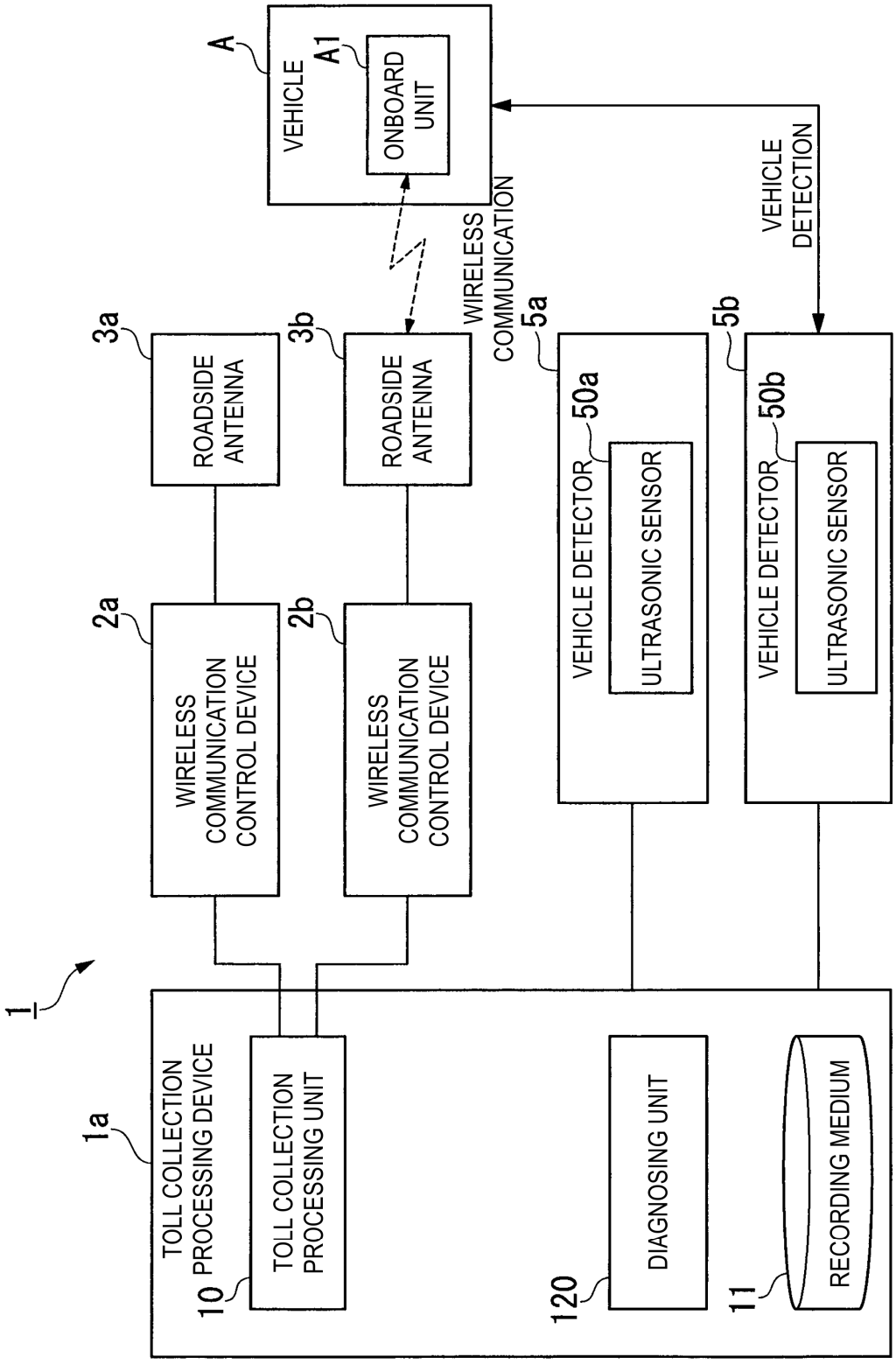
1
1a
TOLL COLLECTION PROCESSING DEVICE
10
TOLL COLLECTION PROCESSING UNIT
120
DIAGNOSING UNIT
11
RECORDING MEDIUM
2a
WIRELESS COMMUNICATION CONTROL DEVICE
2b
WIRELESS COMMUNICATION CONTROL DEVICE
3a
ROADSIDE ANTENNA
3b
ROADSIDE ANTENNA
WIRELESS COMMUNICATION
A
VEHICLE
A1
ONBOARD UNIT
5a
VEHICLE DETECTOR
50a
ULTRASONIC SENSOR
5b
VEHICLE DETECTOR
50b
ULTRASONIC SENSOR
VEHICLE DETECTION

FIG. 2

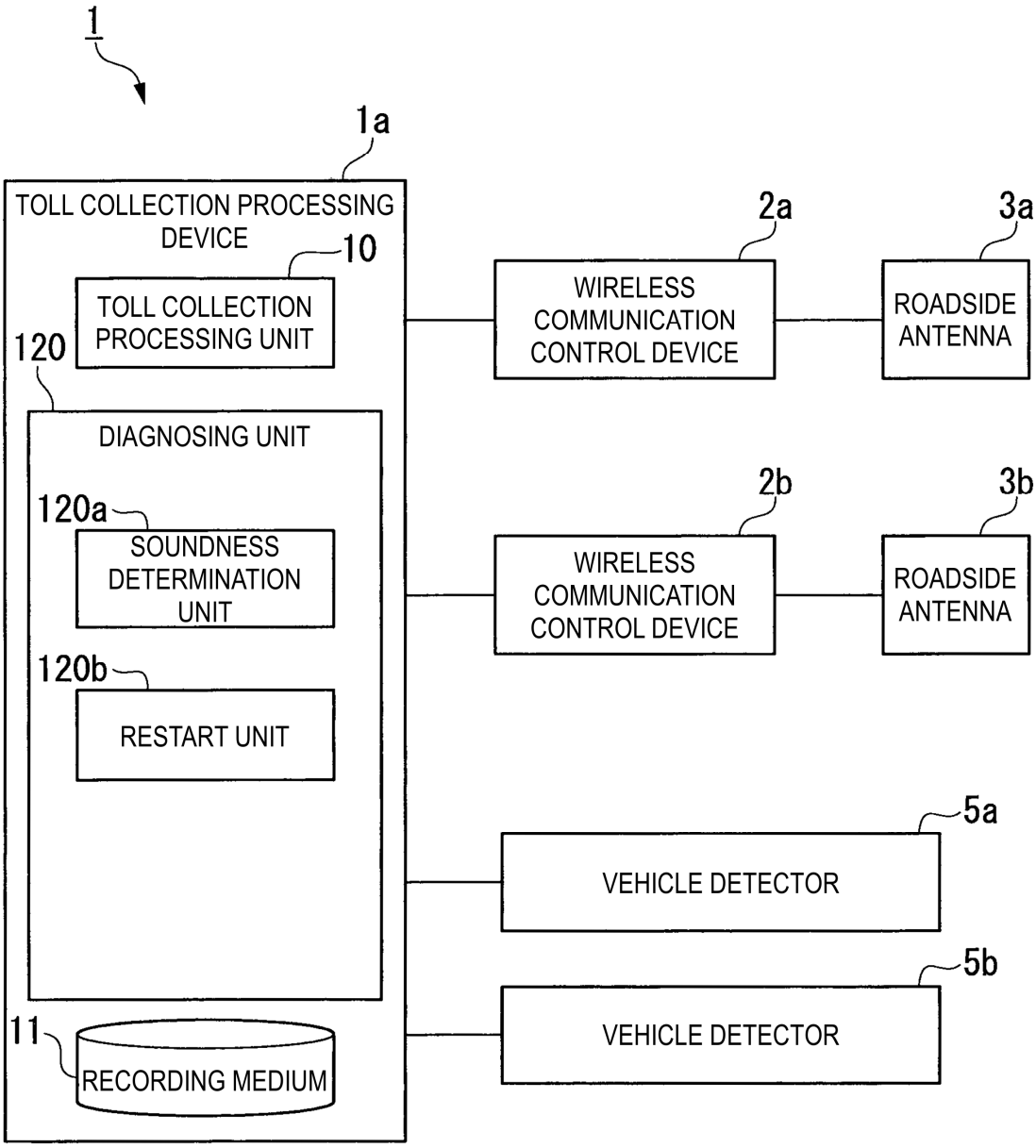
1
1a
TOLL COLLECTION PROCESSING DEVICE
10
TOLL COLLECTION PROCESSING UNIT
120
DIAGNOSING UNIT
120a
SOUNDNESS DETERMINATION UNIT
120b
RESTART UNIT
11
RECORDING MEDIUM
2a
WIRELESS COMMUNICATION CONTROL DEVICE
3a
ROADSIDE ANTENNA
2b
WIRELESS COMMUNICATION CONTROL DEVICE
3b
ROADSIDE ANTENNA
5a
VEHICLE DETECTOR
5b
VEHICLE DETECTOR

FIG. 3

T1

TOLLGATE	THRESHOLD VALUE
R1	8
R2	10
R3	7
⋮	⋮

FIG. 4

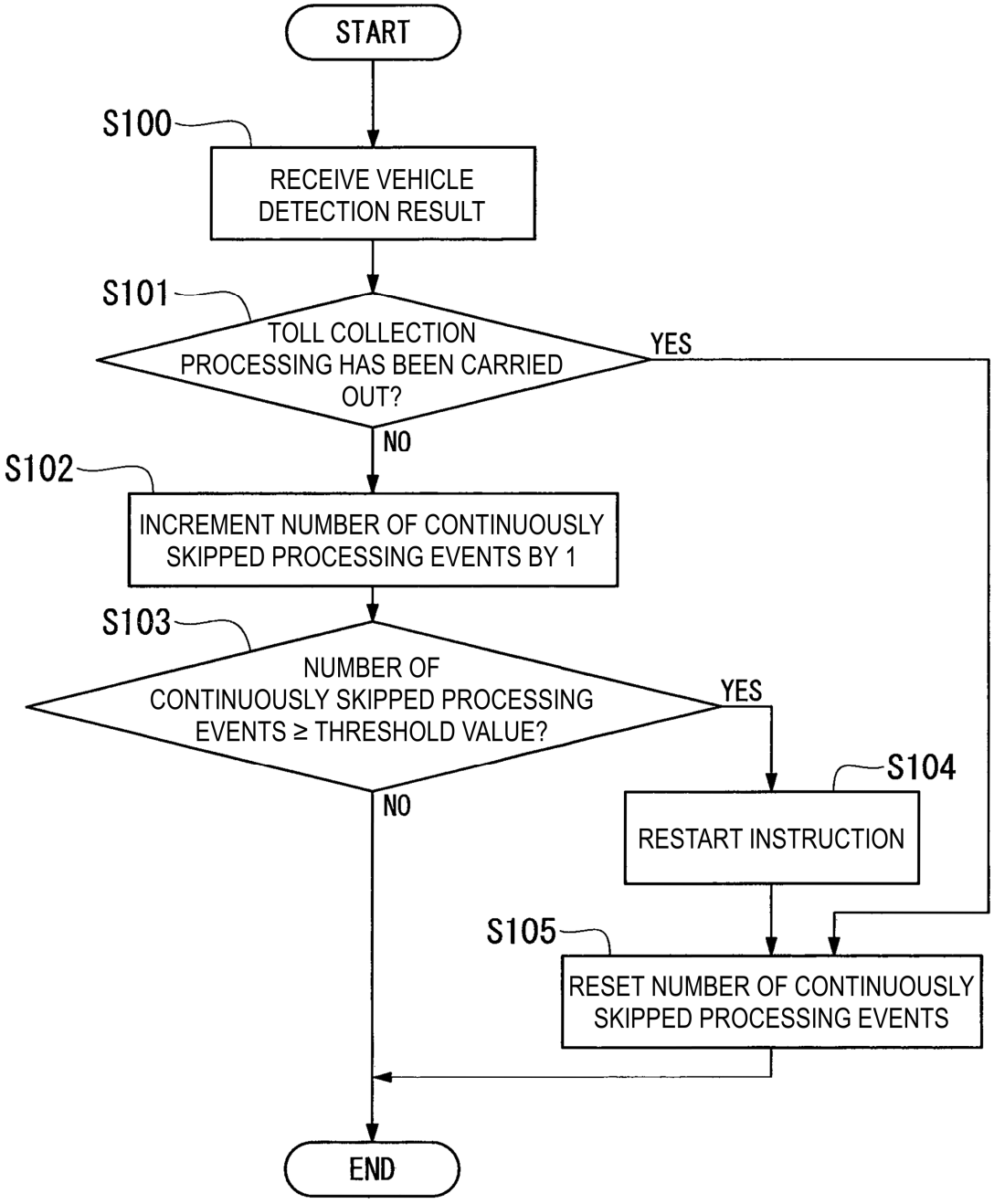
START
S100
RECEIVE VEHICLE DETECTION RESULT
S101
TOLL COLLECTION PROCESSING HAS BEEN CARRIED OUT?
YES
NO
S102
INCREMENT NUMBER OF CONTINUOUSLY SKIPPED PROCESSING EVENTS BY 1
S103
NUMBER OF CONTINUOUSLY SKIPPED PROCESSING EVENTS ≥ THRESHOLD VALUE?
YES
NO
S104
RESTART INSTRUCTION
S105
RESET NUMBER OF CONTINUOUSLY SKIPPED PROCESSING EVENTS
END

FIG. 5

T2

TOLLGATE	THRESHOLD VALUE
R1	10%
R2	20%
R3	15%
⋮	⋮

FIG. 6

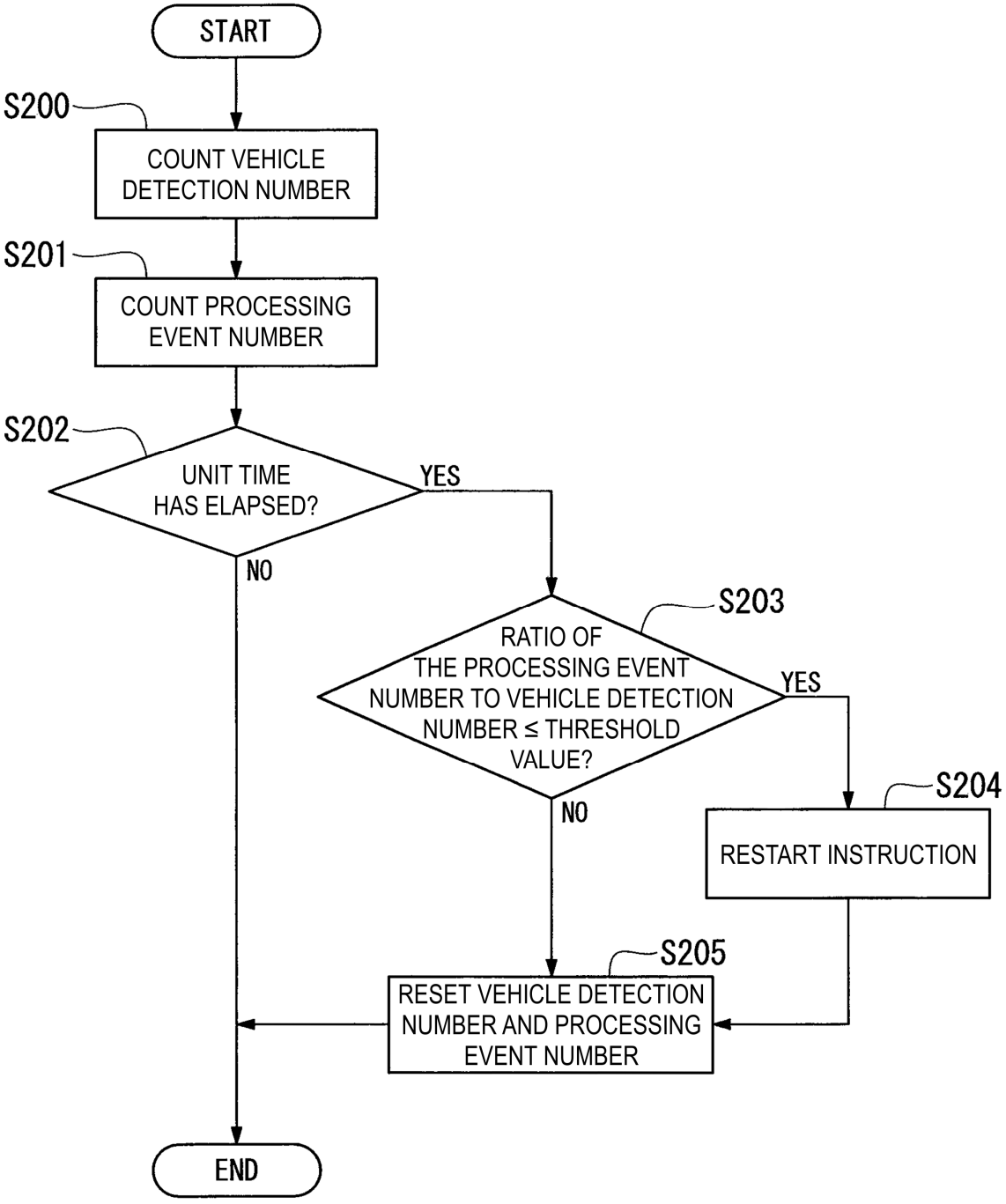
START
S200
COUNT VEHICLE DETECTION NUMBER
S201
COUNT PROCESSING EVENT NUMBER
S202
UNIT TIME HAS ELAPSED?
YES
NO
S203
RATIO OF THE PROCESSING EVENT NUMBER TO VEHICLE DETECTION NUMBER ≤ THRESHOLD VALUE?
YES
NO
S204
RESTART INSTRUCTION
S205
RESET VEHICLE DETECTION NUMBER AND PROCESSING EVENT NUMBER
END

FIG. 7

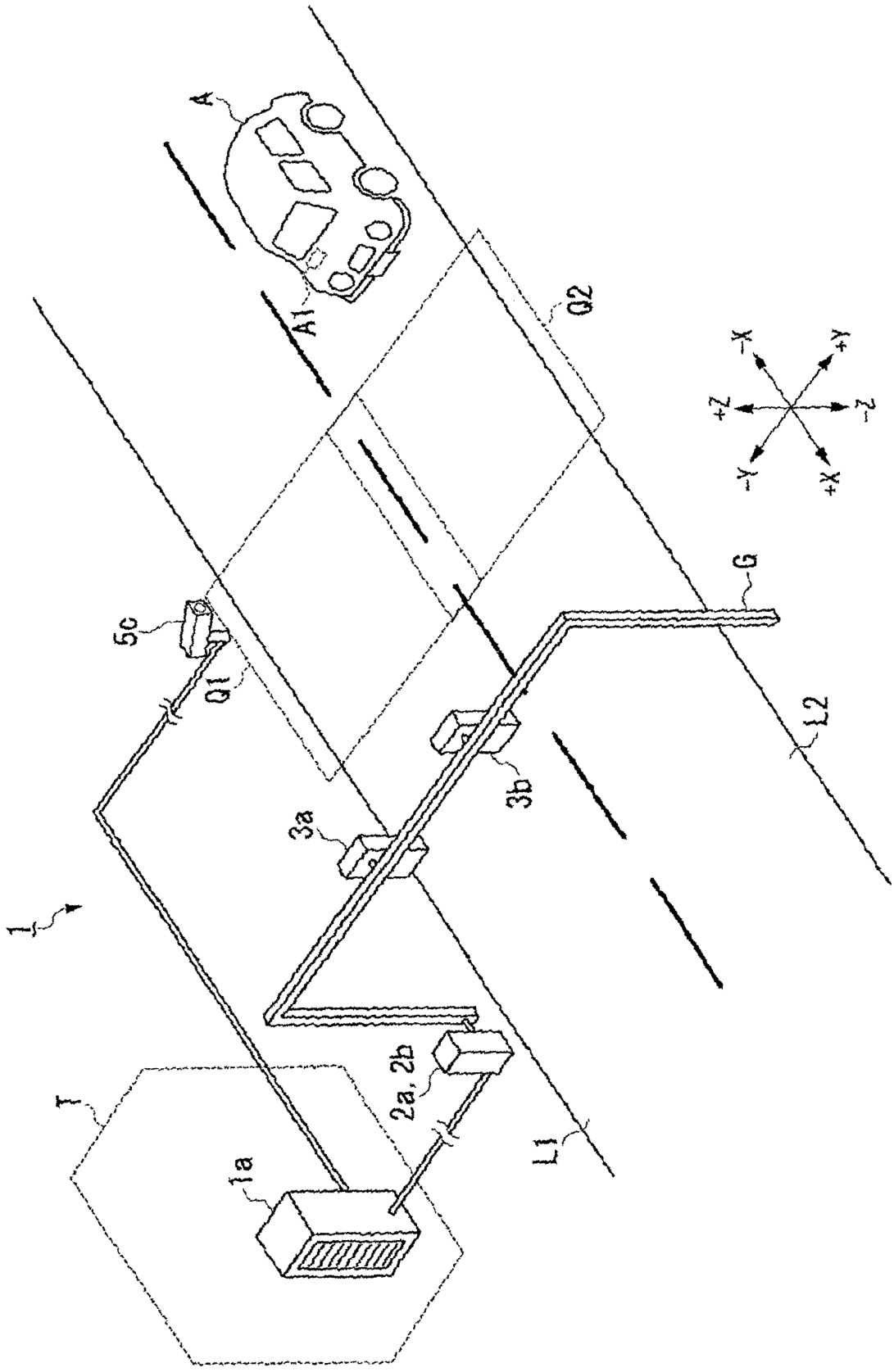

FIG. 8

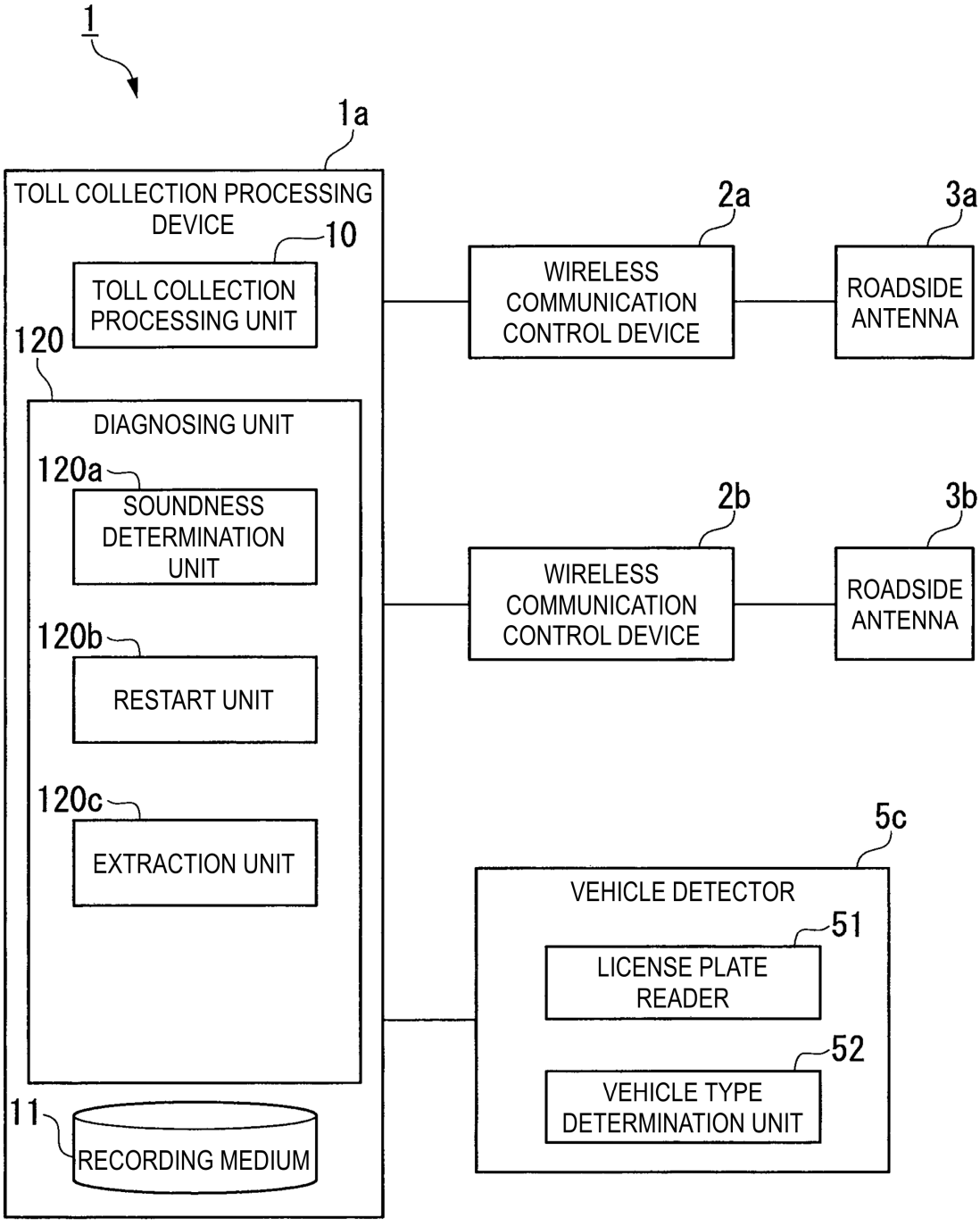
1
1a
TOLL COLLECTION PROCESSING DEVICE
10
TOLL COLLECTION PROCESSING UNIT
120
DIAGNOSING UNIT
120a
SOUNDNESS DETERMINATION UNIT
120b
RESTART UNIT
120c
EXTRACTION UNIT
11
RECORDING MEDIUM
2a
WIRELESS COMMUNICATION CONTROL DEVICE
3a
ROADSIDE ANTENNA
2b
WIRELESS COMMUNICATION CONTROL DEVICE
3b
ROADSIDE ANTENNA
5c
VEHICLE DETECTOR
51
LICENSE PLATE READER
52
VEHICLE TYPE DETERMINATION UNIT

FIG. 9

T3

VEHICLE TYPE	ONBOARD UNIT OWNERSHIP RATE	THRESHOLD VALUE
A	50%	10
B	75%	8
C	85%	6
D	95%	5
E	95%	5

FIG. 10

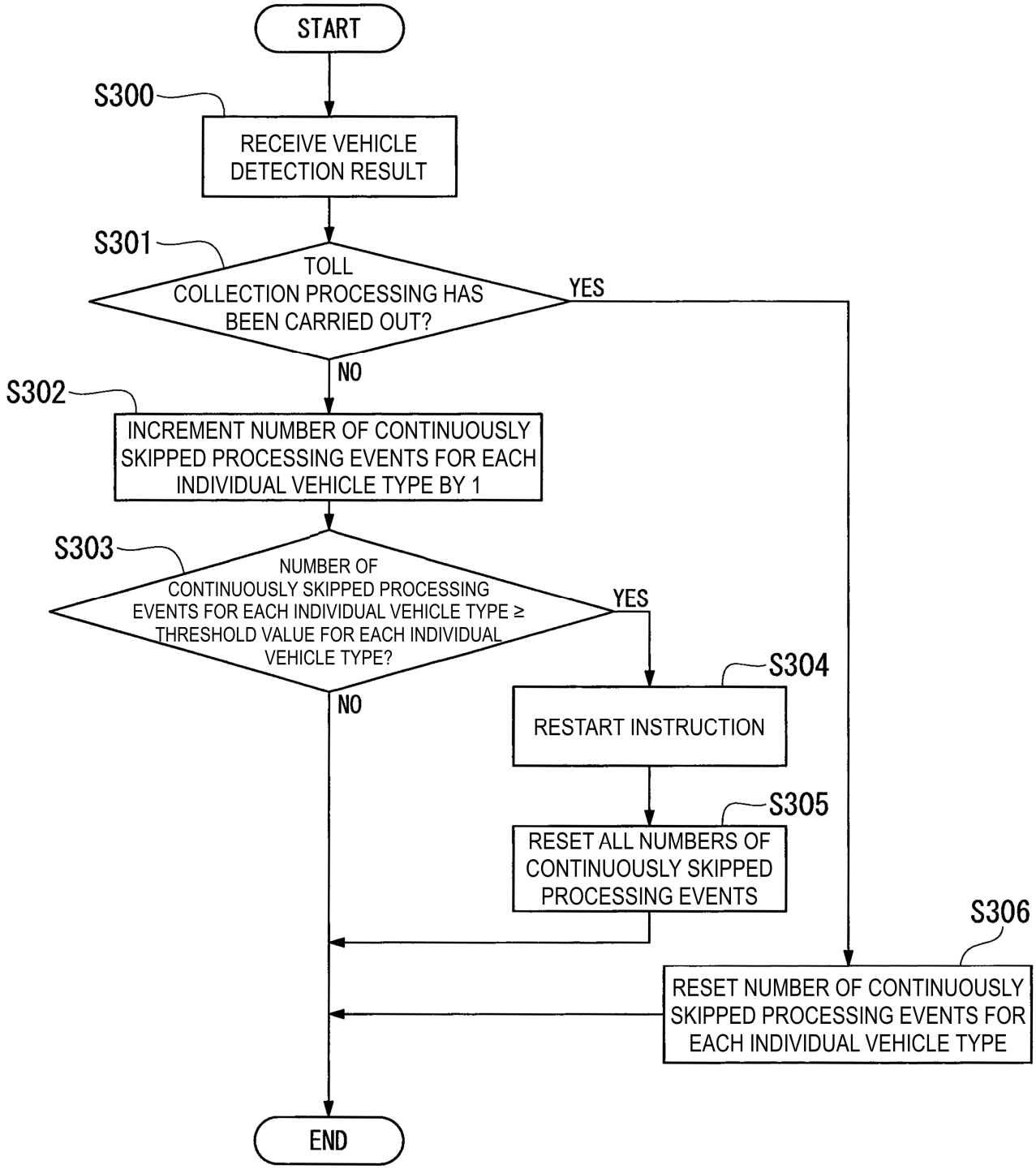
START
S300
RECEIVE VEHICLE DETECTION RESULT
S301
TOLL COLLECTION PROCESSING HAS BEEN CARRIED OUT?
YES
NO
S302
INCREMENT NUMBER OF CONTINUOUSLY SKIPPED PROCESSING EVENTS FOR EACH INDIVIDUAL VEHICLE TYPE BY 1
S303
NUMBER OF CONTINUOUSLY SKIPPED PROCESSING EVENTS FOR EACH INDIVIDUAL VEHICLE TYPE ≥ THRESHOLD VALUE FOR EACH INDIVIDUAL VEHICLE TYPE?
YES
NO
S304
RESTART INSTRUCTION
S305
RESET ALL NUMBERS OF CONTINUOUSLY SKIPPED PROCESSING EVENTS
S306
RESET NUMBER OF CONTINUOUSLY SKIPPED PROCESSING EVENTS FOR EACH INDIVIDUAL VEHICLE TYPE
END

FIG. 11

T4

VEHICLE TYPE	ONBOARD UNIT OWNERSHIP RATE	THRESHOLD VALUE
A	50%	10%
B	75%	15%
C	85%	20%
D	95%	25%
E	95%	25%

FIG. 12

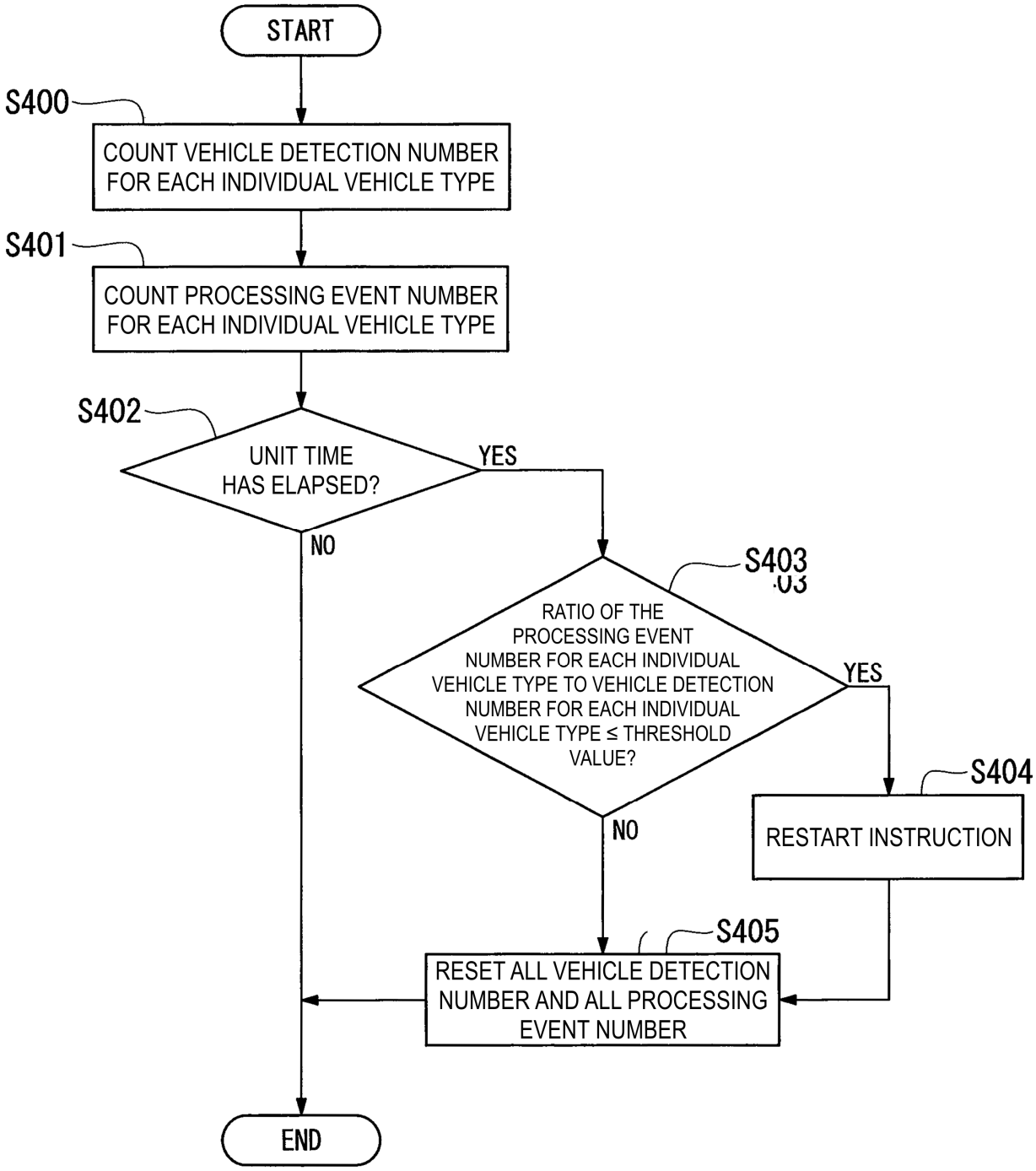
START
S400
COUNT VEHICLE DETECTION NUMBER FOR EACH INDIVIDUAL VEHICLE TYPE
S401
COUNT PROCESSING EVENT NUMBER FOR EACH INDIVIDUAL VEHICLE TYPE
S402
UNIT TIME HAS ELAPSED?
YES
NO
S403
RATIO OF THE PROCESSING EVENT NUMBER FOR EACH INDIVIDUAL VEHICLE TYPE TO VEHICLE DETECTION NUMBER FOR EACH INDIVIDUAL VEHICLE TYPE ≤ THRESHOLD VALUE?
YES
NO
S404
RESTART INSTRUCTION
S405
RESET ALL VEHICLE DETECTION NUMBER AND ALL PROCESSING EVENT NUMBER
END

FIG. 13