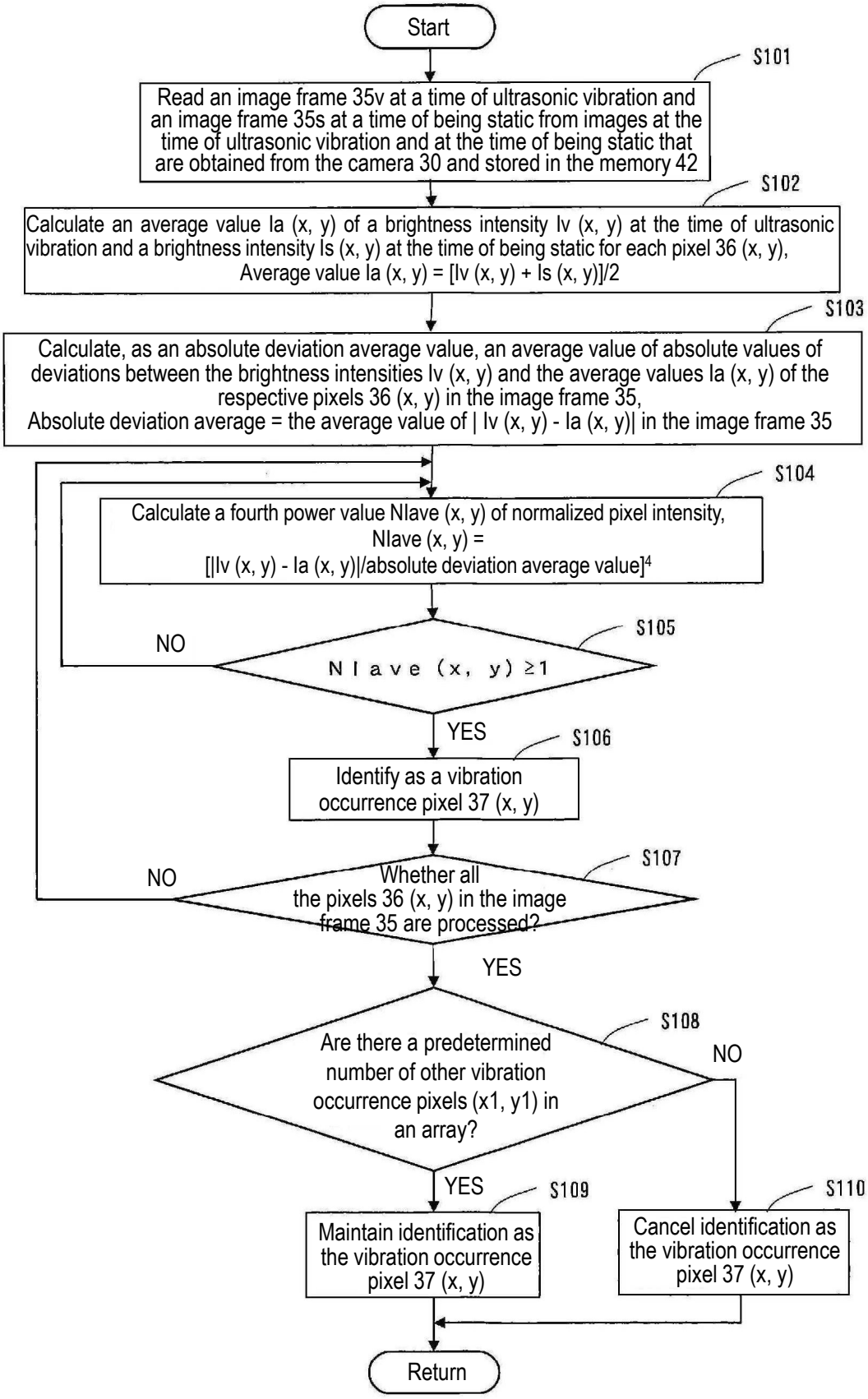
Start
S101
Read an image frame 35v at a time of ultrasonic vibration and an image frame 35s at a time of being static from images at the time of ultrasonic vibration and at the time of being static that are obtained from the camera 30 and stored in the memory 42
S102
Calculate an average value Ia (x, y) of a brightness intensity Iv (x, y) at the time of ultrasonic vibration and a brightness intensity Is (x, y) at the time of being static for each pixel 36 (x, y),
Average value Ia (x, y) = [Iv (x, y) + Is (x, y)]/2
S103
Calculate, as an absolute deviation average value, an average value of absolute values of deviations between the brightness intensities Iv (x, y) and the average values Ia (x, y) of the respective pixels 36 (x, y) in the image frame 35,
Absolute deviation average = the average value of | Iv (x, y) - Ia (x, y)| in the image frame 35
S104
Calculate a fourth power value NIave (x, y) of normalized pixel intensity,
NIave (x, y) =
[|Iv (x, y) - Ia (x, y)|/absolute deviation average value]4
S105
NIave (x, y) ≥1
NO
YES
S106
Identify as a vibration occurrence pixel 37 (x, y)
S107
Whether all the pixels 36 (x, y) in the image frame 35 are processed?
NO
YES
S108
Are there a predetermined number of other vibration occurrence pixels (x1, y1) in an array?
NO
YES
S109
Maintain identification as the vibration occurrence pixel 37 (x, y)
S110
Cancel identification as the vibration occurrence pixel 37 (x, y)
Return

FIG. 5