control circuit 210. The condition information may further include a time zone, a season, weather, and the like when the elevator 2 is operated. The normal waveform registration unit 242 may acquire the condition information from a user input or from the host controller 300.

[0042]

The normal waveform storage unit 251 stores normal waveform information indicating an operation waveform in the motor control circuit 210 when the elevator 2 is operated under a predetermined operating condition. In the embodiment, the normal waveform storage unit 251 stores the normal waveform information and the condition information registered by the normal waveform registration unit 242. As a result, the condition information indicating the predetermined operating condition is stored in the normal waveform storage unit 251 in association with the corresponding normal waveform information. The normal waveform storage unit 251 may store a plurality of sets of condition information and normal waveform information.

[0043]

The determination start unit 243 causes the abnormality determination unit 244 to start a determination based on condition information. For example, the determination start unit 243 monitors the current operating condition of the operating elevator 2 (for example, motor rotation speed, motor rotation time, load of car 14, and the like), determines whether or not the current operating condition matches condition information stored in the normal waveform storage unit 251, and if the current operating condition matches the condition information, determines that the abnormality determination unit 244 may start a determination. The determination start unit 243 can automatically start a

Consequently, setting parameters of the motor control circuit 210 can be adjusted efficiently. Before a serious abnormality occurs in the host controller 300 that affects an operation of an elevator, an abnormality of a waveform in the motor control circuit 210 (deviation from normal operation, which is outside allowable range) can be detected. Consequently, by re-adjusting the motor control circuit 210 due to aging or the like at an early stage, it is possible to prevent a serious abnormality beforehand. If parts need to be replaced, it is possible to secure the parts in stock in advance. As a result, it is possible to reduce the possibility that the elevator 2 will stop in the future. The normal or abnormal state of the motor control circuit 210 may indicate a normal or abnormal operation of the motor control circuit 210 itself, but is not limited thereto. The normal or abnormal state of the motor control circuit 210 includes a normal or abnormal state of the entire system or components included in the system, which appears in the operation of the motor control circuit 210. Examples of the components include various components such as the motor 100, a brake, the car 14, the wire rope 16, and a rail.

[0087]

In the embodiment, the condition information indicating a predetermined operating condition is stored in the normal waveform storage unit 251 in association with the corresponding normal waveform information. The elevator inverter system 1 further includes the determination start unit 243 that causes the abnormality determination unit 244 to start a determination based on condition information. According to such a configuration, the determination start unit 243 can automatically start a determination based on the operating waveform information and the condition information. Consequently, a periodic abnormality determination can be

CLAIMS

1. An elevator inverter system comprising:

a motor control circuit that supplies power to a motor that raises and lowers a car of an elevator in order to control the motor;

a normal waveform storage unit that stores normal waveform information indicating an operation waveform in the motor control circuit when the elevator is operated under a predetermined operating condition; and

an abnormality determination unit that, based on the normal waveform information stored in the normal waveform storage unit, compares operating waveform information indicating an operation waveform in the motor control circuit when the elevator, which is operating, is operated under the predetermined operating condition with the normal waveform information to determine whether or not the motor control circuit is operated normally, wherein

the normal waveform storage unit stores condition information indicating the predetermined operating condition in association with the normal waveform information corresponding to the condition information, and

the elevator inverter system further comprises a determination start unit that causes the abnormality determination unit to start the determination based on the condition information.

2. The elevator inverter system according to claim 1, wherein

the normal waveform storage unit stores a plurality of sets of the condition information and the normal waveform information, and

the determination start unit extracts one piece of the normal waveform information to be used for comparison based on a plurality of pieces of the condition information.

3. The elevator inverter system according to claim 1 or 2 further comprising a normal waveform registration unit that stores an operation waveform in the motor control circuit when the elevator is operated, as the normal waveform information, in the normal waveform storage unit in association with condition information indicating a predetermined operating condition in the operation.

4. The elevator inverter system according to claim 3 further comprising a registration start unit that, when a parameter of the motor control circuit is changed, causes the normal waveform registration unit to start storing at least the normal waveform information in the normal waveform storage unit.

5. The elevator inverter system according to any one of claims 1 to 4, further comprising:

an abnormal waveform storage unit that stores the operating waveform information when the abnormality determination unit determines that the motor control circuit is not operated normally as abnormal waveform information;

a communication unit that has a function to communicate with a mobile terminal; and

an abnormality waveform transmission unit that, when communication between the communication unit and the mobile terminal is established, transmits the abnormal waveform information stored in the abnormal waveform storage unit to the mobile terminal.

6. The elevator inverter system according to claim 5 further comprising the mobile terminal, wherein

the mobile terminal includes:

a position information storage unit that stores connection destination position information indicating a position corresponding to the elevator,

a position information acquisition unit that acquires terminal position information indicating a current position of the mobile terminal,

a connection destination determination unit that determines a communication unit corresponding to an elevator to be connected based on the connection destination position information and the terminal position information, and

a radio communication unit that performs radio communication with the communication unit determined by the connection destination determination unit.

7. The elevator inverter system according to claim 6, wherein

when the mobile terminal enters the car, the connection destination determination unit determines a communication unit corresponding to the car as a connection destination.

8. The elevator inverter system according to any one of claims 5 to 7, further comprising a server capable of communicating with the mobile terminal, wherein

the server includes:

an abnormal waveform acquisition unit that acquires the abnormal waveform information transmitted to the mobile terminal, and

an adjustment information generating unit that generates adjustment information about adjustment of the motor control circuit based on the abnormal waveform information acquired by the abnormal waveform acquisition unit.

9. The elevator inverter system according to claim 8, wherein

the server further includes an adjustment information transmission unit that transmits the adjustment information generated by the adjustment information generating unit to the mobile terminal.

10. The elevator inverter system according to claim 8 or 9, wherein

the adjustment information includes a parameter of the motor control circuit itself.

11. An elevator inverter system comprising:

a motor control circuit that supplies power to a motor that raises and lowers a car of an elevator in order to control the motor;

a normal waveform storage unit that stores normal waveform information indicating an operation waveform in the motor control circuit when the elevator is operated under a predetermined operating condition; and

an abnormality determination unit that, based on the normal waveform information stored in the normal waveform storage unit, compares operating waveform information indicating an operation waveform in the motor control circuit when the elevator, which is operating, is operated under the predetermined operating condition with the normal waveform information to determine whether or not the motor control circuit is operated normally

an abnormal waveform storage unit that stores the operating waveform information when the abnormality determination unit determines that the motor control circuit is not operated normally as abnormal waveform information;

a communication unit that has a function to communicate with a mobile terminal; and

an abnormality waveform transmission unit that, when communication between the communication unit and the mobile terminal is established, transmits the abnormal waveform information stored in the abnormal waveform storage unit to the mobile terminal; and

a server capable of communicating with the mobile terminal, wherein

the server includes:

an abnormal waveform acquisition unit that acquires the abnormal waveform information transmitted to the mobile terminal,

an accumulation unit that accumulates at least a plurality of sets of condition information indicating the

predetermined operating condition and the abnormal waveform information;

a derived information generating unit that generates derived information for deriving a parameter of the motor control circuit based on at least the sets of the condition information and the abnormal waveform information accumulated in the accumulation unit,

an adjustment information generating unit that generates adjustment information about adjustment of the motor control circuit based on at least derived information generated by the derived information generating unit and the abnormal waveform information acquired by the abnormal waveform acquisition unit, and

an adjustment information transmission unit that transmits the adjustment information generated by the adjustment information generating unit to the mobile terminal.

12. A method for determining an abnormality in an elevator inverter comprising:

causing a motor control circuit to supply power to a motor that raises and lowers a car of an elevator in order to control the motor;

storing normal waveform information indicating an operation waveform in the motor control circuit when the elevator is operated under a predetermined operating condition;

based on the normal waveform information, comparing operating waveform information indicating an operation waveform in the motor control circuit when the elevator, which is operating, is operated under the predetermined operating

condition with the normal waveform information to determine whether or not the motor control circuit is operated normally;

storing condition information indicating the predetermined operating condition in association with the normal waveform information corresponding to the condition information; and

starting the determination based on the condition information.

13. A server capable of communicating with a mobile terminal, the server comprising:

an abnormal waveform acquisition unit that acquires abnormal waveform information indicating an operation waveform in the motor control circuit when it is determined that the motor control circuit included in an inverter, which operates under a predetermined operating condition, is not operated normally from the mobile terminal;

an accumulation unit that accumulates a plurality of sets of condition information indicating the predetermined operating condition and the abnormal waveform information;

a derived information generating unit that generates derived information for deriving a parameter of the motor control circuit based on at least the sets of the condition information and the abnormal waveform information accumulated in the accumulation unit;

an adjustment information generating unit that generates adjustment information about adjustment of the motor control circuit based on at least derived information generated by the derived information generating unit and the abnormal waveform information acquired by the abnormal waveform acquisition unit; and

an adjustment information transmission unit that transmits the adjustment information generated by the adjustment information generating unit to the mobile terminal.

14. A mobile terminal comprising:

a position information storage unit that stores connection destination position information indicating a position corresponding to an inverter including a motor control circuit that supplies power to a motor in order to control the motor and a communication unit having a communication function;

a position information acquisition unit that acquires terminal position information indicating a current position of the mobile terminal;

a connection destination determination unit that determines a communication unit corresponding to an inverter to be connected based on the connection destination position information and the terminal position information; and

a radio communication unit that performs radio communication with a communication unit determined by the connection destination determination unit.