

TERMINAL, POWER ADAPTER AND METHOD FOR HANDLING CHARGING ANOMALY

CROSS-REFERENCE TO RELATED APPLICATIONS

5 This application is a Singapore national phase application based up an International Application No. PCT/CN2015/070468, filed on January 9, 2015, which is based on and claims priority to Chinese Patent Application Nos. 201410042541.0, 201410043139.4, 201410043218.5, all filed on January 28, 2014, the entire contents of which are incorporated herein by reference.

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TECHNICAL FIELD

Embodiments of the present disclosure relate to the charging field, and more specifically, relate to a terminal, a power adapter and a method for handling a charging anomaly.

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BACKGROUND

Typically, a battery in an electronic device is charged by a way of coupling a charging interface of the electronic device with an external power adapter. In order to reduce charging time during charging the battery, the charging current can be enhanced for realizing a quick charging on the battery in the related art. However, if an anomaly occurs in a charging loop, for example, an output voltage of the power adapter is an over-voltage and/or an output current of the power adapter is an over-current, the battery will be damaged no matter whether the battery is charged in a conventional constant voltage mode or with increased charging current. The anomaly in the charging loop cannot be detected and handled in the related art, such that the safety during the charging is poor.

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SUMMARY

Embodiments of the present disclosure provide a terminal, a power adapter and a method for handling a charging anomaly.

In at least one embodiment, a terminal is provided. The terminal includes a battery
5 and a charging interface. The terminal is configured to form a charging loop with a power adapter via the charging interface, so as to charge the battery. The terminal further includes a communication unit, an anomaly detection unit and an anomaly handling unit. The communication unit is configured to receive charging parameter information from the power adapter. The anomaly detection unit is configured to
10 determine, according to the charging parameter information, whether an anomaly occurs on the charging loop. The anomaly handling unit is configured to control the charging loop to enter into a protection state if the anomaly occurs on the charging loop.

In at least one embodiment, the communication unit is further configured to send charging protection indication information to the power adapter, so as to indicate the
15 power adapter to control the charging loop to enter into the protection state if the anomaly occurs on the charging loop.

In at least one embodiment, the charging interface includes power wires and data wires. The terminal is configured to form the charging loop with the power adapter via the power wires in the charging interface, so as to charge the battery. The
20 communication unit is configured to receive the charging parameter information from the power adapter via the data wires in the charging interface.

In at least one embodiment, the anomaly handling unit is configured to control the charging loop to enter into the protection state by an act of: reducing an input voltage of the power adapter; reducing an input current of the power adapter; or disconnecting the
25 charging loop.

In at least one embodiment, the anomaly of the charging loop includes at least one of overvoltage output and overcurrent output of the power adapter. The output of the

power adapter varies with the input of the power adapter i.e. the decreased input of the power adapter causes the decreased output of the power adapter.

In at least one embodiment, the charging parameter information includes the output voltage of the power adapter. The anomaly detection unit is configured to: compare the
5 output voltage with a voltage threshold, and determine the overvoltage output of the power adapter and the anomaly occurring on the charging loop if the output voltage is higher than the voltage threshold.

In at least one embodiment, the charging parameter information includes the output current of the power adapter. The anomaly detection unit is configured to compare the
10 output current with a current threshold, and determine the overcurrent output of the power adapter and the anomaly occurring on the charging loop if the output current is higher than the current threshold.

In at least one embodiment, a power adapter is provided. The power adapter includes a power conversion unit and a charging interface. The power conversion unit is
15 configured to form a charging loop with a terminal via the charging interface, so as to charge a battery of the terminal. The power adapter further includes a communication unit and an anomaly handling unit. The communication unit is configured to receive charging protection indication information from the terminal. The anomaly handling unit is configured to control the charging loop to enter into a protection state, according
20 to an indication of the charging protection indication information.

In at least one embodiment, the power adapter is contacted with the terminal via the charging interface. The charging interface includes power wires for charging and data wires. The communication unit is configured to receive the charging protection indication information from the terminal via the data wires in the charging interface.

25 In at least one embodiment, the communication unit is further configured to send charging parameter information to the terminal. The charging parameter information is used for the terminal to determine whether an anomaly occurs on the charging loop.

In at least one embodiment, the charging parameter information includes at least one of an output voltage and an output current of the power adapter.

In at least one embodiment, a method for handling a charging anomaly is provided. The method includes: receiving, by a terminal, charging parameter information from a power adapter; determining, by the terminal, according to the charging parameter
5 information, whether an anomaly occurs on a charging loop between the terminal and the power adapter; and controlling, by the terminal, the charging loop to enter into a protection state if the anomaly occurs on the charging loop.

In at least one embodiment, the method further includes: sending, by the terminal,
10 charging protection indication information to the power adapter, so as to indicate the power adapter to control the charging loop to enter into the protection state if the anomaly occurs on the charging loop.

In at least one embodiment, the terminal includes a charging interface. The charging interface includes data wires and power wires for charging. Receiving, by the terminal,
15 the charging parameter information from the power adapter includes: receiving, by the terminal, the charging parameter information from the power adapter via the data wires in the charging interface.

In at least one embodiment, controlling, by the terminal, the charging loop to enter into the protection state, includes: reducing, by the terminal, an input voltage of the power adapter; reducing, by the terminal, an input current of the power adapter; or
20 disconnecting by the terminal, the charging loop.

In at least one embodiment, the anomaly of the charging loop includes at least one of overvoltage output and overcurrent output of the power adapter.

In at least one embodiment, the charging parameter information includes the output
25 voltage of the power adapter. Determining, by the terminal according to the charging parameter information, whether the anomaly occurs on the charging loop between the terminal and the power, includes: comparing, by the terminal, the output voltage with a

voltage threshold; and determining by the terminal, the overvoltage output of the power adapter and the anomaly occurring on the charging loop if the output voltage is higher than the voltage threshold.

In at least one embodiment, the charging parameter information includes the output
5 current of the power adapter. Determining, by the terminal according to the charging parameter information, whether the anomaly occurs on the charging loop between the terminal and the power, includes: comparing, by the terminal, the output current with a current threshold; and determining, by the terminal, the overcurrent output of the power adapter and the anomaly occurring on the charging loop if the output current
10 overcurrent is higher than the current threshold.

In at least one embodiment, a method for handling a charging anomaly is provided. The method includes: receiving, by a power adapter, charging protection indication information from a terminal; and controlling, by the power adapter, a charging loop between the power adapter and the terminal to enter into a protection state according to
15 an indication of the charging protection indication information.

In at least one embodiment, the power adapter is contacted with the terminal via the charging interface. The charging interface includes power wires for charging and data wires. Receiving, by the power adapter, the charging protection indication information from the terminal includes: receiving, by the power adapter, the charging protection
20 indication information from the terminal via the data wires in the charging interface.

In at least one embodiment, the method further includes: sending, by the power adapter, charging parameter information to the terminal. The charging parameter information is used for the terminal to determine whether an anomaly occurs on the charging loop.

25 In at least one embodiment, the charging parameter information includes at least one of an output voltage and an output current of the power adapter.

In the embodiments of the present disclosure, the terminal receives the charging parameter information from the power adapter, and according to the charging parameter information, determines whether the anomaly occurs on the charging loop. The terminal controls the charging loop to enter into the protection state if the anomaly occurs on the charging loop, so as to improve the safety of the charging process.

BRIEF DESCRIPTION OF THE DRAWINGS

In order to make the technical solutions of embodiments of the present disclosure more clearly, the accompanying drawings used in the description of embodiments of the present disclosure are briefly described hereunder. Obviously, the described drawings are merely some embodiments of present disclosure. For those skilled in the art, other drawings can be obtained based on these drawings without any creative work.

Fig. 1 is a block diagram of a terminal in accordance with an exemplary embodiment of the present disclosure.

Fig. 2 is a block diagram of a power adapter in accordance with an exemplary embodiment of the present disclosure.

Fig. 3 is a flowchart of a method for handling a charging anomaly in accordance with an exemplary embodiment of the present disclosure.

Fig. 4 is a flowchart of a method for handling a charging anomaly in accordance with an exemplary embodiment of the present disclosure.

DETAILED DESCRIPTION

The technical solutions in embodiments of the present disclosure will be given a clear and complete description with reference to the accompanying drawings in the embodiments of the present disclosure. Obviously, the described embodiments are merely a part of embodiments of the present disclosure, rather than all embodiments of the present disclosure. All other embodiments obtained by those skilled in the art based

on embodiments of the present disclosure without creative efforts shall fall within the protection scope of the present disclosure.

Fig. 1 is a block diagram of a terminal in accordance with an exemplary embodiment of the present disclosure. The terminal 10 shown in Fig. 1 may include a battery 11 and a charging interface 12. The terminal 10 is configured to form a charging loop with a power adapter via the charging interface 12, so as to charge the battery 11. The terminal 10 further includes a communication unit 13, an anomaly detection unit 14 and an anomaly handling unit 15. The communication unit 13 is configured to receive charging parameter information from the power adapter. The anomaly detection unit 14 is configured to determine, according to the charging parameter information, whether an anomaly occurs on the charging loop. The anomaly handling unit 15 is configured to control the charging loop to enter into a protection state if the anomaly occurs on the charging loop.

In the embodiments of the present disclosure, the terminal receives the charging parameter information from the power adapter, and determines, according to the charging parameter information, whether the anomaly occurs on the charging loop. The terminal controls the charging loop to enter into the protection state if the anomaly occurs on the charging loop, so as to improve the safety of the charging process.

In at least one embodiment, the communication unit 13 is further configured to send charging protection indication information to the power adapter if the anomaly occurs on the charging loop, so as to indicate the power adapter to control the charging loop to enter into the protection state.

In the embodiments of the present disclosure, when the anomaly occurs on the charging loop, the terminal not only actively controls the charging loop to enter into the protection state, but also notifies the power adapter to control the charging loop to enter into the protection state. In this case, even if the anomaly handling unit of the terminal fails to control the charging loop to enter into the protection state, the power adapter can

be still used to control the charging loop to enter into the protection state, thereby further improving the safety of the charging process.

In at least one embodiment, the charging interface includes power wires and data wires. The terminal 10 is configured to form the charging loop with the power adapter via the charging interface 12, so as to charge the battery, and specifically to: form the charging loop with the power adapter via the power wires in the charging interface 12, so as to charge the battery. The communication unit 13 is configured to receive the charging parameter information from the power adapter, and specifically to: receive the charging parameter information from the power adapter via the data wires in the charging interface.

For example, the charging interface can be a USB (Universal Serial Bus) interface or a micro USB interface. The above-mentioned power wires can be power wires in the USB interface, such as +5V and -5V power wires; the above-mentioned data wires can be data wires in the USB interface, such as a D+ wire and a D- wire.

In at least one embodiment there may be several reasons causing the anomaly of the charging loop, for example, an overvoltage output and an overcurrent output of the power adapter, etc. The detection and handling manners of different anomalies may be different. An illustration to the detection and handling manners of various anomalies is provided below in conjunction with specific embodiments.

In at least one embodiment, the charging parameter information includes an output voltage of the power adapter. The anomaly detection unit 14 is configured to, according to the charging parameter information, determine whether the anomaly occurs on the charging loop, and specifically to: compare the output voltage with a voltage threshold, and determine the overvoltage output of the power adapter and the anomaly occurring on the charging loop if the output voltage is higher than the voltage threshold.

In at least one embodiment, the above-mentioned voltage threshold can be set according to the specific model of the terminal 10 and the power adapter, or can also be set according to experience.

5 In at least one an embodiment, the charging parameter information includes an output current of the power adapter. The anomaly detection unit 14 is configured to, according to the charging parameter information, determine whether the anomaly occurs on the charging loop, and specifically to: compare the output current with a current threshold, and determine the overcurrent output and the anomaly occurring on the charging loop if the output current is higher than the current threshold.

10 In at least one embodiment, the above-mentioned current threshold can be set according to the specific model of the terminal 10 and the power adapter, or can also be set according to experience.

In conjunction with Fig. 1, as described above, the terminal in the embodiments of the present disclosure is described in detail; in conjunction with Fig. 2, the power
15 adapter in the embodiments of the present disclosure is described hereinafter in detail. It should be noted that the interaction and related features, and functions of the terminal and power adapter described at the terminal side corresponds to that at the power adapter side; for the sake of brevity, repeated description shall be omitted appropriately.

Fig. 2 is a block diagram of a power adapter in accordance with an exemplary
20 embodiment of the present disclosure. The power adapter 20 shown in Fig. 2 includes a power conversion unit 21 and a charging interface 22. The power conversion unit 21 is configured to form a charging loop with the terminal via the charging interface 22, so as to charge the battery of the terminal. The power adapter 20 further includes a communication unit 23 and an anomaly handling unit 24. The communication unit 23 is
25 configured to receive charging protection indication information from the terminal. The anomaly handling unit 24 is configured to control the charging loop to enter into a

protection state according to an indication of the charging protection indication information.

In the embodiments of the present disclosure, when the anomaly occurs on the charging loop, the communication unit of the power adapter receives the charging
5 protection indication information from the terminal, and controls the charging loop to enter into the protection state according to the indication of the charging protection indication information, thereby improving the safety of the charging process.

In at least one embodiment, the power adapter 20 is contacted with the terminal via the charging interface 22. The charging interface 22 includes power wires for charging
10 and data wires. The communication unit 23 is configured to receive the charging protection indication information from the terminal, and specifically to: receive the charging protection indication information from the terminal via the data wires in the charging interface 22.

For example, the charging interface can be a USB (Universal Serial Bus) interface
15 or a micro USB interface. The above-mentioned power wires can be power wires in the USB interface, such as +5V and -5V power wires; the above-mentioned data wires can be data wires in the USB interface, such as a D+ cable and a D- cable.

In at least one embodiment, the communication unit 23 is further configured to send charging parameter information to the terminal. The charging parameter information is
20 used for the terminal to determine whether an anomaly occurs on the charging loop.

In at least one embodiment, the charging parameter information includes at least one of an output voltage and an output current of the power adapter 20.

In conjunction with Fig. 1 and Fig. 2, as described above, the terminal and the power adapter according to the embodiments of the present disclosure are described in
25 detail. In conjunction with Fig. 3 and Fig. 4, the method for handling a charging anomaly according to the embodiments of the present disclosure is described hereinafter in detail. It should be noted that the method for handling a charging anomaly in Fig. 3

can be performed by the terminal 10 in Fig. 1. The method of handling a charging anomaly in Fig. 4 can be performed by the power adapter in Fig. 2. In order to avoid repetition, repeated description shall be omitted appropriately.

Fig. 3 is a schematic flowchart of a method for handling a charging anomaly in the
5 embodiments of the present disclosure. The method of Fig. 3 includes followings.

In 310, a terminal receives charging parameter information from a power adapter.

In 320, the terminal, according to the charging parameter information, determines whether an anomaly occurs on a charging loop between the terminal and the power adapter.

10 In 330, the terminal controls the charging loop to enter into a protection state if the anomaly occurs on the charging loop.

In the embodiments of the present disclosure, the terminal receives the charging parameter information, and according to the charging parameter information, determines whether the anomaly occurs on the charging loop. The terminal controls the
15 charging loop to enter into the protection state if the anomaly occurs on the charging loop, so as to improve the safety of the charging process.

In at least one embodiment, the method in Fig. 3 further includes: sending, by the terminal, charging protection indication information to the power adapter if the anomaly occurs on the charging loop, so as to indicate the power adapter to control the charging
20 loop to enter into the protection state.

In at least one embodiment, the terminal includes a charging interface. The charging interface includes data wires and power wires for charging. The terminal is configured to receive the charging parameter information from the power adapter, and specifically to receive the charging parameter information from the power adapter via the data wires
25 in the charging interface.

In at least one embodiment, the terminal is configured to control the charging loop to enter into the protection state by an act of reducing an input voltage of the power

adapter; or reducing an input current of the power adapter; or disconnecting the charging loop.

In at least one embodiment, the anomaly of the charging loop includes at least one of: overvoltage output and overcurrent output of the power adapter.

5 In at least one embodiment, the charging parameter information includes an output voltage of the power adapter. Determining, by the terminal according to the charging parameter information, whether the anomaly occurs on the charging loop between the terminal and the power includes: comparing, by the terminal, the output voltage with a voltage threshold; and determining by the terminal, the overvoltage output of the power
10 adapter and the anomaly occurring on the charging loop if the output voltage is higher than the voltage threshold.

In at least one embodiment, the charging parameter information includes an output current of the power adapter. Determining, by the terminal according to the charging parameter information, whether the anomaly occurs on the charging loop between the
15 terminal and the power includes: comparing, by the terminal, the output current with a current threshold; and determining, by the terminal, the overcurrent output of the power adapter and the anomaly occurring on the charging loop if the output current overcurrent is higher than the current threshold.

Referring to Fig. 4, a flow chart is presented in accordance with an exemplary
20 embodiment which is thus illustrated. The method shown in Fig. 4 includes followings.

In 410, a power adapter receives charging protection indication information from a terminal;

In 420, the power adapter controls a charging loop between the power adapter and the terminal to enter into a protection state according to an indication of the charging
25 protection indication information.

In the embodiments of the present disclosure, if an anomaly occurs on the charging loop, the power adapter receives the charging protection indication information from the

terminal, and according to the indication of the charging protection indication information, controls the charging loop to enter into the protection state, thereby improving the safety of the charging process.

In at least one embodiment, the power adapter is contacted with the terminal via the charging interface. The charging interface includes power wires for charging and data wires. Receiving, by the power adapter, the charging protection indication information from the terminal, includes: receiving, by the power adapter, the charging protection indication information from the terminal via the data wires in the charging interface.

In at least one embodiment, the method of Fig. 4 further includes: sending, by the power adapter, charging parameter information to the terminal. The charging parameter information is used for the terminal to determine whether an anomaly occurs on the charging loop.

In at least one embodiment, the charging parameter information includes at least one of an output voltage and an output current of the power adapter.

Those skilled in the art can realize that, the units and algorithm steps in conjunction with all examples described in the embodiments disclosed in this specification are able to be implemented by electronic hardware, or a combination of computer software and electronic hardware. Whether these functions are performed by hardware or software depends on specific applications and design constraint conditions of the technical solutions. For each specific application, those skilled in the art can realize the described functions by using different methods, but this realization shall not be considered beyond the scope of the present disclosure.

It would be appreciated by those skilled that, for convenience and simplicity of the description, the specific working process of the systems, devices and units as described above can refer to the corresponding process in the abovementioned method embodiments, and no further details hereto will be given.

In several embodiments provided in this application, it should be understood that the disclosed systems, devices and methods can be realized by other manners. For example, the above-described embodiments are only schematic; for example, the division of said unit is only a logic function division; there may be additional dividing
5 manners during the actual implementation. For example, multiple units or components may be combined or integrated into another system, or some features can be ignored, or not implemented. Another point, the displayed or discussed mutual coupling or direct coupling or communication connection may be via some interfaces, indirect coupling or communication connection of devices or units, in electronic, mechanical, or other
10 forms.

Said unit described as a separation part may be or may not be separated physically; the part displayed as a unit may be or may not be a physical unit, namely it can be located in one place, or can be distributed to multiple network units. Part or all of the units can be selected according to actual needs to achieve the purpose of the
15 embodiment.

In addition, all functional units in the embodiments of the present disclosure can be integrated in one processing unit, or each unit exists individually in physical form, or two or more units are integrated in one unit.

If said function is realized in the form of software function unit and sold or used as
20 an independent product, it can be stored in a computer readable storage medium. With such an understanding, the technical solution of the present disclosure substantially or its portion that contributes to the prior art or a portion of the technical solution may embody in the form of a computer software product which is stored in a memory media, including a plurality of instructions such that a computer (may be a personal computer, a
25 server, or a network device, etc.) executes all or some steps of the methods described in each of all the embodiments. And the previously mentioned memory media include such media capable of storing program codes as USB flash disk, portable hard drive,

read-only memory (ROM), random access memory (RAM), floppy disk or compact disk.

The above descriptions are only specific embodiments of the present disclosure, but not intended to limit the protection scope of the present disclosure. The variation or
5 replacement easily thought of by those of skill in the art within the technical scope disclosed by the present disclosure, shall fall within the protection scope of the present disclosure. Therefore, the protection scope of the present disclosure shall be determined with reference to the protection scope of the claims.

WHAT IS CLAIMED IS:

1. A terminal, comprising a battery and a charging interface; the terminal being configured to form a charging loop with a power adapter via the charging interface, so
5 as to charge the battery; wherein, the terminal further comprises a communication unit, an anomaly detection unit and an anomaly handling unit,

the communication unit is configured to receive charging parameter information from the power adapter;

the anomaly detection unit is configured to determine, according to the charging
10 parameter information, whether an anomaly occurs on the charging loop;

the anomaly handling unit is configured to control the charging loop to enter into a protection state if the anomaly occurs on the charging loop, wherein the anomaly handling unit is configured to reduce an input voltage of the power adapter or reduce an input current of the power adapter when entering into the protection state; and

15 the communication unit is further configured to send charging protection indication information to the power adapter to indicate the power adapter to control the charging loop to enter into the protection state if the anomaly occurs on the charging loop.

2. The terminal according to claim 1, wherein, the charging interface comprises
20 power wires and data wires,

the terminal is configured to form the charging loop with the power adapter via the power wires in the charging interface, so as to charge the battery; and

the communication unit is configured to receive the charging parameter information from the power adapter via the data wires in the charging interface.

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3. The terminal according to claim 1 or 2, wherein, the anomaly handling unit is configured to:

disconnect the charging loop.

4. The terminal according to any one of claims 1-3, wherein, the anomaly of the charging loop comprises at least one of overvoltage output and overcurrent output of the power adapter.

5 5. The terminal according to claim 4, wherein, the charging parameter information comprises an output voltage of the power adapter,
the anomaly detection unit is configured to:
compare the output voltage with a voltage threshold; and
determine the overvoltage output of the power adapter and the anomaly occurring
10 on the charging loop if the output voltage is higher than the voltage threshold.

6. The terminal according to claim 4 or 5, wherein, the charging parameter information comprises an output current of the power adapter,
the anomaly detection unit is configured to:
15 compare the output current with a current threshold; and
determine the overcurrent output and the anomaly occurring on the charging loop if the output current is higher than the current threshold.

7. A power adapter, comprising a power conversion unit and a charging interface;
20 the power conversion unit being configured to form a charging loop with a terminal via the charging interface, so as to charge a battery of the terminal; wherein, the power adapter further comprises a communication unit and an anomaly handling unit,
the communication unit is configured to receive charging protection indication information from the terminal; and
25 the anomaly handling unit is configured to control the charging loop to enter into a protection state according to an indication of the charging protection indication information, wherein the anomaly handling unit is configured to reduce an output voltage of the power adapter or reduce an output current of the power adapter.

8. The power adapter according to claim 7, wherein, the power adapter is contacted with the terminal via the charging interface, the charging interface comprises power wires for charging and data wires, and

the communication unit is configured to:

- 5 receive the charging protection indication information from the terminal via the data wires in the charging interface.

9. The power adapter according to claim 7 or 8, wherein, the communication unit is further configured to send charging parameter information to the terminal, and the
10 charging parameter information is used for the terminal to determine whether an anomaly occurs on the charging loop.

10. The power adapter according to claim 9, wherein, the charging parameter information comprises at least one of an output voltage and an output current of the
15 power adapter.

11. A method for handling a charging anomaly, comprising:
receiving, by a terminal, charging parameter information from a power adapter;
determining, by the terminal according to the charging parameter information,
20 whether an anomaly occurs on a charging loop between the terminal and the power adapter; and

controlling, by the terminal, the charging loop to enter into a protection state if the anomaly occurs on the charging loop, wherein,

- controlling, by the terminal, the charging loop to enter into the protection state
25 comprises:

reducing, by the terminal, an input voltage of the power adapter; or
reducing, by the terminal, an input current of the power adapter,
wherein the method further comprises:

sending, by the terminal, charging protection indication information to the power adapter to indicate the power adapter to control the charging loop to enter into the protection state, if the anomaly occurs on the charging loop.

5 12. The method according to claim 11, wherein, the terminal comprises a charging interface, the charging interface comprises data wires and power wires for charging, and receiving, by the terminal, the charging parameter information from the power adapter comprises:

receiving, by the terminal, the charging parameter information from the power
10 adapter via the data wires in the charging interface.

13. The method according to claim 11 or 12, wherein,
controlling, by the terminal, the charging loop to enter into the protection state
comprises:
15 disconnecting, by the terminal, the charging loop.

14. The method according to any one of claims 11-13, wherein, the anomaly of the charging loop comprises at least one of followings: overvoltage output and overcurrent output of the power adapter.

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15. The method according to claim 14, wherein, the charging parameter information comprises an output voltage of the power adapter,

determining, by the terminal according to the charging parameter information, whether the anomaly occurs on the charging loop between the terminal and the power
25 adapter comprises:

comparing, by the terminal, the output voltage with a voltage threshold; and

determining by the terminal, the overvoltage output of the power adapter and the anomaly occurring on the charging loop if the output voltage is higher than the voltage threshold.

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16. The method according to claim 14, wherein, the charging parameter information comprises an output current of said power adapter,

determining, by the terminal according to the charging parameter information, whether the anomaly occurs on the charging loop between the terminal and the power adapter comprises:

comparing, by the terminal, the output current with a current threshold; and

determining, by the terminal, the overcurrent output of the power adapter and the anomaly occurring on the charging loop if the output current overcurrent is higher than the current threshold.

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17. A method for handling a charging anomaly, comprising:

receiving, by a power adapter, charging protection indication information from a terminal; and

controlling, by the power adapter, a charging loop between the power adapter and the terminal to enter into a protection state according to an indication of the charging protection indication information, wherein controlling, by the power adapter, a charging loop between the power adapter and the terminal to enter into a protection state comprises:

reducing, by the power adapter, an output voltage of the power adapter or reducing, by the power adapter, an output current of the power adapter.

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18. The method according to claim 17, wherein, the power adapter is contacted with the terminal via a charging interface, the charging interface comprises power wires for charging and data wires, and

receiving, by the power adapter, the charging protection indication information from the terminal comprises:

receiving, by the power adapter, the charging protection indication information from the terminal via the data wires in the charging interface.

19. The method according to claim 17 or 18, further comprises:

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sending, by the power adapter, charging parameter information to the terminal, and the charging parameter information being used for the terminal to determine whether an anomaly occurs on the charging loop.

- 5 20. The method according to claim 19, wherein, the charging parameter information comprises at least one of an output voltage and an output current of the power adapter.