

MEASUREMENT DEVICE AND METHOD FOR MEASURING PARAMETERS

TECHNICAL FIELD

The present invention relates to the field of measurement technology, particularly to smart measurement devices and method for measuring parameters.

BACKGROUND

Multimeters or multi-testers are electronic measuring instruments capable of measuring functions in a single unit or device. Various conventional metering devices are capable of reading alternative current (AC) or direct current (DC) signals. On the other hand, there are also modern electrical meters that are digitally enabled, e.g., a Digital Power Meter (DPM).

However, there are certain limitations to these existing metering devices. For instance, most of these devices are not capable or enabled for internet connectivity. Further, some digital multimeters have computing capability but generally are bulky and unhandy. Additionally, conventional metering devices require hardware such as an adaptor in order to transfer or convey information to computers. Also, some existing multimeters are cumbersome to install.

Therefore, there is a need for a measurement device and method for measuring parameters which can eliminate at least one of the drawbacks in the existing metering devices.

Further, there is a need for internet-enabled measurement device which is more efficient, easy to install, enables wireless communication, and can provide more accurate measurement information.

BRIEF SUMMARY

The present invention provides solution to the above drawbacks of the existing measurement devices. More specifically, the present invention provides a smart measurement device comprising a case, a switch arranged on a side of the case, the switch includes an on position or an off position, at least one universal port arranged on a side of the case, a display for presenting an information, the display is disposed in front side of the case, a wireless communication device

which is linked to a smart device, and a machine readable device arranged in the smart measurement device, wherein the smart measurement device is magnetically mounted to a metallic surface which is close to at least one electrical connection point. The smart measurement device is capable to operate in a mesh communication. The mesh communication means that one smart measurement device could be linked to another smart measurement device to expand a local WiFi network. This smart measurement device solution is easy to install, and/or facilitates wireless cloud communication and/or Internet-of-Things (IoT).

According to an embodiment of the present invention, the smart measurement device is magnetically mounted to the metallic surface thereby allowing ease and/or swift mounting installation.

According to an embodiment of the present invention, a smart measurement device facilitates ease of installation, and/or acquisition of electrical data.

According to an embodiment of the present invention, a smart measurement device is provided with at least one universal port configured to facilitate probe installations of jack at one end, and of magnetic probes, alligator clips, or lug terminations at another end of a device under measurement. The jack may be a banana jack and the like. The arrangement of this embodiment allows easy metering and probe installation.

According to an embodiment of the present invention, a smart measurement device is provided with a wireless communication device which is configured to transmit data across a wireless communication set-up to a back-end server. This arrangement facilitates the smart measurement device to easily pair with other smart devices such as smartphone, tablet, phablet, portable computer, laptop, and the like, or with other computing devices. The back-end server can be a back-end cloud server. This arrangement allows compatibility with smart devices, and facilitates accurate presentation of measurement information.

According to an embodiment of the present invention, a smart measurement device is provided with a machine readable device which comprises a firmware that can be accessed and/or updated automatically, wirelessly, and/or over-the-air (OTA).

According to an embodiment of the present invention, a smart measurement device is provided with a machine readable device which comprises a non-transitory machine readable

storage medium and a machine readable instructions that when executed by a processor, causes the processor to generate signals for measuring parameters of a device under measurement by the smart measurement device.

According to an embodiment of the present invention, a method of measuring parameters is provided involving a smart measurement device as disclosed.

BRIEF DESCRIPTION OF DRAWINGS

Fig. 1 illustrates a perspective view of a smart measurement device in accordance to an embodiment of the present invention.

Fig. 2 illustrates a top cross-sectional view of a smart measurement device in accordance to an embodiment of the present invention.

Fig. 3 illustrates a bottom cross-sectional view of a smart measurement device in accordance to an embodiment of the present invention.

DETAILED DESCRIPTION

Referring to Fig. 1, a smart measurement device according to an embodiment of the present invention is shown. In an embodiment, the smart measurement device **100** comprises a case **1**, a switch **2** arranged on a side of the case **1**, the switch **2** includes an on position or an off position, at least one universal port (**3a, 3b, 3c, 3d**) arranged on a side of the case, a display **4** for presenting an information, the display **4** is arranged in a printed circuit board **6** and exposed from the front side of the case **1**, a wireless communication device (not shown) which is linked to a smart device; and a machine readable device (not shown) arranged in the smart measurement device **100**; wherein the smart measurement device **100** is magnetically mounted to a metallic surface which is close to at least one electrical connection point. The case **1** allows magnetic attachment to other metallic surface. This arrangement facilitates ease of installation. The metallic surface can be surface of a metallic electrical enclosure, electrical main switch board, or electrical sub-switchboard. The switch **2** allows the smart measurement device to be turned on or off. This smart measurement device solution is easy to install, and/or facilitates wireless cloud communication and/or Internet-of-Things (IoT). This arrangement allows easy installation and/or facilitates wireless cloud communication and/or Internet-of-Things (IoT).

Referring to Fig. 2, a top cross-sectional view of a smart measurement device is shown. The smart measurement device comprises a printed circuit board **6**, at least one power input (**7a**, **7b**, **7c**) for the smart measurement device, a display **4**, a microcontroller **8**, and a switch **5**. The display **4**, the at least one power input (**7a**, **7b**, **7c**), the micro controller **8**, and the switch **5** are arranged or electrically connected on the printed circuit board **6**. The display **4** is for displaying information. The switch **5** can be a display push button switch for switching parameters of the display **4**. The at least one power input (**7a**, **7b**, **7c**) can be at least one device power input for smart measurement device. The micro controller **8** can be a System-on-a-Chip (SoC) microcontroller with integrated WiFi and bluetooth. The SoC enables the functionality of the mesh Wifi networking and Bluetooth networking with other devices.

Referring to Fig. 3, a bottom cross-sectional view of a smart measurement device is shown. The at least one universal port (**3a**, **3b**, **3c**, **3d**) and switch **2** are arranged in the casing. The at least one universal port (**3a**, **3b**, **3c**, **3d**) facilitates probe installations, and/or allows easy metering.

Furthermore, a method of measuring parameters is disclosed. The method of measuring parameters involving a smart measurement device as disclosed is provided. The method of measuring parameters comprises the steps of:

- receiving an electrical signal by a smart measurement device from measurement probes;
- converting the electrical signal into numerical information through on-board electronics;
- storing the numerical information in a local data storage device;
- extracting the stored numerical information through machine readable instructions; and
- sending the numerical information to a back-end server on a periodic basis.

Additionally, the machine readable instructions in a machine readable device also analyse, detect anomalies from the stored numerical information against at least one pre-defined rule of threshold, and send notification or trigger to the back-end server.

The smart measurement device as disclosed herein is capable of measuring parameters including but not limited to current, voltage, resistance, and/or power.

While various embodiments are presented by the present invention, it should be noted that these embodiments are illustrative only and not restrictive to scale the concept of the present invention. Moreover, the phrases “according to an embodiment”, “in accordance to an embodiment”, “in some embodiments”, or “another embodiment” as used herein should not be

construed as restrictive, as they may or may not refer to a single embodiment. Further, modification to the embodiments herein described is possible to those skilled in the art without departing from the principles of the present invention. Also, expressions such as “including”, “have”, “having”, “comprising” and the likes in the entire specification shall be construed in a non-exclusive manner and allowing other features, components, elements, or steps, not explicitly described to be also present. Lastly, references herein to singular may also relate to plural.

CLAIMS

1. A smart measurement device comprising:
 - a case;
 - a printed circuit board;
 - a switch arranged on a side of the case, the switch includes an on position or an off position;
 - at least one universal port arranged on a side of the case;
 - a display for presenting an information, the display is arranged in the printed circuit board and exposed from the front side of the case;
 - a wireless communication device which is linked to a smart device; and
 - a machine readable device arranged in the smart measurement device;wherein the smart measurement device is magnetically mounted to a metallic surface which is close to at least one electrical connection point.
2. The smart measurement device as claimed in claim 1, wherein the at least one universal port is configured to facilitate probe installations of jack at one end, and of magnetic probes, alligator clips, or lug terminations at another end of a device under measurement.
3. The smart measurement device as claimed in claim 1, wherein the wireless communication device is configured to transmit data across a wireless communication set-up to a back-end server.
4. The smart measurement device as claimed in claim 1, wherein the machine readable device comprises a firmware.
5. The smart measurement device as claimed in claim 4, wherein the firmware is updated automatically, wirelessly, or over-the-air (OTA).
6. The smart measurement device as claimed in claim 1, wherein the smart measurement device is enabled through Internet-of-Things (IoT).
7. The smart measurement device as claimed in claim 1, wherein the machine readable device comprises a non-transitory machine readable storage medium and a machine readable instructions that when executed by a processor, causes the processor to generate signals for measuring parameters of a device under measurement by the smart measurement device.

8. A method of measuring parameters comprising the steps of:

- receiving an electrical signal by a smart measurement device from measurement probes;
- converting the electrical signal into numerical information through on-board electronics;
- storing the numerical information in a local data storage device;
- extracting the stored numerical information through machine readable instructions;
- sending the numerical information to a back-end server on a periodic basis;
- analysing or detecting of the machine readable instructions from the stored numerical information in comparison to a pre-defined rules of thresholds; and
- sending notification or trigger by the smart measurement device to the back-end server.