

EXHIBIT 1007

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(54) [Title of the Invention] SWITCHING REGULATOR PROVIDED
WITH CO-AXIAL CABLE CONNECTION PROTECTION FUNCTION

(57) [Abstract]

[Object] An object of the invention is to eliminate the risk of an electric shock hazard and a short circuit hazard due to misoperation in the work, poor connector connection, or the like at the time of the detaching of a co-axial cable through which the power-supplying side is connected to the power-consuming side with the superposing of a direct-current voltage onto a signal voltage, thereby ensuring safety.

[Construction] An output voltage variable circuit 16 and a co-axial cable connection signal detection circuit 14 are provided inside a switching regulator 6, which is provided with a co-axial cable connection protection function. If

the co-axial cable, through which the power-supplying side is connected to the power-consuming side, is in a state of non-connection to the power-consuming side, the co-axial cable connection signal detection circuit 14 detects that there is no load current and sends a detection signal to the output voltage variable circuit 16 to stabilize the level of an output voltage at a low voltage level. When the co-axial cable has now been connected thereto, the co-axial cable connection signal detection circuit 14 detects the presence of a load current. A detection signal is transferred from the output voltage variable circuit 16 to the output voltage stabilization circuit 15. An output voltage is increased up to a high level required at the power-consuming side. It is outputted as a stabilized voltage.

[Claim]

[Claim 1] A switching regulator provided additionally with a co-axial cable connection protection function for removing a potential short circuit hazard and a potential electric shock hazard at the time of detaching of a co-axial cable when a direct-current output voltage is sent from a power-supplying side to a power-load side in order to transmit power with superposing on the co-axial cable, through which a signal voltage is sent, comprising:

an output voltage variable circuit that performs output voltage variable control in accordance with information on the detaching of the co-axial cable; and

a co-axial cable connection detection circuit that detects a state of absence/presence of a load current corresponding to a state of the detaching of the co-axial cable and supplies the detaching information to the output voltage variable circuit.

[Detailed Description of the Invention]

[0001]

[Field of Industrial Application] The present invention relates to a switching regulator provided additionally with a co-axial cable connection protection function. More particularly, the invention relates to a switching regulator provided with a co-axial cable connection protection function for removing a potential short circuit hazard and a

potential electric shock hazard at the time of the detaching of a co-axial cable when the direct-current voltage of the switching regulator is applied to a signal line utilizing a co-axial cable to transmit power.

[0002]

[Description of the Related Art] A method that is commonly used in the art for supplying power with the application of a voltage from a switching regulator to a co-axial cable connected to a signal line is illustrated in Fig. 4.

[0003]

Specifically, at a power-supplying side 1, a regulator voltage is superposed from a switching regulator 18 via a power line 7 onto a signal voltage on a signal line 3. This voltage-superposed power is transmitted to a power-consuming side 2 via a co-axial cable 5.

[0004]

At the power-consuming side 2, separation processing is performed to take out an alternating-current component onto a signal line 4 and a direct-current component onto a power line 8. The power is supplied in this way.

[0005]

As illustrated in Fig. 5, the switching regulator 6 includes a PWM (Pulse Width Modulation) control circuit 17 and a switching element 9 at its primary side. Its secondary-side output transformed by a transformer 10 is

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