The United States of America



The Director of the United States Patent and Trademark Office

Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this

United States Patent

Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America, and if the invention is a process, of the right to exclude others from using, offering for sale or selling throughout the United States of America, or importing into the United States of America, products made by that process, for the term set forth in 35 U.S.C. 154(a)(2) or (c)(1), subject to the payment of maintenance fees as provided by 35 U.S.C. 41(b). See the Maintenance Fee Notice on the inside of the cover.

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US008120305B2

(12) **United States Patent**
Kim

(10) **Patent No.: US 8,120,305 B2**
(45) **Date of Patent: Feb. 21, 2012**

(54) **METHOD FOR STARTING SINGLE PHASE INDUCTION MOTOR AND ELECTRONIC RELAY USING THE SAME**

(76) Inventor: **Young Jun Kim**, Seoul (KR)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 337 days.

(21) Appl. No.: **12/544,289**

(22) Filed: **Aug. 20, 2009**

(65) **Prior Publication Data**

US 2011/0018486 A1 Jan. 27, 2011

(51) **Int. Cl.**
H02P 1/44 (2006.01)

(52) **U.S. Cl.** **318/786**; 318/785; 318/781; 318/778; 318/767; 318/727

(58) **Field of Classification Search** 318/786, 318/785, 781, 778, 767, 727
See application file for complete search history.

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(57) **ABSTRACT**

An electronic relay for single phase induction motor, the electronic relay including a triac located between a start winding and a start capacitor of the single phase induction motor to control current flow of the start winding and an induced voltage detection circuit to detect an induced voltage of the start winding proportional to an angular velocity of the motor. The electronic relay is adapted to detect a zero-point voltage of a motor line voltage before start of the motor and to calculate an acceleration torque during start of the motor. The electronic relay is programmed to turn on the triac when the zero-point voltage of the motor line is detected and to turn off the triac when the acceleration torque begins decreasing.

13 Claims, 4 Drawing Sheets

