



US011936258B2

(12) **United States Patent**
Chen

(10) **Patent No.:** **US 11,936,258 B2**
(45) **Date of Patent:** **Mar. 19, 2024**

(54) **METHOD FOR CONTROLLING OUTPUTS OF ELECTRIC MOTORS**

(56) **References Cited**

U.S. PATENT DOCUMENTS

(71) Applicant: **Feng-Tien Chen, Taichung (TW)**

4,644,342 A * 2/1987 Takara H02P 25/20
318/773

(72) Inventor: **Feng-Tien Chen, Taichung (TW)**

5,239,251 A * 8/1993 Lauw H02P 27/05
388/930

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 310 days.

2002/0125855 A1 * 9/2002 Johnson B60L 50/40
318/801

(21) Appl. No.: **17/556,504**

2015/0236634 A1 * 8/2015 Han H02P 5/74
318/504

(22) Filed: **Dec. 14, 2021**

2020/0136546 A1 * 4/2020 Chen H02P 25/22
2023/0163672 A1 * 5/2023 Chen H02K 3/28
310/49.23

2023/0268784 A1 * 8/2023 Chen H02K 1/16
310/216.001

(65) **Prior Publication Data**

US 2023/0163672 A1 May 25, 2023

FOREIGN PATENT DOCUMENTS

TW 1619886 B 4/2018

* cited by examiner

(30) **Foreign Application Priority Data**

Nov. 24, 2021 (TW) 110143809

Primary Examiner — Ahmed Elhakib

(74) *Attorney, Agent, or Firm* — Birch, Stewart, Kolasch & Birch, LLP

(57)

ABSTRACT

A method for controlling outputs of electric motors includes the steps of (a) providing an electric motor including a stator winding unit selected from first to fourth winding groups, each of the winding groups having at least a primary winding with a first number of poles and a first rated power, and at least a secondary winding with a second number of poles being the same as or different from the first number of poles and a second rated power being the same as or different from the first rated power; and (b) providing a control device respectively coupled with the electric motor and an external electrical power source for sensing a needed loading state of the electric motor and supplying a required connection relationship between the stator winding unit and the external electrical power source based on the needed loading state sensed by the control device.

(51) **Int. Cl.**

H02K 21/16 (2006.01)

F04B 49/02 (2006.01)

F25B 49/02 (2006.01)

H02K 1/16 (2006.01)

(52) **U.S. Cl.**

CPC **H02K 21/16** (2013.01); **F04B 49/02** (2013.01); **F25B 49/02** (2013.01); **H02K 1/16** (2013.01)

(58) **Field of Classification Search**

CPC : H02K 21/16; H02K 1/16; H02K 3/28; F04B 49/02; F04B 2203/02; F04B 35/04; F25B 49/02; F25B 49/02

USPC 310/49.23

See application file for complete search history.

9 Claims, 9 Drawing Sheets

