(12)

(11) **EP 2 613 042 A8**

CORRECTED EUROPEAN PATENT APPLICATION

published in accordance with Art. 153(4) EPC

(15) Correction information:

Corrected version no 1 (W1 A1) Corrections, see

Bibliography INID code(s) 72

(48) Corrigendum issued on: **28.08.2013 Bulletin 2013/35**

(43) Date of publication: **10.07.2013 Bulletin 2013/28**

(21) Application number: 11866438.2

(22) Date of filing: 29.09.2011

(51) Int Cl.: F02D 17/00 (2006.01) F02D 29/02 (2006.01)

(86) International application number: PCT/JP2011/072343

(87) International publication number: WO 2013/046387 (04.04.2013 Gazette 2013/14)

(84) Designated Contracting States:

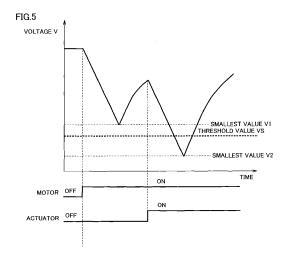
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

- (71) Applicant: TOYOTA JIDOSHA KABUSHIKI KAISHA
 Toyota-shi, Aichi-ken, 471-8571 (JP)
- (72) Inventors:
 - KONDO, Yumi
 Toyota-shi, Aichi-ken, 471-8571 (JP)

- YOSHITOMI, Yuuya Toyota-shi, Aichi-ken, 471-8571 (JP)
- KAWAI, Toshihiro Toyota-shi, Aichi-ken, 471-8571 (JP)
- (74) Representative: Kuhnen & Wacker Patent- und Rechtsanwaltsbüro Prinz-Ludwig-Strasse 40A 85354 Freising (DE)

(54) ENGINE STARTUP DEVICE AND CONTROL METHOD

(57)A starter includes a pinion gear that can be engaged with a ring gear coupled to a crank shaft of an engine, an actuator that moves the pinion gear to a position where the pinion gear is engaged with a ring gear, and a motor that rotates the pinion gear. An ECU stops the engine when a predetermined stop condition is satisfied, and cranks the engine with a motor when a predetermined start condition is satisfied after the engine is stopped. The motor and the actuator are supplied with electric power from a battery. The ECU includes a mode in which the motor is driven prior to driving of the actuator. The ECU restricts a stop of the engine if, of a decreased voltage of the battery after driving the motor and a decreased voltage of the battery after driving the actuator, the lower voltage falls below a threshold value.



EP 2 613 042 A8