



- (51) **International Patent Classification:**
F16D 27/14 (2006.01) F16D 48/00 (2006.01)
F16D 48/06 (2006.01)
- (21) **International Application Number:**
PCT/US2009/042822
- (22) **International Filing Date:**
5 May 2009 (05.05.2009)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
61/052,843 13 May 2008 (13.05.2008) US
- (71) **Applicant (for all designated States except US):** BORG-WARNER INC. [US/US]; Patent Department, 3850 Hamlin Road, Auburn Hills, MI 48326 (US).
- (72) **Inventors; and**
- (75) **Inventors/Applicants (for US only):** LEISING, Brian, E. [US/US]; 212 Brookstone Way, Central, SC 29630 (US). WOOD, Phillip [US/US]; 2130 W. View Court, Lake Orion, MI 48360 (US). TRUE, Ryan, M. [US/US]; 1274 North Selfridge, Clawson, MI 48017 (US).
- (74) **Agents:** OBERHOLTZER, Steven, L. et al.; Brinks Hofer Gilson & Lione, 524 South Main Street, Suite 200, Ann Arbor, MI 48104-2921 (US).

(81) **Designated States** (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) **Designated States** (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

[Continued on next page]

(54) **Title:** FLASH MEMORY SIGNATURE CAL

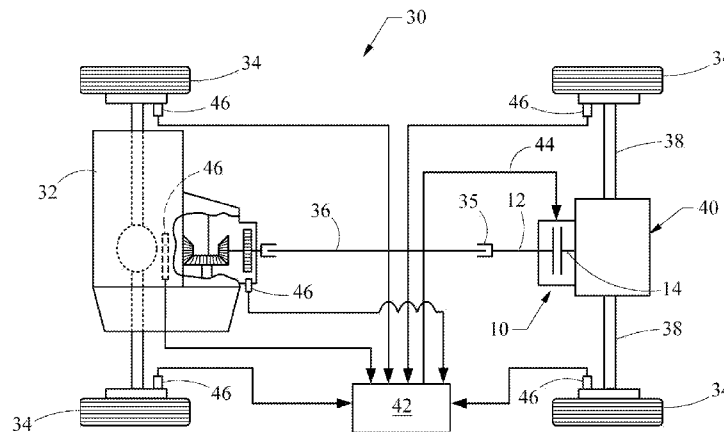


Fig. 1

(57) **Abstract:** A coupling device system for use in a motor vehicle is provided including a coupling device and a memory chip. The coupling device has an input member, an output member, and at least one modulating clutch assembly selectively coupling the input member to the output member. The modulating clutch assembly includes an electrical clutch operator and clutch plates. The clutch plates include at least one first clutch plate coupled to the input member and at least one second clutch plate coupled to the output member. The second clutch plate is disposed adjacent the first clutch plate. The memory chip is integrated with the coupling device and is configured to store data related to a measured characteristic of the coupling device. The memory chip is also configured to communicate with a vehicle controller. A method of providing a calibration curve of the coupling device to the vehicle controller is also disclosed.

WO 2009/140102 A3

(88) Date of publication of the international search report:
18 February 2010

A. CLASSIFICATION OF SUBJECT MATTER*F16D 27/14(2006.01)i, F16D 48/06(2006.01)i, F16D 48/00(2006.01)i*

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC F16D 27/14

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

KOMPASS (KIPO Internal) & Keywords; electromagnetic clutch, coupling, controller, solenoid, torque and memory

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	US 7,147,094 B2 (HISAAKI WAKAO et al) 12 December 2006 See column 5 line 30 - column 10 line 64, column 13 line 21 - column 14 line 52, Figures 1-8 and Figures 14-15.	1-3, 6-7, 9-19 4-5, 8
Y A	US 6,905,008 B2 (CHRISTOPHER J. KOWALSKY et al.) 14 June 2005 See column 2 line 44 - column 3 line 63 and Figure 1.	1-3, 6-7, 9-19 4-5, 8
A	US 6,497,301 B2 (NORIO IIDA et al.) 24 December 2002	1-19
A	JP 2007-177979 A (GKN DRIVELINE TORQUE TECHNOLOGY KK.) 12 July 2007	1-19
A	US 6,427,817 B1 (KENTARO ARAI et al.) 6 August 2002	1-19

 Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

23 DECEMBER 2009 (23.12.2009)

Date of mailing of the international search report

28 DECEMBER 2009 (28.12.2009)

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
Government Complex-Daejeon, 139 Seonsa-ro, Seo-
gu, Daejeon 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

TAK, Hyeong Yeop

Telephone No. 82-42-481-8421



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2009/042822

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 07147094 B2	12.12.2006	EP 1495901 A2	12.01.2005
		EP 1495901 A3	05.09.2007
		JP 2005-132141 A	26.05.2005
		JP 2005-028940 A	03.02.2005
		JP 04161369 B2	08.10.2008
		US 2005-0064989 A1	24.03.2005
		US 06905008 B2	14.06.2005
CN 100406765 C	30.07.2008		
CN 1580598 C0	16.02.2005		
DE 102004034009 A1	10.03.2005		
JP 2005-061629 A	10.03.2005		
KR 10-2005-0016091 A	21.02.2005		
US 2005-0034950 A1	17.02.2005		
US 06497301 B2	24.12.2002		
		DE 60128763 T2	31.01.2008
		EP 1188597 A2	20.03.2002
		EP 1188597 A3	19.05.2004
		EP 1188597 B1	06.06.2007
		JP 3525879 B2	10.05.2004
		JP 2002-087093 A	26.03.2002
		US 2002-0033291 A1	21.03.2002
		JP 2007-177979 A	12.07.2007
US 06427817 B1	06.08.2002	CA 2354219 A1	03.04.2002
		JP 2002-106604 A	10.04.2002
		JP 03628982 B2	16.03.2005