



- (51) **International Patent Classification:**
H02M 7/219 (2006.01) *H02M 1/42* (2007.01)
H05B 33/08 (2006.01)
- (21) **International Application Number:**
PCT/IB2011/055647
- (22) **International Filing Date:**
13 December 2011 (13.12.2011)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
61/425,806 22 December 2010 (22.12.2010) US
61/441,484 10 February 2011 (10.02.2011) US
- (71) **Applicant (for all designated States except DE, US):**
KONINKLIJKE PHILIPS ELECTRONICS N.V.
[NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).
- (71) **Applicant (for DE only):** **PHILIPS INTELLECTUAL PROPERTY & STANDARDS GMBH** [DE/DE];
Lübeckertordamm 5, 20099 Hamburg (DE).
- (72) **Inventor; and**
- (75) **Inventor/Applicant (for US only):** **ELFERICH, Reinhold**
[DE/DE]; c/o High Tech Campus Building 44, NL-5656 AE Eindhoven (NL).
- (74) **Agents:** **VAN EEUWIJK, Alexander** et al.; c/o High Tech Campus Building 44, NL-5656 AE Eindhoven (NL).
- (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, CL, 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, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, 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, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, 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, RS, SE, SI, SK, SM, 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))

[Continued on next page]

(54) **Title:** POWER CONVERTER DEVICE FOR DRIVING SOLID STATE LIGHTING LOAD

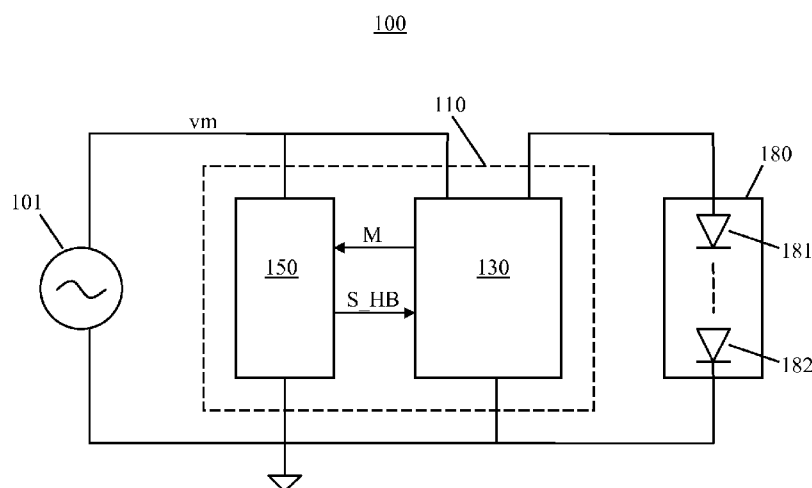


FIG. 1

(57) **Abstract:** A power converter device for converting power from a mains power supply (201) to power a solid state lighting load(280) includes a converter (230) and a control circuit (350). The converter (230) includes a half-bridge inverter (220) that functions as a boost inverter and output stage inverter, the half-bridge inverter having multiple switches(221, 222). The control circuit (350) is configured to control a mains input current and an output current of the device independently by providing a switching signal (S_HB) to the switches in the half-bridge inverter, where the switching signal has a duty cycle, a frequency and a cycle skipping duty cycle.



— *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))*

(88) Date of publication of the international search report:
15 November 2012

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2011/055647

A. CLASSIFICATION OF SUBJECT MATTER

INV. H02M7/219 H05B33/08 H02M1/42
ADD.

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)

H02M H05B

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)

EP0-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CARLTON, D.; DUNFORD, W.G.: "Skip-cycle modulation of three-phase boost power factor correction circuits operating in discontinuous conduction mode", POWER ELECTRONICS SPECIALISTS CONFERENCE, 2001. PESC. 2001 IEEE 32ND ANNUAL, vol. 2, 17 June 2001 (2001-06-17), - 21 June 2001 (2001-06-21), pages 1001-1006, XP002681732,	1,9,10
A	figures 1-8 ----- -/--	2-8, 11-20



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 another 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

12 August 2012

Date of mailing of the international search report

12/09/2012

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Kanelis, Konstantin

INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2011/055647

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	HUNG-LIANG CHENG; KUO-HSING LEE; YAN-CUN LI; CHIN-SIEN MOO: "A novel single-stage high-power-factor high-efficiency ac-to-dc resonant converter", IEEE 2ND INTERNATIONAL POWER AND ENERGY CONFERENCE, 2008. PECON 2008, 1 December 2008 (2008-12-01), - 3 December 2008 (2008-12-03), pages 1135-1140, XP002681739,	1,9,10
A	figures 1-10	2-8, 11-20
Y	----- CHENG, H.L.; MOO, C.S.; CHEN, W.M.: "A novel single-stage high-power-factor electronic ballast with symmetrical topology", INTERNATIONAL SYMPOSIUM ON INDUSTRIAL ELECTRONICS, 2001. PROCEEDINGS. ISIE 2001. IEEE, vol. 1, 12 June 2001 (2001-06-12), - 16 June 2001 (2001-06-16), pages 30-35, XP002681734, DOI: 10.1109/ISIE.2001.931750	1,9,10
A	figures 1-9	2-8, 11-20
Y	----- RUIZ, A.; AGUILAR, C.; ARAU, J.: "Half-bridge boost rectifier as power factor corrector-electronic balast", INTERNATIONAL POWER ELECTRONICS CONGRESS, 2000. CIEP 2000. VII IEEE, 15 October 2000 (2000-10-15), - 19 October 2000 (2000-10-19), pages 136-141, XP002681735,	1,9,10
A	figures 1-10	2-8, 11-20
Y	----- US 2007/040516 A1 (CHEN LIANG [US]) 22 February 2007 (2007-02-22) paragraphs [0053], [0268]; figures 1-719,23,53	1,9,10
Y	----- US 7 035 071 B1 (TIEW KEE CHEE [US] ET AL) 25 April 2006 (2006-04-25) paragraph [0026]; figures 3,4	1,9,10

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2011/055647

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 2007040516	A1	22-02-2007	NONE	

US 7035071	B1	25-04-2006	NONE	
