

(51) International Patent Classification:
H02J 3/38 (2006.01)(21) International Application Number:
PCT/EP2013/056723(22) International Filing Date:
28 March 2013 (28.03.2013)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
12162628.7 30 March 2012 (30.03.2012) EP(71) Applicant: **ABB TECHNOLOGY AG** [CH/CH]; Affol-
ternstrasse 44, CH-8050 Zürich (CH).(72) Inventor: **LAAKSONEN, Hannu**; c/o ABB Oy, Muottitie
2, FI-65320 Vaasa (FI).(74) Agent: **KINNUNEN, Kari**; ABB Oy, Sähkötie 4, FI-
65320 Vaasa (FI).(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, BN, 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, PA, 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, 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).

[Continued on next page]

(54) Title: ISLANDING DETECTION IN ELECTRICITY DISTRIBUTION NETWORK

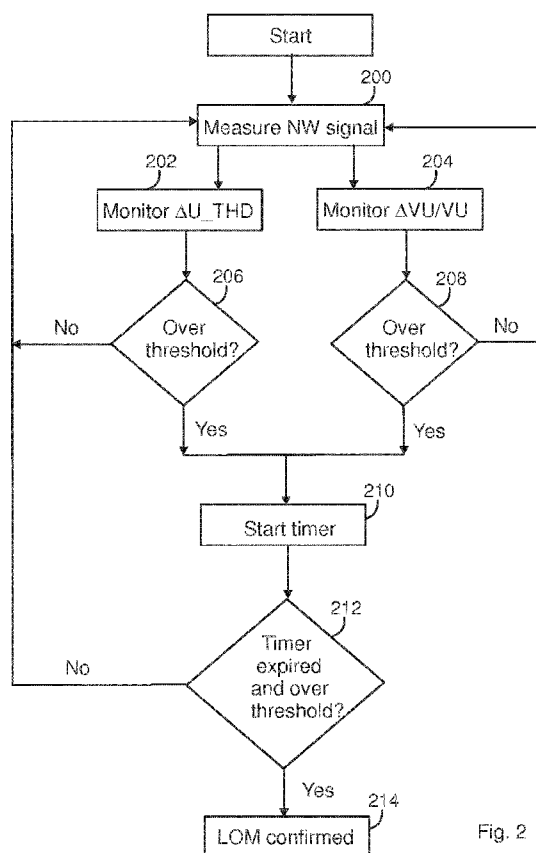


Fig. 2

(57) Abstract: A device for detecting an islanding condition in an electricity distribution network, comprising means for receiving (442) a signal of the electricity distribution network, means for determining (412) an islanding condition based on the received signal. The device comprises means for determining (402, 404, 406) a voltage total harmonic distortion change parameter for each phase component in the received signal, means for determining (408) a voltage unbalance change parameter in the received signal, means for comparing (412) each of the voltage total harmonic distortion change parameters and the voltage unbalance change parameter to respective triggering conditions, means for concluding (412) an islanding condition to have been detected if the voltage total harmonic distortion change parameter for each phase component of the signal and the voltage unbalance change parameter fulfil their respective triggering conditions.

**Published:****(88) Date of publication of the international search report:**

28 August 2014

- *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))*

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2013/056723

A. CLASSIFICATION OF SUBJECT MATTER
INV. H02J3/38
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)
H02J

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)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 02/061911 A1 (BG INTELLECTUAL PTY LTD [GB]; ALDRIDGE WAYNE KENNETH [GB]; WOODS KEVIN) 8 August 2002 (2002-08-08) page 4 - page 5, paragraph 2; figure 1 -----	1,8
A	JP H06 141470 A (TOSHIBA F A SYSTEM ENG; TOSHIBA CORP) 20 May 1994 (1994-05-20) abstract ----- -/--	1,8



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

3 July 2014

Date of mailing of the international search report

14/07/2014

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

Poth, Hartwig

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2013/056723

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JANG S-I ET AL: "An Islanding Detection Method for Distributed Generations Using Voltage Unbalance and Total Harmonic Distortion of Current", IEEE TRANSACTIONS ON POWER DELIVERY, IEEE SERVICE CENTER, NEW YORK, NY, US, vol. 19, no. 2, 1 April 2004 (2004-04-01), pages 745-752, XP011109811, ISSN: 0885-8977, DOI: 10.1109/TPWRD.2003.822964 paragraph [00IV] - paragraph [000V] -----	1-15

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2013/056723

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 02061911	A1	08-08-2002	AR 032801 A1 26-11-2003
			EP 1356567 A1 29-10-2003
			TW 576960 B 21-02-2004
			US 2004252525 A1 16-12-2004
			WO 02061911 A1 08-08-2002

JP H06141470	A	20-05-1994	NONE
