

1) Family number: 47486031 (US2011133764A)

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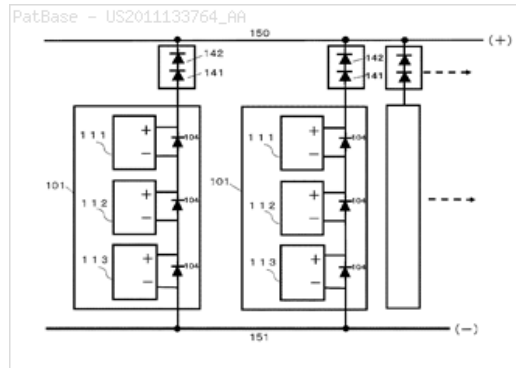
Title: APPARATUS AND METHOD FOR DETECTING ABNORMALITY IN SOLAR CELL POWER GENERATION SYSTEM
Priority: JP20090111698 20090501 EP20090843957 20090522 WO2009JP02264 20090522
Family:

Publication number	Publication date	Application number	Application date
CN102318076 A	20120111	CN200980136942	20090522
CN102318076 B	20140115	CN200980136942	20090522
DE602009037431 D1	20160512	DE200960037431T	20090522
EP2426725 A1	20120307	EP20090843957	20090522
EP2426725 A4	20150408	EP20090843957	20090522
EP2426725 B1	20160330	EP20090843957	20090522
IN01616CN2011 A	20111202	IN2011CN01616	20110308
JP2010263027 A2	20101118	JP20090111698	20090501
JP4673921 B2	20110420	JP20090111698	20090501
US2011133764 AA	20110609	US20090058327	20090522
US8581608 BB	20131112	US20090058327	20090522
WO10125612 A1	20101104	WO2009JP02264	20090522

Probable Assignee: ONAMBA CO LTD
Assignee(s):(std): FURUBAYASHI HIDEKI ; ISHIDA JUN ; MIYATA YUKITAKA ; ONAMBA CO LTD ; SHIZUYA OSAMU ; ONAMBA ELECTRONIC PARTS KUNSHAN CO LTD
Assignee(s): ONAMBA CO LTD OSAKA SHI ; ONAMBA ELECTRONIC PARTS KUNSHAN CO ; ONAMBA CO
Inventor(s):(std): SHIZUYA OSAMU ; FURUBAYASHI HIDEKI ; ISHIDA JUN ; MIYATA YUKITAKA ; HIDEKI FURUBAYASHI ; OSAMU SHIZUYA ; YUKITAKA MIYATA
Agent(s): PATENTANWAELE RUFF WILHELM BEIER DAUSTER AND PARTNER MBB; BAUMANN JOERG; PATENTANWAELE RUFF WILHELM BEIER DAUSTER AND PARTNER MBB; KOLISCH HARTWELL PC; KAZAHAYA NOBUAKI ET AL
Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW
International class (IPC 8-9): G01R31/00 G01R31/02 G01R31/40 H01L31/04 H01L31/042 H02S50/10 H04Q9/00 (Advanced/Invention)
CPC: H04Q2209/40 H04Q2209/886 H01L31/02021 H04Q9/00 Y02E10/50 H02S50/10 Y10T307/461 Y10T307/50 Y10T307/505 Y10T307/511 Y10T307/516 H01L31/044
European class: G01R31/26B2 G01R31/40B H01L31/02H2B H01L31/042 H04Q9/00 Y02E10/50
US class: 136/244 136/244S 307/38 307/43 307/44 307/45 307/46 320/101 320/152 320/157 320/158 320/159 320/162 320/163 320/164 324/500 324/512 324/522 324/537 324/537S 324/750.02 324/750.020P 361/78 361/79 361/86 361/87 361/88 361/90 361/91.1 361/92 361/93.8
JP class F-Term: 5F051 5F051/KA08 5F151 5F151/KA08
JP class F-Index: H01L31/04/K H02S40/34 H02S50/00
[Classification Explorer](#)
Cited documents: US8204709 BB, US6278052 BA, JPS642537 U1, JPS642537, JP8185235 A2, JP8185235 A2, JP64002537 U1, JP64002537 U1, JP64002537 U, JP64002537 A2, JP2005044824 A2, JP2005044824 A2, JP2004260015 A2, JP2004260015 A2, JP2001068706 A2, JP2001068706 A2, JP2000269531 A2, JP2000269531 A2, JP2000196127 A2, JP2000196127 A2, JP10326902 A2, JP10326902 A2, JP10201105 A2, JP10201105 A2, CN1700480 A,
Forward Citations: US9299861, US2015162871, US2012299576, US2012229161, US2010300509, JP6254214, JP6037585, JP5567752, JP2017073957, JP2016166787, JP2015502728, JP2015162469, JP2015079799, JP2012156317, JP2012151426, ES2481091, DE102011089188, CN106560998, CN106560998, CN105703710, CN105703710, CN104272128, CN104272128, CN102841301,

Abstract:

The present invention provides an apparatus for easily detecting an abnormal status of power generation of a solar cell panel in a solar cell power generation system having the power generation of 1 MW or higher. The present invention provides an abnormality detecting apparatus for a solar cell power generation system including a plurality of solar cell strings each having a plurality of solar cell modules connected to each other in series and a backflow preventing diode connected to a power output terminal of each of the solar cell strings, characterized in that the abnormality detecting apparatus further includes measuring means for measuring a current flowing in the backflow preventing diode; and that the measuring means is supplied with electric power from both terminals of the backflow preventing diode.



2) Family number: 15648232 (US5669987A)

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Title: ABNORMALITY DETECTION METHOD, ABNORMALITY DETECTION APPARATUS, AND SOLAR CELL POWER GENERATING SYSTEM USING THE SAME

Priority: JP19940074527 19940413 US19950419115 19950410 JP19940086987 19950412
JP19950086987 19950412 US19970870720 19970606

Family:	Publication number	Publication date	Application number	Application date
	CN1053502 C	20000614	CN19951005107	19950413
	CN1124847 A	19960619	CN19951005107	19950413
	EP0677749 A2	19951018	EP19950302507	19950413
	EP0677749 A3	19960117	EP19950302507	19950413
	JP2874156 B2	19990324	JP19950086987	19950412
	JP7334767 A2	19951222	JP19950086987	19950412
	KR100195686 B1	19990615	KR19950008609	19950413
	KR19950030402 A	19951124	KR19950008609	19950413
	KR950030402 A	19951124	KR19950008609	19950413
	US5669987 A	19970923	US19950419115	19950410
	US6278052 BA	20010821	US19970870720	19970606

Probable Assignee: CANON INC

Assignee(s):(std): CANON KK

Assignee(s): KYANON KK ; CANON KABUSHIKI KAISHA ; CANON INC ; CANON K K

Inventor(s):(std): NOBUYOSHI TAKEHARA ; KIMITOSHI FUKAE ; FUKAE KIMITOSHI C O CANON K K ; TAKEHARA NOBUYOSHI C O CANON K ; FUKAE KIMITOSHI ; TAKEHARA NOBUYOSHI

Inventor(s): TAKEHARA NOBUYOSHI C O CANON K K ; FUKAE KIMITOSHI C O CANON KK ; TAKEHARA NOBUYOSHI C O CANON KK ; TAKEHARA NOBUYOSHI/JP ; FUKAE KIMITOSHI/JP

Designated states: CH DE ES FR GB IT LI

International class (IPC 8-9): G01R31/26 G08B21/00 G08B21/08 H01L31/04 H02J7/35 H02N6/00 H02S50/10 (Advanced/Invention);
G01R31/26 (Advanced/Non-invention);
G01R31/26 G08B21/00 H01L31/04 H02J7/35 H02N6/00 (Core/Invention)

International class (IPC 1-7): G01R31/26 G01R31/36 G08B21/00 H01L25/00 H01L31/04 H01L31/042 H01L31/18 H02J7/35 H02N6/00

CPC: Y10S136/29 Y10S136/293 H02S50/10

European class: G01R31/40B

US class: 136/244 136/290 136/293

JP class F-Term: 5C086 5C086/AA34 5C086/CA02 5C086/CA03 5C086/CB19 5C086/DA08 5C086/EA08 5C086/EA11 5C086/EA39 5C086/EA40 5C086/EA41 5C086/EA45 5C086/FA17 5F051 5F051/AA05 5F051/BA01 5F051/JA06 5F051/JA20 5F051/KA02 5F051/KA08 5F051/KA10 5F151 5F151/AA05 5F151/BA01 5F151/JA07 5F151/JA30 5F151/KA02 5F151/KA08 5F151/KA10 5G003 5G003/AA06 5G003/BA04 5G003/EA08 5G003/GA07 5G003/GC05 5G066 5G066/HA06 5G066/HA13 5G066/HB06 5G503 5G503/AA06 5G503/BA01 5G503/BB01 5G503/BB02 5G503/DA04 5G503/DA16 5G503/DA17 5G503/EA08 5G503/FA17 5G503/GB03 5G503/GB06 5G503/GD04 5G503/GD06 5H660 5H680

JP class F-Index: G08B21/00/C G08B21/00/613 G08B21/08 H01L31/04/K H02J3/38/130 H02J7/35/B H02N6/00 H02S50/00

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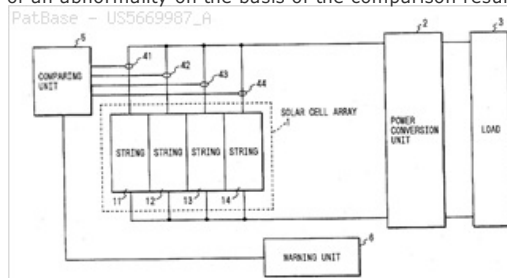
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Forward Citations: WO15022728, WO12166713, WO12166713, WO12128807, WO11104931, WO11101916, WO11070899, WO11026874, WO11026874, WO10042643, WO10042643, WO10039164, WO08012040, WO06078685, WO06054978, WO04008043, WO04008043, US9998071, US9831827, US9673630, US9644958, US9595913, US9520803, US9520038, US9502897, US9502895, US9496751, US9466737, US9442504, US9438037, US9397497, US9362752, US9310445, US9214894, US9209743, US9157657, US9127859, US9121876, US9086368, US9077206, US9057539, US9048781, US9048693, US9048353, US8952569, US8933721, US8884465, US8872083, US8810068, US8797000, US8581608, US8570059, US8482309, US8482153, US8476870, US8461811, US8421400, US8304932, US8294451, US8290745, US8289183, US8279644, US8242634, US8204709, US8159238, US8139382, US8106537, US8093756, US8004116, US7919953, US7843085, US7825330, US7733069, US7719140, US7605498, US7487771, US7177168, US7161082, US7079406, US6979771, US6930868, US6927955, US6892165, US6858791, US6831554, US6801442, US6761581, US6717519, US6653549, US6611441, US6605881, US6545211, US6515215, US6512458, US6493246, US6320769, US6278052, US6218605, US6101073, US6093885, US2018172755, US2015094967, US2013294126, US2012323507, US2012310427, US2012303298, US2012291843, US2012217987, US2012180843, US2011309801, US2011241720, US2011234005, US2011220167,

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Abstract:

It is an object of the invention to accurately detect a defective photoelectric conversion element regardless of the installation place and indicate the corresponding information. The above object can be achieved by a power generating system having a solar cell array constituted by a plurality of parallel-connected solar cell strings each consisting of a plurality of series-connected solar cell modules. The system includes electrical parameter detection units for measuring electrical parameters in solar cell strings, a comparing unit for mutually comparing the detected electrical parameters, and a unit for warning of an abnormality on the basis of the comparison result.



3) Family number: 56135456 (CN203521441U)

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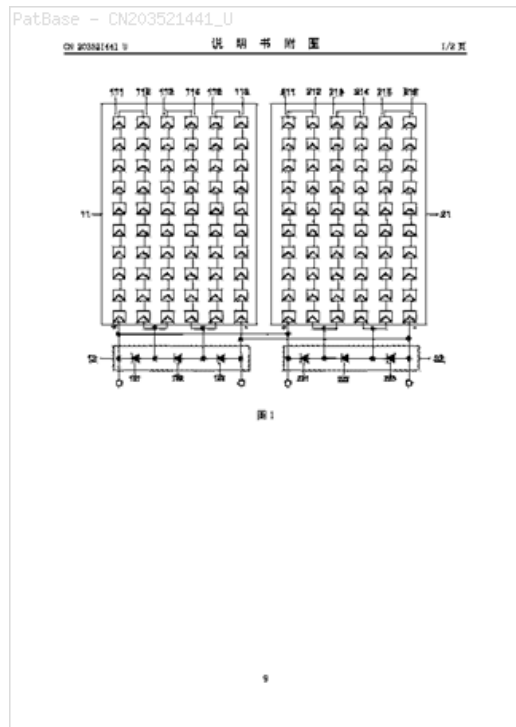
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Priority:	CN201310544286 20131105		CN201320694523U 20131105													
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Probable Assignee:	JINKO SOLAR CO LTD															
Assignee(s):(std):	JINKO SOLAR CO LTD															
Assignee(s):	JINKO SOLAR CO															
Inventor(s):(std):	CHEN KANGPING ; DONG SHUGUANG ; XIAO BIN ; LIU ZENGSHENG ; JIN HAO ; LIU YAFENG															
International class (IPC 8-9):	H01L31/0352 H01L31/042 H01L31/048 H02S40/34 (Advanced/Invention)															
CPC:	Y02E10/50 H01L31/0504 H01L31/048 H01L31/042															

[Classification Explorer](#)

Cited documents:	US2010300509 AA, CN203521441 U, CN203192803 U, CN203104029 U, CN203026527 U, CN202495457 U, CN202423319 U, CN103311349 A,
Forward Citations:	EP3503212, CN108666383, CN108461567, CN108428767, CN106160004, CN106130470, CN105917472, CN105489684, CN104980103, CN104980103, CN104868841, CN104617169,

Abstract:

The utility model provides a photovoltaic module. The photovoltaic module comprises a laminate, the laminate includes a battery layer, the battery layer includes first to Nth battery packs which are connected in parallel, and each battery pack is formed by connecting M 1/N solar batteries in series, wherein N is a positive integer not smaller than 2, and M is a positive integer not smaller than 60. The photovoltaic module further comprises a first current lead-out end electrically connected with the positive electrode of each battery pack and a second current lead-out end electrically connected with the negative electrode of each battery pack. According to the photovoltaic module, by the adoption of the connection mode in which M 1/N solar batteries are connected in series to form a battery pack first and then N battery packs are connected in parallel, the current of each battery pack is enabled to be 1/N of the original value on the premise of ensuring that total output voltage and current are not changed, thereby reducing power loss of each battery pack, reducing power loss of the whole photovoltaic module and improving the generation power of the photovoltaic module.



4) Family number: 44003529 (US2009283129A)

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Title:	SYSTEM AND METHOD FOR AN ARRAY OF INTELLIGENT INVERTERS																																												
Priority:	US20080127772P 20080514		US20090454244 20090514		WO2009US44033 20090514																																								
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Probable Assignee:	NATIONAL SEMICONDUCTOR CORP																																												
Assignee(s):(std):	BERGH DOUG ; FOSS ANDREW ; GOMEZ MIGUEL ; HASENFUS GARY ; HENDEL ROLAND ; MEDLEY DON ; NAT SEMICONDUCTOR CORP																																												
Assignee(s):	NATIONAL SEMICONDUCTOR CORPORATIONUS ; NATIONAL SEMICONDUCTOR CORP																																												
Inventor(s):(std):	FOSS ANDREW ; HENDEL ROLAND ; GOMEZ MIGUEL ; HASENFUS GARY ; BERGH DOUG ; MEDLEY DON ; DON MEDLEY ; ANDREW FOSS ; DOUG BERGH ; ROLAND HENDEL ; GARY HASENFUS ; MIGUEL GOMEZ																																												
Agent(s):	LIESEGANG EVA; MUNCK CARTER NSC; MUNCK WILLIAM A ET AL																																												
Designated states:	AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW																																												
International class (IPC 8-9):	G05F1/67 H01L31/042 H02J13/00 H02J3/38 H02J7/35 H02M7/48 H02M7/493 H02N6/00 (Advanced/Invention); H01L31/042 H02J7/35 H02M7/48 (Core/Invention); H02M7/48 (Core/Non-invention)																																												
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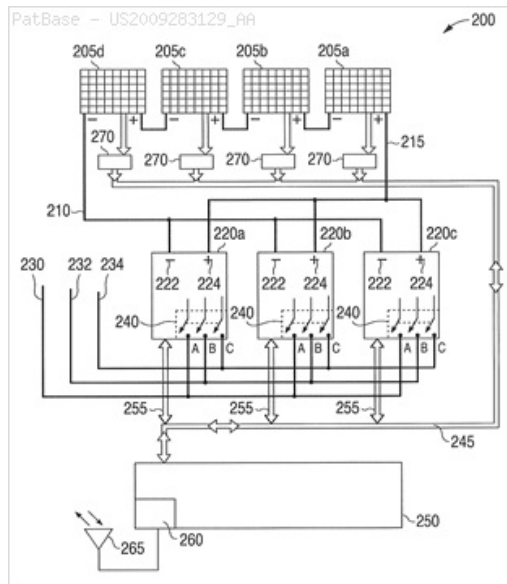
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Abstract:

A system and method for DC to AC conversion in a power generating array. The system and method includes a number of inverters coupled to a group of solar panels. A group controller coordinates operation of the inverters for interleaved switching of the inverters. The group controller communicates via a local area network, a wireless network, or both, to coordinate operation with additional groups of inverters coupled in parallel with additional solar panels.



5) Family number: 43305645 (US2009133733A)

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Title:	AUTONOMOUS, MODULAR POWER GENERATION, STORAGE AND DISTRIBUTION APPARATUS, SYSTEM AND METHOD THEREOF			
Priority:	US20070996604P 20071127	US20080054806P 20080520	CA20082706779 20081126	
	US20080292817 20081126	WO2008US13179 20081126	CA20172706779 20170926	
	US20180883422 20180130			
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WO09070316 A9	20090820	WO2008US13179	20081126

Probable Assignee: SOLAROAD TECHNOLOGIES GROUP LLC

Assignee(s):(std): GRIDKICKER LLC ; RETTI KAHRL ; RETTI KAHRL L ; SOLAROAD ELECTRAWALL LLC ; SOLAROAD ELECTRCRAWALL LLC ; SOLAROAD TECH GROUP LLC

Assignee(s): ELECTRAWALL LLC ; SOLAROAD TECHNOLOGIES GROUP ; SOLAROAD TECHNOLOGIES GROUP LLC ; SOLAROAD ELECTRAWALL LLC342 - 7801 YORK ROADTOWNSONMD21204US

Inventor(s):(std): RETTI KAHRL ; RETTI KAHRL L

Inventor(s): RETTI KAHRLUS

Agent(s): BERESKIN AND PARR LLP SENCRL SRL; VANZINI CHRISTIAN; ROYLANCE ABRAMS BERDO AND GOODMAN LLP; WHITEFORD TAYLOR AND PRESTON LLP; GREGORY M; MICHEL CHRISTIAN ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

International class (IPC 8-9): A47B96/06 H01L31/042 H01L31/058 H01L31/42 H01L35/00 H01M10/052 H01M10/46 H01M6/42 H02J7/00 H02J7/35 H02S10/10 H02S40/38 H1M10/052 (Advanced/Invention); H01M10/0525 H01M10/46 (Advanced/Non-invention); A47B96/06 H01L31/042 H01L35/00 H01M6/42 H02J7/00 (Core/Invention)

CPC: H01M10/0525 H01M10/465 H02J7/355 H02S10/10 H02S40/38 Y02E60/122

European class: H01L31/058B H01L31/058C H01M10/46B H02J7/35M T01M10/0525 Y02E10/50 Y02E60/12 Y02T10/70B2

US class: 1/1 136/206 136/244 136/244S 248/205.1 248/205.100S 320/109 320/109S 320/112 320/112S 320/134 320/134S 429/156 429/156S

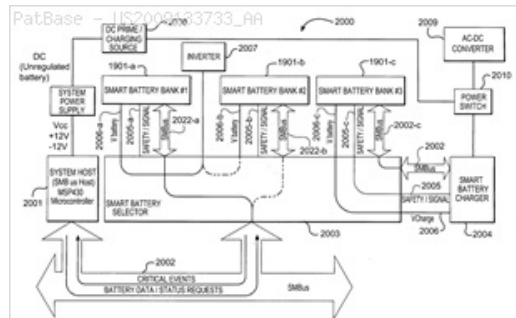
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Forward Citations: WO18165813, WO16134441, WO15060580, WO13170274, WO13170274, US9983041, US9804210, US9793760, US9774198, US9680313, US9502915, US9502909, US9499040, US9469208, US9153963, US9099892, US9007020, US8963481, US8963367, US8853995, US8847543, US8706312, US8547057, US8432130, US8362646, US7977818, US2018170201, US2017063126, US2016207407, US2015249353, US2014312838, US2014172206, US2014103879, US2014034103, US2013169042, US2013099756, US2012310433, US2012206086, US2011210697, US2011119144, US2011115432, US2010323616, US2010300509, US10449872, US10418842, US10381498, US10355152, US10338113, US10207595, US10177579, US10084329, ITRM20110527, GB2498103, FR3016258, EP2928042,

Abstract:

An autonomous, modular energy generation, storage and transmission apparatus, system, and method is provided. An apparatus is tube shaped and includes solar and thermionic energy conversion layers, and a battery module. A system of modular apparatuses may be connected together to form a transmission network. Such devices are particularly suited for outdoor application on highway jersey walls, and for indoor application on office cubicle walls. A method of charging battery modules in the apparatus is provided, along with a method of distributing the same in commerce.



6) Family number: 43540719 (US2009183760A)

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Title:	REDUNDANT ELECTRICAL ARCHITECTURE FOR PHOTOVOLTAIC MODULES		
Priority:	US20080022246P 20080118	US2008002228P 20080118	US20080022242P 20080118
	US20080022234P 20080118	US20080022236P 20080118	US20080022245P 20080118
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Assignee(s):(std): BERG LOWELL J ; CORNEILLE JASON STEPHAN ; KNIGHT RAYMOND W ; CORNEILLE JASON STEPHEN ; MCCOLL WILLIAM JAMES ; CROFT STEVEN THOMAS ; DODD ORVILLE D ; MEYER DALLS W ; MEYER DALLAS W ; MIASOLE ; TENKSOLAR ; NOVOTNY JOHN P ; MEYER FORREST C ; TENKSOLAR INC ; MURNAN THOMAS L ; STOVER LANCE ; WHEELER STEVEN E ; WUDU MULUGETA ZERFU

Assignee(s): TENKSOLAR INC MINNEAPOLIS ; SPECTRUM SOLAR LLC ; TENKSOLAR LLC ; OAKTREE POWER OPPORTUNITIES FUND III LP ; SPECIAL SITUATIONS INVESTING GROUP II LLC ; APOLLO PRECISION KUNMING YUANHONG LTD ; BEIJING APOLLO DING RONG SOLAR TECHNOLOGY CO LTD ; PINNACLE VENTURES LLC ; HANERGY HOLDING GROUP LTD ; ESB NOVUSMODUS LP ; GOLDMAN SACHS AND CO LLC F K A GOLDMAN SACHS AND CO

Inventor(s):(std): CANNON JOEL ; DODD ORVILLE D ; MURNAN THOMAS L ; STOVER LANCE E ; KORKOWSKI KURT ; DODD ORVILLE ; CORNEILLE JASON STEPHEN ; MCCOLL WILLIAM JAMES ; WUDU MULUGETA ZERFU ; CROFT STEVEN THOMAS ; MEYER DALLAS W ; MEYER DALLS W ; JOHN NOVOTNY ; LOWELL BERG ; SHADY GROSS ; LOWELL J BERG ; FORREST C MEYER ; DALLAS W MEYER ; STEVEN E WHEELER ; RAYMOND W KNIGHT ; JOHN P NOVOTNY ; BERG P LOWELL J ; NOVOTNY JOHN P ; MEYER FORREST C ; KNIGHT RAYMOND W ; WHEELER STEVEN E ; MEYER FORREST ; NOVOTNY JOHN ; BERG LOWELL ; GROSS SHADY ; STOVER LANCE ; CORNEILLE JASON STEPHAN

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Agent(s): MAIKOWSKI AND NINNEMANN PATENTANWALTE PARTNERSCHAFT MBB; LAWRENCE RICHARD ANTHONY; GROSS FELIX; MUELLER WOLFRAM HUBERTUS; MAIKOWSKI AND NINNEMANN; MAIKOWSKI AND NINNEMANN PATENTANWALTE PARTNERSCHAFT MBB; ONDA MAKOTO; ONDA HIRONORI; WORKMAN NYDEGGER,1000 EAGLE GATE TOWER; WORKMAN NYDEGGER 1000 EAGLE GATE TOWER; WEAVER AUSTIN VILLENEUVE AND SAMPSON LLP; MASCHOFF GILMORE AND ISRAELSEN; MASCHOFF BRENNAN; ISRAELSEN BURNS R; ISRAELSEN R BURNS; AUSTIN JAMES E ET AL; ISRAELSEN BURNS R ET AL; ISRAELSEN R BURNS ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

International class (IPC 8-9): B05D3/06 B05D5/00 B23K26/00 B29C59/16 B32B37/00 E06B7/08 F24J2/16 F24J2/52 G01D18/00 G01R27/08 G01R31/40 G02B7/183 G05B15/02 G05F1/46 G05F1/67 G06F1/26 G06F17/50 H01L21/00 H01L21/02 H01L25/00 H01L31/00 H01L31/02 H01L31/0203 H01L31/0236 H01L31/032 H01L31/04 H01L31/042 H01L31/048 H01L31/05 H01L31/052 H01L31/054 H01L31/18 H01L51/40 H02J1/00 H02J3/38 H02J3/46 H02J7/35 H02M7/00 H02N6/00 H02S10/00 H02S20/30 H02S30/10 H02S40/22 H02S40/30 H02S40/32 H02S40/34 H02S40/36 H02S40/38 H02S50/00 H02S50/10 H02S50/15 H02S99/00 (Advanced/Invention); F24J2/00 F24J2/54 H01L31/00 H01L31/02 H01L31/048 H01L31/05 H01R4/24 H02J1/12 H02J3/38 H02M7/00 H02S30/10 H02S40/34 (Advanced/Non-invention); B05D5/00 B32B37/00 E06B7/02 G01D18/00 G05B15/02 G06F1/26 G06F17/50 H01L31/0264 H01L31/04 H01L31/042 H01L31/052 H01L31/18 (Core/Invention); H02J1/10 (Core/Non-invention)

International class (IPC 1-7): H02N6/00

CPC: H01L31/022425 E06B7/082 E06B2009/2476 Y02B10/20 Y10T156/1052 Y10T307/653 H01L31/049 H02S40/42 B32B27/32 B32B7/02 B32B15/04 B32B15/18 B32B15/20 B32B27/06 B32B27/304 B32B2307/416 H01L31/0508 Y02P70/521 H01L31/0322 H01L31/0392 H01L31/206 H01L31/035281 H01R4/2475 H02J3/383 Y02E10/563 Y10T307/707 H02S20/22 H02J7/35 H02S40/32 H01L31/02021 H02S40/34 Y02E10/58 H01L31/03923 H01L31/03925 H01L31/03928 H02S30/20 Y02B10/10 Y10T307/549 H01L31/0547 H01L31/05 H02S40/36 H01L31/048 H02J3/46 H02J3/385 H01L31/0504 H02S30/10 H02S40/38 G02B7/183 H01L31/0549 H02S20/00 H02S20/30 H02S40/22 Y02E10/47 Y02E10/52 F24S25/13 F24S25/50 F24S2025/013 F24S2030/16 F24S25/20 F24S2025/801 F24S2020/14 H01L31/18 F24S23/77 F24S25/16 F24S25/35 F24S25/37 F24S25/632 F24S25/65 F24S25/70 F24S40/80 F24S40/85 F24S2020/16 F24S2025/803 F24S2025/807 Y02B10/12 H01L31/02008 H02M7/003 H02S50/10 Y02E10/56 H01L31/042 H02S50/00 H02S50/15 B32B37/02 B32B37/12 B32B38/0004 B32B38/06 B32B2310/0843 B32B2311/00 B32B2311/24 B32B2367/00 B32B2457/12 E06B7/08 H01L31/0236 H01L31/02366 Y02E10/50

European class: B32B37/02 E06B7/08 E06B7/082 F24J2/16 F24J2/46B28 F24J2/52A20C2 F24J2/52A20D F24J2/52A30 F24J2/52A4B4 F24J2/52A4B6 F24J2/52A8F G02B7/183 H01L31/0236 H01L31/02E2B H01L31/02H2B H01L31/032C H01L31/0376B H01L31/0392 H01L31/042 H01L31/042B H01L31/042D H01L31/045 H01L31/048 H01L31/05 H01L31/052B H01L31/052B3 H01L31/18 H02M7/00D L32B310/08B6 L32B311/00 L32B311/24

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US class:

1/1 136/244 136/244S 136/246 136/249 136/251 136/252 136/252S 136/256 136/259 136/262 156/250
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257/E31.027 257/E31.027S 257/E31.054 257/E31.127 257/E31.127S 264/446 264/446P 307/126 307/52
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700/275 700/275P 700/286 700/286S 703/1 703/1S

JP class F-Term:

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JP class F-Index:

H01L31/04/R H01L31/04/562 H01L31/04/570 G05F1/67/A H02S10/00 H02S40/30 H01L31/04/500 H02S40/32
H02S40/34 H02S40/36 H02J3/38/130 H02J7/35/K

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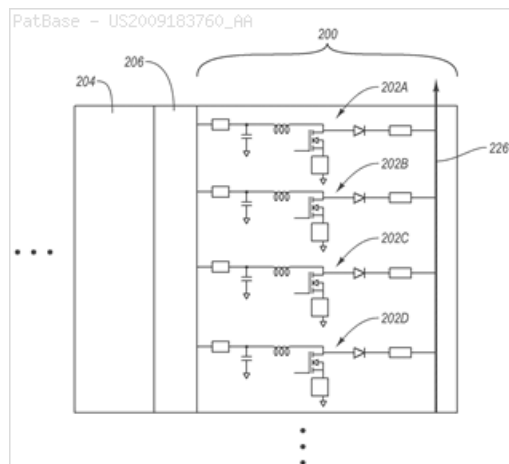
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Abstract:

One example embodiment includes a PV module comprising a conductive backsheet, a substantially transparent front plate, a plurality of PV cells, a plurality of conductive spacers, and a power conversion device. The PV cells can be disposed between the conductive backsheet and the front plate and can be arranged in a plurality of rows. The PV cells within each row can be connected to each other in parallel and the rows can be connected in series. The PV cells can be interconnected between the conductive spacers. The power conversion device can be redundantly connected to the PV cells via a last conductive spacer connected to a last row. The power conversion device can substantially maintain a maximum peak power of the PV module and can convert a lower voltage collectively generated by the PV cells to a predetermined stepped up voltage greater than or equal to 12 volts.



7) Family number: 47721890 (US2010300509A)

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Title: SOLAR PHOTOVOLTAIC MODULES WITH INTEGRAL WIRELESS TELEMETRY

Priority: US20090217055P 20090526 US20100800917 20100526

Publication number	Publication date	Application number	Application date
US2010300509 AA	20101202	US20100800917	20100526

Probable Assignee: RAYMOND DOUGLAS WILLIAM

Assignee(s):(std): RAYMOND DOUGLAS WILLIAM ; STOFER GARY

Inventor(s):(std): RAYMOND DOUGLAS WILLIAM ; STOFER GARY

Agent(s): DOUGLAS W RAYMOND

International class (IPC 8-9): G01R19/00 H01L31/042 (Advanced/Invention)

CPC: H04Q2209/10 H04Q2209/30 H04Q2209/40 H04Q2209/886 G01R31/3025 H01L31/02021 H01L2924/0002 H04Q9/00 H02S50/10

European class: G01R31/302W G01R31/40B H04Q9/00 T01L31/02H2B

US class: 136/244 324/76.11 324/76.110S

[Classification Explorer](#)

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Forward Citations: WO16052607, WO13156943, WO12128807, WO12115502, US9912289, US2015288188, US2015222227, US10461688, JP6573897, JP2016052607, EP2839303, EP2745331, EP2689308, EP2689308, EP2653880, CN106797196, CN106797196, CN105955148, CN105955148, CN104617169,

Abstract:

The invention provides a solar photovoltaic ("PV") module with integral wireless measurement and telemetry, transmitting to a central gateway node. It also provides a solar array constructed using these improved modules and network. These wirelessly monitored modules and the network in which they communicate allow the important state variables of individual modules to be observed remotely, without direct physical access to the array. The monitors measure and report the module voltage, and may also be designed to measure current flow, temperature, and/or other variables of interest. The invention offers valuable savings by immediately revealing trouble, by diagnosing to the specific location of a fault, by reducing losses due to module and string downtime, by reducing labor and capital equipment devoted to ongoing operation and maintenance, and by speeding troubleshooting during initial commissioning of newly built arrays.

