

1) Family number: 11894084 (US5994869A)

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Title: Power conversion circuit for a motor

Abstract: A motor system and method providing improved power factor and harmonic control of power supplied to a motor. The system and method employs a power conversion circuit connected to an AC voltage source for supplying power to a power supply link of the motor. The power conversion circuit includes a rectifier circuit and a power factor correction circuit. The rectifier circuit rectifies the AC voltage and has first and second outputs corresponding to upper and lower rails of the power supply link, respectively. The power factor correction circuit is connected directly between the first output of the rectifier circuit and a node of the corresponding upper rail of the power supply link for improving the power factor of the power supplied to the motor.

Classifications:

International (IPC 8-9): H02P6/08 (Advanced/Invention);

H02P6/08 (Core/Invention)

International (IPC 1-7): H02P1/24

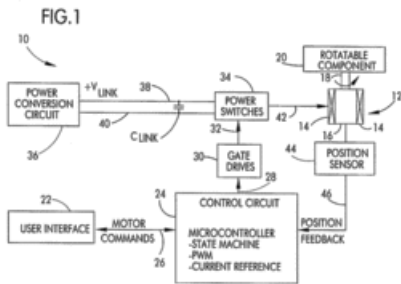
CPC: H02P6/085

European: H02P6/08B

US: 318/729 363/36 363/56

PatBase - US5994869_R

U.S. Patent Nov. 30, 1999 Sheet 1 of 7 5,994,869



Family:

Publication number	Publication date	Application number	Application date
US5994869 A	19991130	US19970985503	19971205

Priority:

US19970985503 19971205

Probable Assignee: GENERAL ELECTRIC CO

Assignee(s): (std): GEN ELECTRIC

Assignee(s): GENERAL ELECTRIC CO ; GENERAL ELECTRIC COMPANY

Inventor(s): (std): BECERRA ROGER C

2) Family number: 70710109 (US2018226879A)

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Title: CURRENT REFERENCE BASED SELECTIVE HARMONIC CURRENT MITIGATION PULSED WIDTH MODULATION

Abstract: Methods and apparatuses for selective harmonic current mitigation pulse width modulation (SHCM-PWM) are provided. Low switching frequencies can be utilized for grid connected cascaded H-bridge multilevel rectifiers to meet harmonic requirements within an extended harmonic spectrum. Instead of using voltage references to calculate switching angles for rectifiers as in conventional selective harmonic elimination-PWM (SHE-PWM) and selective harmonic mitigation-PWM (SHM-PWM), current references can be used to compensate for current harmonics and meet current harmonic requirements and total demand distortion (TDD) within the entire harmonic spectrum.

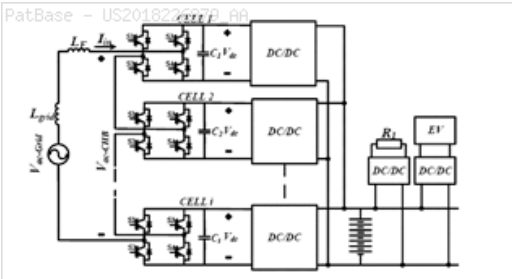
Classifications:

International (IPC 8-9): H02J3/01 H02M1/08 H02M1/12 H02M7/487

H02M7/49 H02M7/5395 (Advanced/Invention);

H02M7/483 H02M7/487 (Advanced/Non-invention)

CPC: H02M1/12 H02M1/126 H02M7/487 H02M7/49 H02M7/5395



Family:

Publication number	Publication date	Application number	Application date
US2018226879 AA	20180809	US20180887620	20180202
US10243446 BB	20190326	US20180887620	20180202

Priority:

US20170455016P 20170206 US20180887620 20180202

Probable Assignee: UNIV FLORIDA

Assignee(s): (std): UNIV FLORIDA ; UNIV OF FLORIDA RESEARCH FOUNDATION INC

Assignee(s): NATIONAL SCIENCE FOUNDATION ; OF FLORIDA RESEARCH FOUNDATION INC UNIV

Inventor(s): (std): WANG SHUO ; MOEINI AMIRHOSSEIN ; ZHAO HUI

Agent(s): ALSTON AND BIRD LLP

3) Family number: 43177164 (US2009102436A)

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Title: CONTROLLER FOR THE THREE-PHASE CASCADE MULTILEVEL CONVERTER USED AS SHUNT ACTIVE FILTER IN UNBALANCED OPERATION WITH GUARANTEED CAPACITORS VOLTAGES BALANCE

Abstract: The present invention comprises a controller for the cascade H-bridge three-phase multilevel converter used as a shunt active filter. Based on the proposed mathematical model, the controller is designed to compensate harmonic distortion and reactive power due to a nonlinear distorting load. Simultaneously, the controller guarantees regulation and balance of all capacitor voltages. The idea behind the controller is to allow distortion of the current reference during the transients to guarantee regulation and balance of the capacitors voltages. The controller provides the duty ratios for each H-bridge of the cascade multilevel converter.

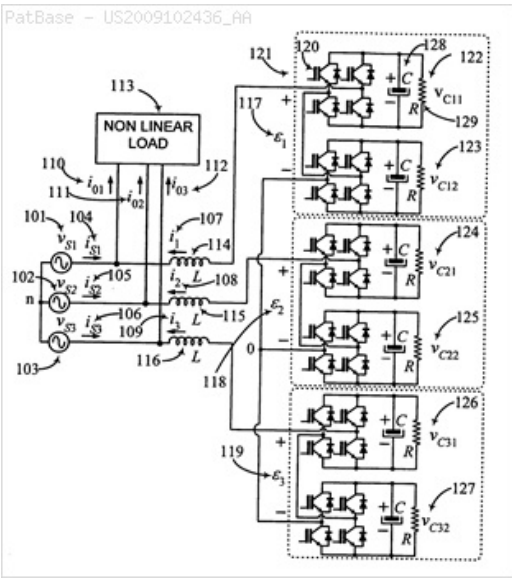
Classifications:

International (IPC 8-9): G05F1/70 G05F5/04 (Advanced/Invention); G05F1/70 G05F5/00 (Core/Invention)

CPC: H02J3/1857 H02M2001/0003 H02M2007/4835 Y02E40/26

European: H02J3/18C 3A3 T02M7/483M Y02E40/26

US: 323/207 323/207P 363/40 363/71



Family:

Publication number	Publication date	Application number	Application date
US2009102436 AA	20090423	US20070975231	20071018
US7710082 BB	20100504	US20070975231	20071018

Priority:

US20070975231 20071018

Probable Assignee: INSTITUTO POTOSINO DE INVESTIGACION CIENTIFICA Y TECNOLOGICA IPICYT

Assignee(s): (std): ESCOBAR VALDERRAMA GERARDO ; INST POTOSINO DE INVESTIGACION ; VALDEZ FERNANDEZ ANDRES ALEJANDRO ; MARTINEZ MONTEJANO MISAEL FRANSISCO ; TORRES OLGUIN RAYMUNDO ENRIQUE

Assignee(s): INSTITUTO POTOSINO DE INVESTIGACION CIENTIFICA Y TECNOLOGICA IPICYT ; INSTITUTO POTOSINO DE INVESTIGACION CIENTIFICA Y T ; INSTITUTO POTOSINO DE INVESTIGACION CIENTIFICA Y TECNOLOGICA (IPICYT) ; INSTITUTO POTOSINO DE INVESTIGACION CIENTIFICA Y TECNOLOGICA IPICYT ; INSTITUTO POTOSINO DE INVESTIGACION CIENTIFICA Y TECNOLOGICA (IPICYT)

Inventor(s): (std): VALDEZ FERNANDEZ ANDRES ALEJANDRO ; ESCOBAR VALDERRAMA GERARDO ; MARTINEZ MONTEJANO

Agent(s): DEFILLO AND ASSOCIATES INC; EVELYN A

4) Family number: 68094222 (CN107546968A)

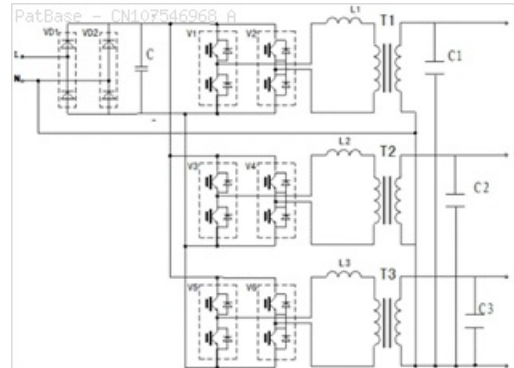
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Title: VOLTAGE STABILIZING SYSTEM FOR RAILWAY POWER SUPPLY HARMONIC CONTROL

Abstract: The invention discloses a voltage stabilizing system for railway power supply harmonic control. The voltage stabilizing system comprises a rectifier module, an inverter module connected with an output end of the rectifier module, and a transformer module connected with the output end of the inverter module; the rectifier module is a single phase input rectifier module; the inverter module includes three sets of parallel single phase H-bridge inverter units; the transformer module comprises three sets of single phase transformers which correspond to the three sets of single phase H-bridge inverter units one by one respectively; a filter reactor is serially arranged between each single phase transformer and each H-bridge inverter unit; auxiliary edges of the single phase transformers are connected into a star shape, and star points are used as an output N line. According to the voltage stabilizing system for railway power supply harmonic control, a single phase input and three sets of H-bridge common direct current buses of the inverter module are adopted by the rectifier module, the cost and volume of the rectifier side can be saved, the application condition of the single phase power supply can be adapted, and three sets of independent 220V single phase power supply or a set of 380V three phases can be outputted.

Classifications:

International (IPC 8-9): H02M1/12 H02M5/458
H02M7/5387 (Advanced/Invention)

**Family:**

Publication number	Publication date	Application number	Application date
CN107546968 A	20180105	CN201710936238	20171010

Priority:

CN201710936238 20171010

Probable Assignee: BEIJING DONGBIAO ELECTRONICS CO LTD**Assignee(s):** (std): BEIJING DONGBIAO ELECTRONICS CO LTD**Assignee(s):** BEIJING EASTERN STANDARD ELECTRONICS CO LTD ; BEIJING DONGBIAO ELECTRONICS CO**Inventor(s):** (std): WANG LIXIN ; XUE HAOFENG ; ZHAO NA ; ZHAO ZHIFANG ; ZHOU JIHUA**5) Family number: 32239233 (US2007171684A)**

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Title: DC-AC CONVERTER CONTROLLER, IC THEREFOR, AND ELECTRONIC APPARATUS UTILIZING SUCH DC-AC CONVERTER

Abstract: An inverter has a semiconductor switch circuit provided in the primary circuit of a transformer. The switch circuit is controlled by a PWM circuit. The switch circuit is operated on the basis of an intermittent-operation signal having an ON state and OFF state to: set an error signal to a substantially zero level during OFF periods; gradually increase the error signal upon transition from an OFF state to an ON state; and gradually decrease the error signal upon transition from an ON state to an OFF state. Each ON phase of the intermittent operation is slowly started and slowly ended through charging and discharging of a capacitor provided in a feedback circuit. This enables concomitant application of constant-current control and intermittent-operation control to the inverter, which in turn provides a broad range of power that can be supplied to a load, significantly reduces humming of the transformer, and prevents over-current from occurring in the inverter.

Classifications:

International (IPC 8-9): H02M1/36 H02M3/24 H02M3/335 H02M7/48
H02M7/527 H02M7/5387 H05B41/24 H05B41/288 H05B41/39

H05B41/392 (Advanced/Invention);

H02M7/48 H02M7/529 H05B41/24 H05B41/39 (Advanced/Non-invention);

H02M1/00 H02M3/24 H02M7/48 H02M7/5387 H05B41/24 H05B41/28

H05B41/39 (Core/Invention)

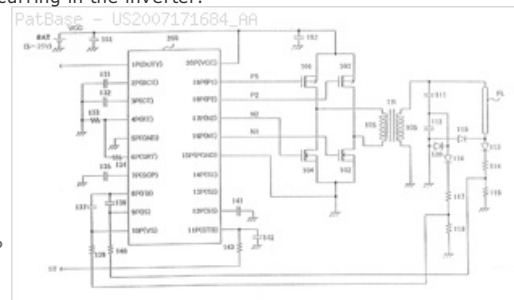
International (IPC 1-7): H02M7/48 H02M7/527 H05B41/24 H05B41/392**CPC:** H02M7/4807 H05B41/2828 H05B41/2851 H05B41/3927 Y02B20/186**European:** H02M7/48H H05B41/282P4 H05B41/285C H05B41/392D8
Y02B20/18D4**US:** 315/279 315/279P 363/132 363/132S 363/17 363/21.09 363/21.090P
363/49 363/49S 363/56.02 363/98**JP F-Term:** 5H007 5H007/AA06 5H007/BB03 5H007/CA02 5H007/CB05
5H007/CC32 5H007/DA05 5H007/DA06 5H007/DB01 5H007/EA02

5H007/GA02 5H770 5H770/AA07 5H770/AA17 5H770/AA22 5H770/BA07 5H770/CA06 5H770/DA01 5H770/DA11 5H770/DA18

5H770/DA22 5H770/DA30 5H770/DA41 5H770/DA44 5H770/EA01 5H770/EA23 5H770/EA27 5H770/FA05 5H770/FA06 5H770/GA06

5H770/GA13 5H770/GA14 5H770/GA16 5H770/GA17 5H770/GA20 5H770/HA02 5H770/HA03 5H770/HA16 5H770/JA01 5H770/JA07

5H770/JA18 5H770/LA01 5H770/LA02 5H770/LA05 5H770/LB02

JP F-Index: H02M7/48/F H02M7/48/L**Family:**

Publication number	Publication date	Application number	Application date
CN100539380 C	20090909	CN200580001616	20050302
CN1906842 A	20070131	CN200580001616	20050302
JP2005086336 A1	20080124	JP20060510790T	20050302
JP4675319 B1	20110420	JP20060510790T	20050302
JP4675319 B2	20110420	JP20060510790T	20050302
KR20060121224 A	20061128	KR20067012377	20050302
TW200531419 A	20050916	TW20050105355	20050223
TWI342659 B	20110521	TW20050105355	20050223
US2007171684 AA	20070726	US20050597705	20050302
US2009072754 AA	20090319	US20080269334	20081112
US7466566 BB	20081216	US20050597705	20050302
US7920390 BB	20110405	US20080269334	20081112
WO05086336 A1	20050915	WO2005JP04018	20050302

Priority:

JP20040061709 20040305 US20050597705 20050302 WO2005JP04018 20050302
US20060597705 20060804 US20080269334 20081112

Probable Assignee: ROHM CO LTD

Assignee(s): (std): FUKUMOTO KENICHI ; ROHM CO LTD ; ROHM COMPANY LTD

Assignee(s): ROHM CO

Inventor(s): (std): FUKUMOTO KENICHI ; KENICHI FUKUMOTO

Agent(s): ROHM CO LTD C O KEATING AND BENNETT LLP; KEATING AND BENNETT LLP

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

6) Family number: 56493432 (US8736102B)

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Title: MULTIFUNCTIONAL POWER CONVERTER

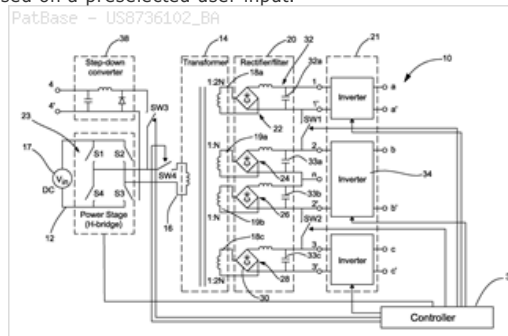
Abstract: The multifunctional power converter apparatus and method includes an input power stage configured to receive a DC input voltage from a DC power source and convert the DC input voltage to an AC or DC output voltage. At least one electrical power conversion electronic circuit is connected to an output of the input power stage, a DC output circuit; an AC output circuit; and a controller configured to control the input power stage, the DC output circuit and the AC output circuit. The controller is configured to automatically control the power converter output voltage based on a preselected user input.

Classifications:

International (IPC 8-9): H02J3/00 (Advanced/Invention)

CPC: Y10T307/297 Y10T307/367 Y10T307/469 Y10T307/511 H02M3/28 H02M7/10 H02M2001/009 H02M7/48

US: 307/17 307/26 307/39 307/45 363/127 363/41 363/55 363/71



Family:

Publication number	Publication date	Application number	Application date
US8736102 BA	20140527	US20100899664	20101007

Priority:

US20100899664 20101007

Probable Assignee: BOEING CO

Assignee(s): (std): BOEING CO ; GAO LIJUN ; KARIMI KAMIAR J ; LIU SHENGYI

Inventor(s): (std): KARIMI KAMIAR J ; GAO LIJUN ; LIU SHENGYI

Agent(s): SMITH MOORE LEATHERWOOD LLP

7) Family number: 56314582 (US2016308357A)

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Title: DIFFERENTIATED CONTROL METHOD OF THE CASCADED ACTIVE POWER FILTER

Abstract: The present invention relates to a differentiated control method of the cascaded active power filter, wherein the cascaded links are divided into low frequency links and high frequency links; wherein low frequency links are used to generate the fundamental voltage generated by the cascaded multilevel converter; wherein high frequency links are used to produce different, separate voltage from the aforementioned fundamental voltage generated by the cascaded multilevel converter; wherein according to the given cycle, some links are selected circularly from cascaded links as the high frequency links; wherein in the control cycle, each phase links with the maximum and minimum DC capacitor voltage, as well as those links that the pulse

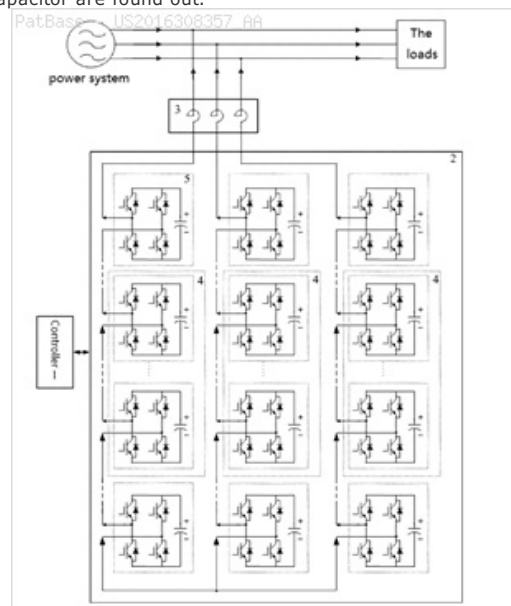
width modulation (PWM) combination discharge and charge most to DC capacitor are found out.

Classifications:

International (IPC 8-9): H02J3/01 H02J3/18 H02M1/12 H02M1/42 H02M7/219 (Advanced/Invention)

CPC: Y02E40/26 H02M1/4233 H02M1/12 H02M7/219 H02J3/1857 H02M2001/327 H02M2007/4835

US: 1/1 363/44



Family:

Publication number	Publication date	Application number	Application date
CN103762596 A	20140430	CN201410048458	20140212
CN103762596 B	20160309	CN201410048458	20140212
GB201609967 A0	20160720	GB20160009967	20140506
GB2539330 A1	20161214	GB20160009967	20140506
US2016308357 AA	20161020	US20140100980	20140506
WO15120568 A1	20150820	WO2014CN000466	20140506

Priority:

CN201410048458 20140212 WO2014CN000466 20140506

Probable Assignee: CHEN JUNLING

Assignee(s): (std): CHEN JUNLING ; JUNLING CHEN

Inventor(s): (std): JUNLING CHEN ; XUEFEI YUAN ; YUAN XUEFEI

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 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

8) Family number: 66451607 (US2017209202A)

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Title: SYSTEM AND METHOD FOR HARMONIC CONTROL OF DUAL-OUTPUT GENERATORS

Abstract: A dual-output generator is configured to output two or more waveforms at different frequencies. In particular, the dual-output generator is configured to provide low-frequency output, which may be suitable for ultrasonic surgical instruments, and a high-frequency output, which may be suitable for electrosurgical instruments, while reducing the amplitude of all remaining frequencies other than the two selected low and high frequencies to about zero.

Classifications:

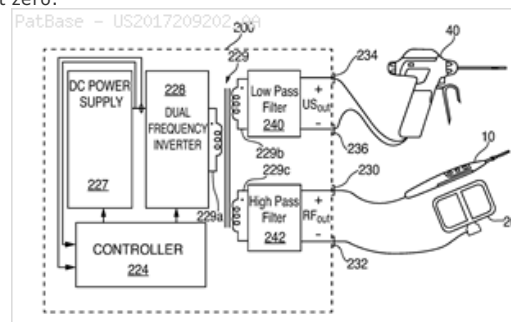
International (IPC 8-9): A61B17/32 A61B18/00 A61B18/10 A61B18/12 A61B18/14 A61B18/16 H02M7/5395 (Advanced/Invention); A61B18/00 A61B18/12 A61B18/14 A61B18/16 (Advanced/Non-invention)

CPC: A61B18/00 A61B2018/0091 A61B2018/00958 A61B18/16 A61B2017/320094 A61B2017/320095 A61B2018/00577 A61B2018/00589 A61B2018/00601 A61B2018/0063 A61B18/14 A61B2018/1266 H02M7/5395 A61B18/1206 A61B2018/00994 A61B2018/128 A61B17/320092 A61B18/1445

US: 1/1 606/34

JP F-Term: 4C160 4C160/JJ17 4C160/JJ25 4C160/KK03 4C160/KK05 4C160/KK23 4C160/JJ46 4C160/JJ50 4C160/KK04 4C160/KK06 4C160/KK15 4C160/KK36 4C160/KK39 4C160/KK70

JP F-Index: A61B17/32/510 A61B18/12



Family:

Publication number	Publication date	Application number	Application date
CN106994041 A	20170801	CN201710057101	20170123
DE602017000647 D1	20181129	DE201760000647T	20170120
DE602017014158 D1	20200423	DE201760014158T	20170120
EP3216409 A1	20170913	EP20170152397	20170120
EP3216409 B1	20181024	EP20170152397	20170120

EP3434213 A1	20190130	EP20180193703	20170120
EP3434213 B1	20200401	EP20180193703	20170120
JP2017127639 A2	20170727	JP20170007701	20170119
JP2018167040 A2	20181101	JP20180107567	20180605
JP6401315 B2	20181010	JP20170007701	20170119
US2017209202 AA	20170727	US20160004923	20160123
US10582962 BB	20200310	US20160004923	20160123

Priority:

US20160004923 20160123 JP20170007701 20170119 EP20170152397 20170120
EP20180193703 20170120 JP20180107567 20180605

Probable Assignee: OF TENNESSEE RESEARCH FOUNDATION UNIV

Assignee(s): (std): COVIDIEN LP ; UNIV OF TENNESSEE RES FOUND ; UNIV OF TENNESSEE RES FOUNDATION ; UNIV TENNESSEE RES FOUND ; UNIV OF TENNESSEE RESEARCH FOUNDATION

Assignee(s): OF TENNESSEE RESEARCH FOUNDATION KNOXVILLE UNIV ; COVIDIEN LP MANSFIELD ; OF TENNESSEE RESEARCH FOUNDATION UNIV

Inventor(s): (std): BRADFORD C TRENTO ; COSTINETT DANIEL J ; FRIEDRICHS DANIEL A ; DANIEL J COSTINETT ; DANIEL A FRIEDRICHS ; TRENTO BRADFORD C ; ZHAO CHONGWEN

Inventor(s): FRIEDRICHS DANIEL A AURORA ; ZHAO CHONGWEN KNOXVILLE ; TRENTO BRADFORD C KNOXVILLE ; FRIEDRICHS DANIEL A MENDOTA HEIGHTS ; COSTINETT DANIEL J KNOXVILLE

Agent(s): MASCHIO AND SOAMES IP LTD; MASCHIO ANTONIO

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

9) Family number: 43430803 (US2009160259A)

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Title: DISTRIBUTED ENERGY CONVERSION SYSTEMS

Abstract: A distributed energy conversion system may include one or more DC power sources and two or more inverters to convert DC power from the power sources to AC power. The AC power from the two or more inverters may be combined to provide a single AC output. A module may include one or more photovoltaic cells and two or more inverters. An integrated circuit may include power electronics to convert DC input power to AC output power and processing circuitry to control the power electronics. The AC output power may be synchronized with an AC power distribution system.

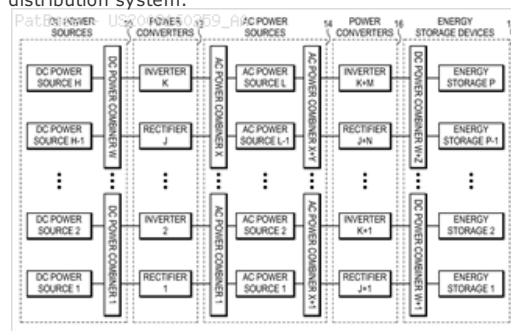
Classifications:

International (IPC 8-9): H01L31/042 H02J3/38 H02J7/35 H02M1/08 H02M3/04 H02M3/335 H02M7/00 H02M7/04 H02M7/42 H02M7/44 H02M7/48 H02M7/537 H02M7/5383 H02S40/32 (Advanced/Invention); H01L31/042 H02J7/35 H02M7/48 (Advanced/Non-invention); H01L31/042 H02J7/35 H02M7/00 H02M7/42 H02M7/48 H02M7/537 H02M7/5383 (Core/Invention); H02M1/08 H02M7/44 (Core/Non-invention)

CPC: H02J3/381 H02M3/33546 H02M7/44 H02M3/04 H02M7/04 H02M7/42 Y02B10/14 H02J2300/20 H02J2300/24 H02J2300/26 H02J2300/28 H02J2300/30 H02J7/345 H02J3/382 H02J3/383 H02M7/4807 H02S40/32 Y02E10/563 Y02E10/58 Y02E10/763 Y10T307/707 H02J3/385 H02J3/386 H02J3/387 H02J7/35

European: H01L31/042D H02J3/38 H02J3/38D1 H02J7/35 H02M7/48H T02J7/34C Y02E10/56B

US: 1/1 307/102 307/151 307/78 307/82 307/82P 363/131 363/131P 363/21.04 363/74 363/74P



Family:

Publication number	Publication date	Application number	Application date
CN101946394 A	20110112	CN200880127151	20081221
CN102301578 A	20111228	CN200980155811	20091218
CN102301578 B	20150128	CN200980155811	20091218
EP2232689 A1	20100929	EP20080864982	20081221
EP2232689 A4	20121024	EP20080864982	20081221
IN02405KN2010 A	20111125	IN2010KN02405	20100701
IN02857KN2011 A	20120127	IN2011KN02857	20110708
KR101235990 B1	20130221	KR20107015800	20081221
KR20100092974 A	20100823	KR20107015800	20081221
KR20110104525 A	20110922	KR20117016567	20091218
KR20120039722 A	20120425	KR20127004459	20081221
TW201034354 A	20100916	TW20090143647	20091218
US2009160259 AA	20090625	US20080340715	20081220
US2010157632 AA	20100624	US20090368987	20090210
US2010157638 AA	20100624	US20090368990	20090210
US2015117067 AA	20150430	US20140451189	20140804
US2016211672 AA	20160721	US20160988497	20160105
US2017163042 AA	20170608	US20170439493	20170222
US8796884 BB	20140805	US20090368990	20090210
US9263895 BB	20160216	US20080340715	20081220
US9608448 BB	20170328	US20160988497	20160105
WO09082721 A1	20090702	WO2008US87882	20081221
WO10071855 A2	20100624	WO2009US68871	20091218
WO10071855 A3	20100923	WO2009US68871	20091218

Priority:

US20070008670 20071221 US20070008670P 20071221 US20080340715 20081220
WO2008US87882 20081221 US20090149305P 20090202 US20090368987 20090210
US20090368990 20090210 WO2009US68871 20091218 US20140451189 20140804
US20160988497 20160105 US20170439493 20170222

Probable Assignee: ENPHASE ENERGY INC**Assignee(s):** (std): AZURAY TECHNOLOGIES INC ; BATTEN ROBERT D ; DITOMMASO VINCENZO ; FIEZ TERRI SHREEVE ; LE TRIET TU ; MAYARAM KARTIKEYA ; NAIKNAWARE RAVINDRANATH ; NAIKNAWARE RAVINDRANATH M ; SOLARBRIDGE TECHNOLOGIES INC ; SUNPOWER CORP ; WI CHI INC**Assignee(s):** SILICON VALLEY BANK ; SOLAR BRIDGE TECHNOLOGIES INC ; ENPHASE ENERGY INC ; AZURAY TECHNOLOGIES INC US**Inventor(s):** (std): BATTEN ROBERT D ; DITOMMASO VINCENZO ; FIEZ TERRI ; FIEZ TERRI SHREEV ; FIEZ TERRI SHREEVE ; KARTIKEYA MAYARAM ; LE TRIET TU ; MAYARAM KARTIKEYA ; NAIKNAWARE RAVINDRANATH ; NAIKNAWARE RAVINDRANATH M ; RAVINDRANATH NAIKNAWARE ; SHREEVE FIEZ TERRI ; TU LE TRIET**Inventor(s):** NAIKNAWARE, Ravindranath ; LE TRIET**Agent(s):** MOORE BARRY; MARGER JOHNSON AND MCCOLLOM PC; BARNES AND THORNBURG LLP; MAKUCH JOSEPH S 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 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 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 PE 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**10) Family number: 76069838 (US2019305667A)**

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Title: CONTROL TO OUTPUT DYNAMIC RESPONSE AND EXTEND MODULATION INDEX RANGE WITH HYBRID SELECTIVE HARMONIC CURRENT MITIGATION-PWM AND PHASE-SHIFT PWM FOR FOUR-QUADRANT CASCADED H-BRIDGE CONVERTERS

Abstract: A hybrid Cascaded H-Bridge (CHB) converter includes a selective harmonic current mitigation pulse width modulation (SHCM-PWM) unit coupled to an input current and providing an output signal SW_{SHCM} , a phase shift pulse width modulation (PSPWM) unit coupled to the input current and providing an output signal SW_{PS} , a modulation selector coupled to the output signal SW_{SHCM} of the SHCM-PWM unit and the output signal SW_{PS} of the PSPWM unit and providing an output signal SW , and a CHB converter coupled to the output signal SW of the modulation selector. The modulation selector can select one of the output signals (SW_{SHCM} and SW_{PS}) as the output signal SW based on the input current. The hybrid technique is for cascaded multilevel converters which utilizes asymmetric SHCM to mitigate the harmonics generated from PS-PWM to meet harmonic limits with a smaller number of switching transitions and smaller inductance than the conventional PS-PWM technique.

Classifications:**International (IPC 8-9):** H02M1/08 H02M1/12 H02M3/158

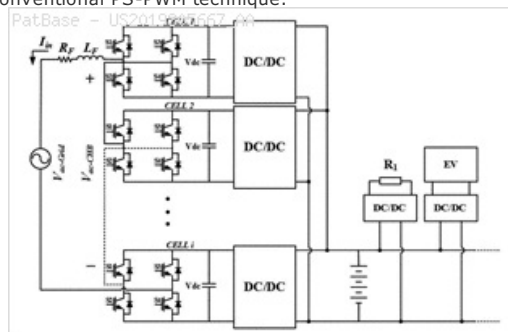
H02M7/219 (Advanced/Invention);

H02M1/42 (Advanced/Non-invention)

CPC: H02M1/12 H02M2003/1586 H02M3/1584 H02M7/49 H02M2001/0074

H02M3/1588 H02M2001/007 H02M7/219 H02M1/08 H02M1/4208

H02M1/4225 Y02B70/126 H02M7/21

**Family:**

Publication number	Publication date	Application number	Application date
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Priority:

US20170454997P 20170206 US20180883390 20180130 US20190270180 20190207

Probable Assignee: UNIV FLORIDA**Assignee(s):** (std): UNIV FLORIDA**Assignee(s):** NATIONAL SCIENCE FOUNDATION ; OF FLORIDA RESEARCH FOUNDATION INC UNIV**Inventor(s):** (std): WANG SHUO ; ZHAO HUI ; MOEINI AMIRHOSSEIN**Agent(s):** ALSTON AND BIRD LLP**11) Family number: 56396858 (US2014128941A)**

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Title: PHOTOTHERAPY SYSTEM AND PROCESS INCLUDING DYNAMIC LED DRIVER WITH PROGRAMMABLE WAVEFORM

Abstract: A phototherapy or photobiomodulation process employing the application of electromagnetic radiation (EMR) to a living organism, typically a human being. The EMR is generated by one or more strings of LEDs and is programmed to emit one or more wavelengths, typically in the visible and infrared portions of the spectrum, the EMR in each wavelength being delivered in pulses having specified on-times, off-times, photoexcitation frequencies, duty factors, phase delays, and power amplitudes. A system for providing such EMR includes a microcontroller having a pattern library of algorithms, each of which defines a particular sequence

of synthesized pulses, and an application pad, preferably flexible, containing the LED strings.

Classifications:

International (IPC 8-9): A61B17/00 A61B18/18 A61B6/02 A61N2/00

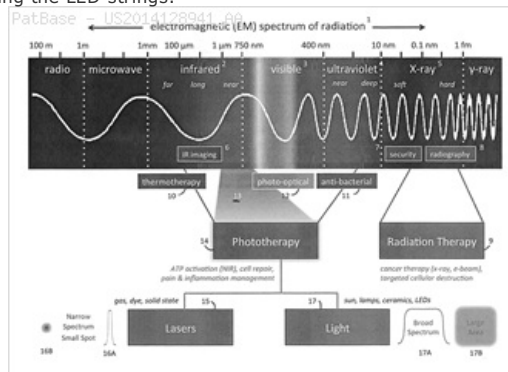
A61N5/06 A61N5/067 G16H50/20 G21K5/00 H01L33/00 H05B33/08 H05B37/02 H05B45/00 H05B47/10 (Advanced/Invention); H05B37/02 (Advanced/Non-invention)

CPC: A61B2017/00159 A61N2005/0629 A61N2005/0652 H05B45/00 H05B45/24 H05B45/46 A61N5/06 A61N2005/0626 A61N2005/0651 H05B33/08 H05B47/105 H05B45/20 H05B45/325

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JP F-Term: 4C082 4C082/PA01 4C082/PA02 4C082/PA06 4C082/PA10 4C082/PC01 4C082/PC04 4C082/PC08 4C082/PE09 4C082/PE10 4C082/PJ30 4C082/RA01 4C082/RA04 4C082/RC09 4C082/RL02 4C082/RL13 4C082/RL15 4C082/RL16 4C082/RL24 5F142 5F142/EA31 5F142/GA40

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Priority:

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Probable Assignee: APPLIED BIOPHOTONICS LTD

Assignee(s): (std): APPLIED BIOPHOTONICS LTD ; EPPLAJD BAJOFOTONIKS LTD ; WILLIAMS RICHARD K

Assignee(s): WILLIAMS RICHARD K CUPERTINO ; APPLIED BIOPHOTONICS LTD

Inventor(s): (std): LIKH DZHOZE P ; SHELL DENIEL ; LIN KEN KHUN ; UILLYAMS RICHARD K ; SCHELL DANIEL ; LEAHY JOSEPH P ; WILLIAMS LAURA ; WILLIAMS LAURA E ; LIN KENG HUNG ; WILLIAMS RICHARD K ; WILLIAMS RICHARD

Inventor(s): LEAHY JOSEPH P SAN JOSE ; SCHELL DANIEL LOS GATOS ; WILLIAMS RICHARD K CUPERTINO

Agent(s): PATENTANWAELE EINSEL AND KOLLEGEN; FREEMAN JACQUELINE CAROL; GILL DAVID ALAN; OSHIMA AND PARTNERS; YURIDICHESKAYA GORODISKII I PARTNERY OOO FA; PATENTABILITY ASSOCIATES; DAVID E; STEUBER DAVID E

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 DJ 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 JO JP KE KG KH KM KN KP KR KW 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 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