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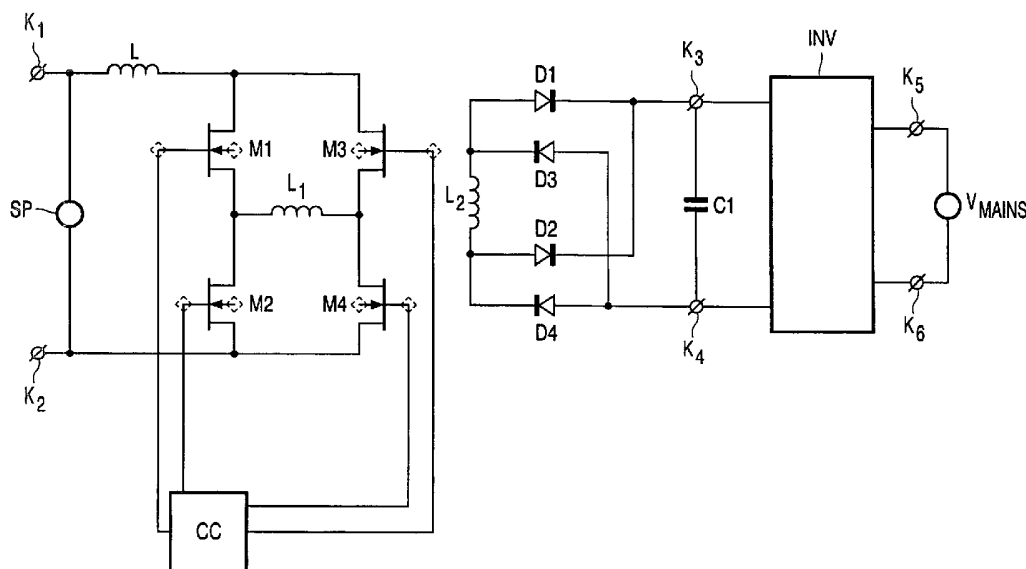
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(54) Title: DC-DC-CONVERTER



(57) Abstract: In a solar power system a boost converter is used comprising a choke and a transformer. Alternately the choke is boosted in a first time interval while power transfer is taking place in a second time interval by means of the transformer. When the input voltage supplied by a solar panel is increased the first time interval is decreased while the second time interval is increased. As a result the boost converter can handle a wide range of input voltages.

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## INTERNATIONAL SEARCH REPORT

Int. Application No

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## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H02M3/335

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 7 H02M

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 practical, search terms used)

EPO-Internal, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4 761 722 A (PRUITT) 2 August 1988 (1988-08-02) column 2, line 60 -column 11, line 38; figures 1-8	1-6
Y	DE 38 08 433 C (ANT NACHRICHTENTECHNIK GMBH) 3 May 1989 (1989-05-03) column 2, line 14 -column 3, line 56; figures 1,2	1-4,6
A	DE 199 37 410 A (ELEKTRO AND AUTOMATISIERUNGSTECHNIK) 15 February 2001 (2001-02-15) column 4, line 67 -column 5, line 30; figures 1,2	1,4,6-9
	-/--	



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

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## INTERNATIONAL SEARCH REPORT

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JIANG Y ET AL: "Soft-switching of IGBTs with the help of MOSFETs in bridge-type converters" PROCEEDINGS OF THE ANNUAL POWER ELECTRONICS SPECIALISTS CONFERENCE. (PESC). SEATTLE, JUNE 20 - 25, 1993, NEW YORK, IEEE, US, vol. CONF. 24, 20 June 1993 (1993-06-20), pages 151-157, XP010149038 ISBN: 0-7803-1243-0	5
A	the whole document	1,4,6
A	YAKUSHEV V ET AL: "Full-bridge isolated current fed converter with active clamp" APPLIED POWER ELECTRONICS CONFERENCE AND EXPOSITION, 1999. APEC '99. FOURTEENTH ANNUAL DALLAS, TX, USA 14-18 MARCH 1999, PISCATAWAY, NJ, USA, IEEE, US, 14 March 1999 (1999-03-14), pages 560-566, XP010323507 ISBN: 0-7803-5160-6 the whole document	1,4-6
A	UMEDA F ET AL: "New control method of resonant DC-DC converter in small scaled photovoltaic system" PROCEEDINGS OF THE ANNUAL POWER ELECTRONICS SPECIALISTS CONFERENCE (PESC). TOLEDO, JUNE 29 - JULY 3, 1992, NEW YORK, IEEE, US, vol. 2 CONF. 23, 29 June 1992 (1992-06-29), pages 714-718, XP010064847 ISBN: 0-7803-0695-3 the whole document	1-4,6-9
A	MOSCHOPOULOS G ET AL: "A single-stage zero-voltage switched PWM full-bridge converter with power factor correction" APPLIED POWER ELECTRONICS CONFERENCE AND EXPOSITION, 1997. APEC '97 CONFERENCE PROCEEDINGS 1997., TWELFTH ANNUAL ATLANTA, GA, USA 23-27 FEB. 1997, NEW YORK, NY, USA, IEEE, US, 23 February 1997 (1997-02-23), pages 457-463, XP010215857 ISBN: 0-7803-3704-2 the whole document	1,4-6
A	PATENT ABSTRACTS OF JAPAN vol. 1995, no. 09, 31 October 1995 (1995-10-31) & JP 07 146724 A (SHARP CORP), 6 June 1995 (1995-06-06) abstract	1-4,6-9

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## INTERNATIONAL SEARCH REPORT

Int'l Application No  
PCT/IB 03/02163

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	PATENT ABSTRACTS OF JAPAN vol. 2000, no. 20, 10 July 2001 (2001-07-10) & JP 2001 060123 A (MATSUSHITA ELECTRIC WORKS LTD), 6 March 2001 (2001-03-06) abstract -----	1,7-9
A	EP 0 780 750 A (SHARP K.K.) 25 June 1997 (1997-06-25) the whole document -----	

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IB 03/02163

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 4761722	A	02-08-1988	NONE	
DE 3808433	C	03-05-1989	DE 3808433 C1	03-05-1989
DE 19937410	A	15-02-2001	DE 19937410 A1	15-02-2001
JP 07146724	A	06-06-1995	JP 3086574 B2	11-09-2000
JP 2001060123	A	06-03-2001	NONE	
EP 780750	A	25-06-1997	JP 3111273 B2	20-11-2000
			JP 9172780 A	30-06-1997
			JP 3404620 B2	12-05-2003
			JP 10133755 A	22-05-1998
			DE 69620124 D1	02-05-2002
			DE 69620124 T2	31-10-2002
			EP 0780750 A2	25-06-1997
			US 5719758 A	17-02-1998