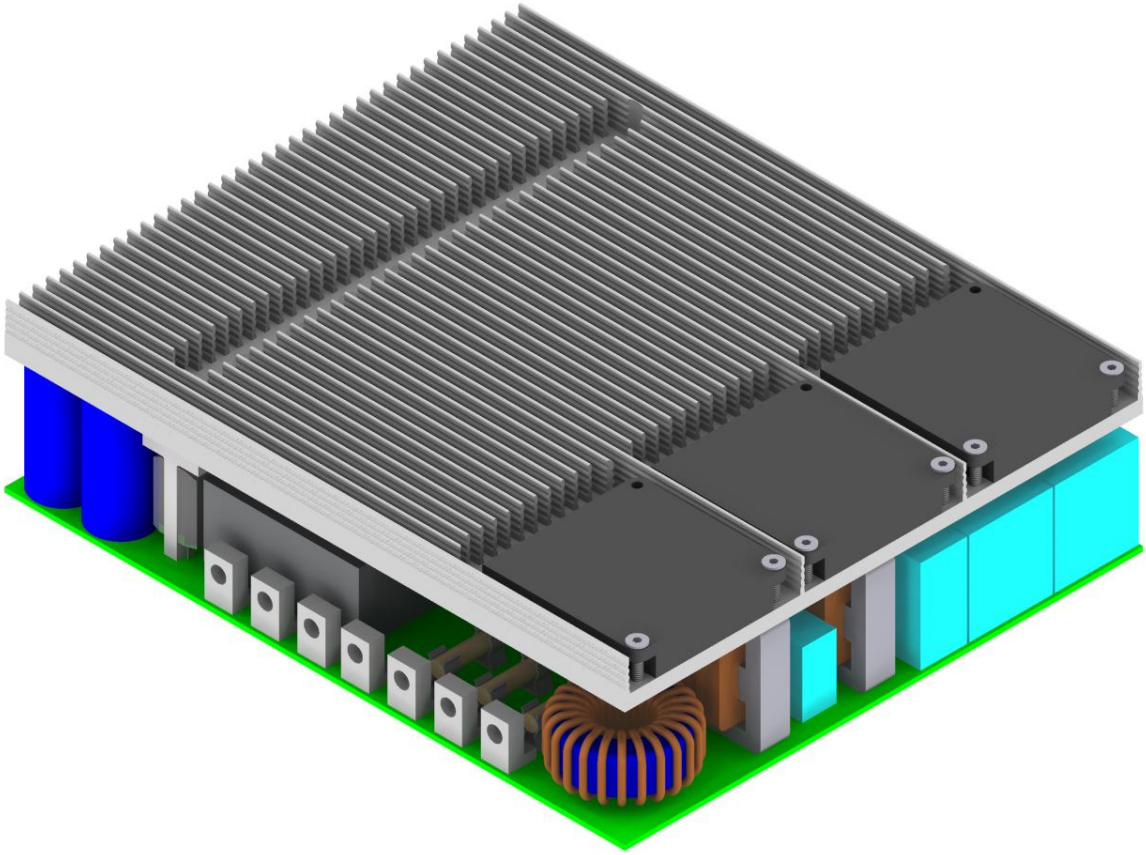
Datasheet 16.11.2011

VIENNA Rectifier Technology Package ”VR73”



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1 Introduction

1.1 Circuit Topology

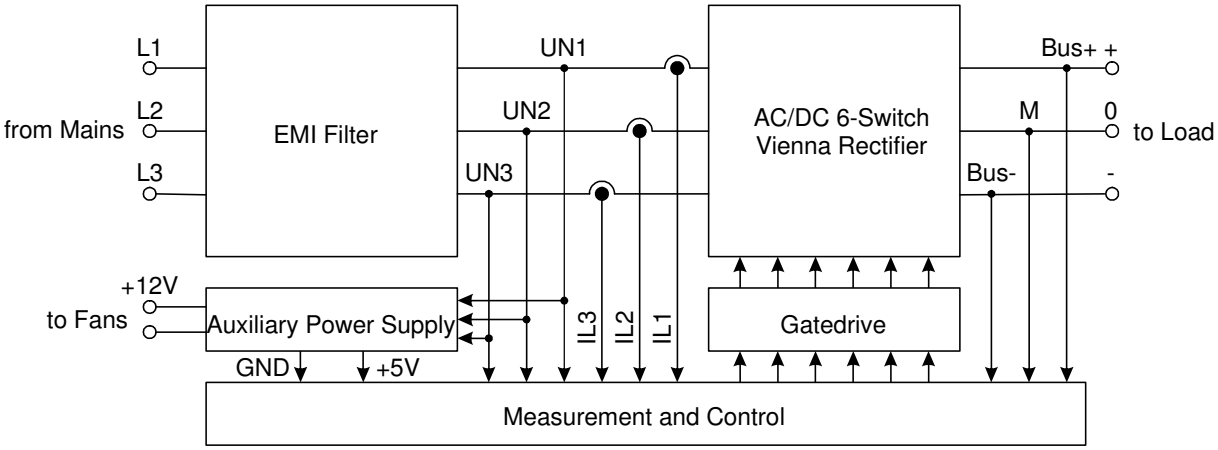

Fig.1.1: Block diagram of the VR73 Evaluation System.

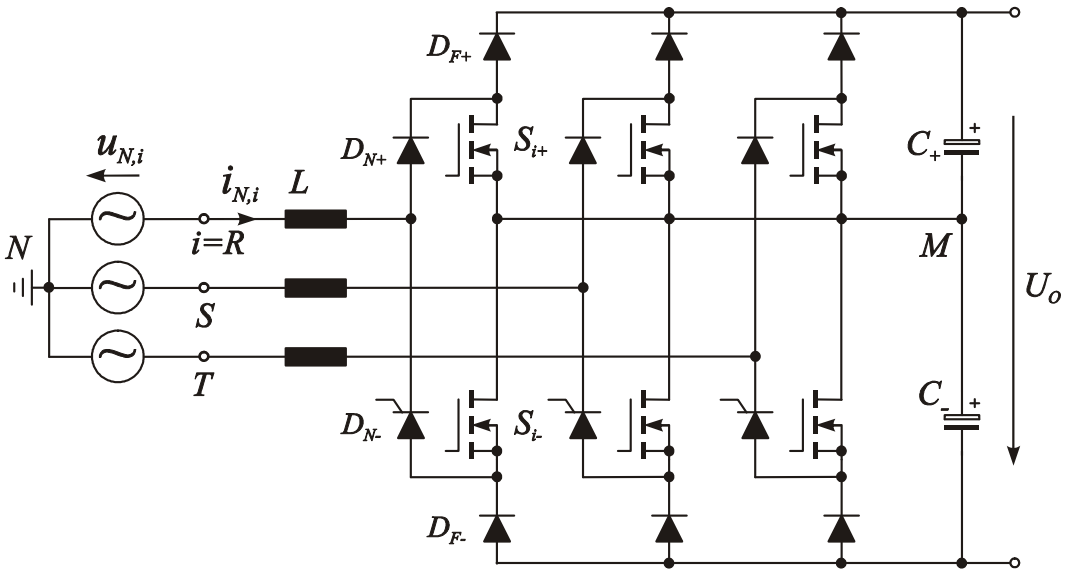

Fig.1.2: Structure of the power circuit of the realized 6-switch PWM (VIENNA) rectifier system.

The basic structure of the three-phase three-level unity power factor rectifier is shown in Fig.1.2. The system is of equal functionality like the VIENNA Rectifier ([1], [2], [3]), the advantage of the six-switch topology is the reduced conduction loss, because of the absence of the center point diodes. The

technical and economic advantages of the system as compared to alternative rectifier concepts were analyzed in detail in [6] and [7]. The main advantages are [11]:

- simple analogue or digital control circuit
- three-level characteristic of the bridge legs resulting in
- low voltage stress on the power semiconductors
- low amplitudes of switching frequency harmonics of the input phase currents
- two controlled partial output voltages and/or high current handling capability of the output voltage center point in case of asymmetric distribution of the load to the partial voltages [8]
- high reliability (no possibility of a short-circuit on the output voltage in case of control errors).

1.2 Specification

Full digital control by TI DSP

1.2.1 General

Control structure	- Output voltage control - Output voltage symmetry control - Average current mode input current control - 3rd harmonic injection - Input voltage feed-forward - Continuous operation at mains voltage unbalance with reduced output power
Protection functions (by disabling all switching signals, unit recovers by reset)	- Input overcurrent protection - Output overvoltage - Input voltage out of limits (Unit recovers automatically if voltage returns in specified range)
Indications	green, yellow and red status LEDs
Dimensions (l x w x h)	200 x 167 x 58mm^3
Power density (aircooled)	6.2kW/dm^3
Switching frequency	70kHz

1.2.2 Input

Input line to line voltage range nominal	400V…480VAC AC, 50…60Hz
Input line to line voltage limits	320V…530VAC
Input current max	22.5A rms
Power factor (> 25% load, 50Hz)	> 0.99
THD_I of input currents	< 3% (THD_U < 1%, 100% load)
Maximum input current unbalance	± 10% (symmetric mains)

1.2.3 Output

Rated output power	12kW
Rated output voltage	800VDC (± 400VDC)
Reduced output power for two phase operation	57 % $P_{O,nom}$
Overvoltage protection	± 450VDC

2 Literature

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