

The high dynamic offers advantages

Standard power supplies are not complying in all aspects with today's legislation by European standards. The designer must be up to date also in the mechanical design arena, besides the mandatory facts. Reinhard Kalfhaus of Syko Germany explains

Wide variety of converter topologies to choose from

The design parameters are rated different by the end user of equipment and the electronic designer.

Each power supply has his individual design parameters, as there are the voltage, the voltage range, the current, the losses, the compact housing, the functionality, and the ability to exchange information.

Normally the biggest definition is to differentiate DC/DC, AC/DC, DC/AC or the AC/AC converter. At that point in time it does not implement special attention for the designer at Syko what kind of converter or what kind of voltage is given or requested for the output.

The designer has a wide variety of converter topologies to choose the right from. Having the competent project management in place to link the specialists in hard- and soft-ware together makes the success.

Achieving railway requirements for 2,5 kVA vent motor drive (KLIMO, Klima and Motion power supply) within 10 weeks of design and functional product demonstration is a landmark of Syko. The specification of input voltage for railway applications is therefore 67V to 170V. This can be taken from three phase voltage systems at the following phase voltages 400V, 230V, 180V and 90V. In addition there is the 400Hz cycle supply system active when the 220 V DC supply is active.

The design is built on the robust buck converter topology in bridge configuration. The minimum input voltage is therefore minus 20%, multiplied by factor of 0,7 as the RMS (route mean square) of the following transformer.

An other solution can be built by an electrical separated high frequency DC Voltage of UArms - (1,2x1,4) solution feeding the three phase

bridge in the following path. This solution has the additional DC/DC converter with lower weight than a low voltage transformer with about twice the MTBF (mean time between failure) value.

Excluding the DC voltage by having a low voltage transformer solution gives advantage to ball bearings life time in the motor and is cheaper in price.

The power supply electronic is built on standard components, both the driver side and the power side.

It comes in mind by having the driver ICs to

exclude the dynamic current watch. The coil filtering the output eliminates dv/dt and di/dt spikes to the load. That gives time to sense the coil current spikes and have controlled correction.

Standard power supplies are not complying in all aspects with today's legislation by European standards. The designer must be up to date also in the mechanical design arena, besides the mandatory facts in shock, vibrations, EMC, input voltage confirming EN 50155 /121 for trains, ambient temperature -35 to +85 °C and the results of condensation effects.

Syko confirms the requirement with a design having outlines 260 x 160 x 120 mm excluding the output transformer and the heat sink by having static 2kVA, dynamic 2,5 kVA (3,5 kVA), at input voltage of in a DC net of 110 volt (750 V).

An independent start up power supply insures early coming late going supply voltages (5V / +/-15V / 24V), they are electrical decoupled. You have an island solution with the benefits of decoupled input power part, control and output voltage that also the soft start relay can be activated. The result is decreased influence of disturbance and surge sensitivity and the ability to link on to an PC through the RS 232- connection.

Functional design of the power block, the control unit, filters with heat sink, DC Bus capacitors, the start up voltages with the micro controller board with digital and analog ports enables easy maintenance and service including first start up usage.

The power boards are standards. The micro controller board is adjusted to drives or vent applications at 16 2/3 up to 400 Hz cycles by

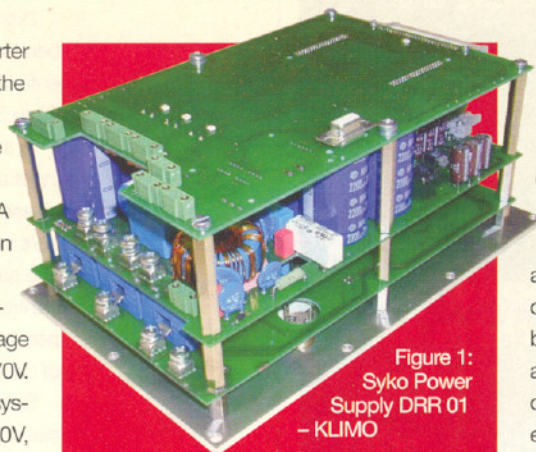


Figure 1:
Syko Power
Supply DRR 01
- KLIMO

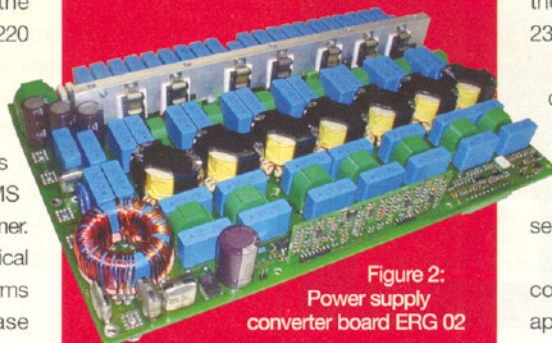


Figure 2:
Power supply
converter board ERG 02

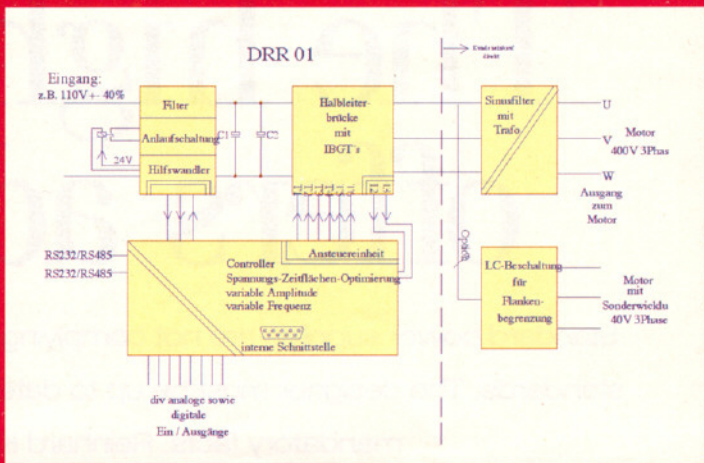


Figure 3: Block diagram of functions DRR 01 – KLIMO

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continues

controlled +/-1% output voltage with adjustable I x R – compensation.

The vent board has a status screening of the three phase sinusoidal voltage of +/-5%. In case of an electrical motor is an short circuit controlled ramp up function U/f.

Watching the current above specified safe area reacts in delayed turn off. Two analog floating inputs allow to monitor the U/f plot and save it for future comparison.

Digital ports for alert functions about over temperature and MC status and to control rotation orientation by digital input of 10 to 72 volt at 1mA or 13 to 300 volt at 1mA.

In addition a KLIMO supplied by 220V battery input and a controlled absolute sinus of 230V three phase and 400Hz cycle output to supply processors in nuclear and magnetic contaminated areas. The same port as before (0V to 5V) can be used to control the output voltage. The 0 to 5V / IR-compensation can handle voltage drop up to 300meters of connecting cable distance..

Syko is the expert in power converting of special solutions to standards in manufacturing.

The following portfolio of input voltages are no problem to incorporate into modul, open frame or rack solutions: (135 to 154)V / (18 to 450)V (120W), (300 to 650)V (500/1500W), 680V 16 2/3 Hz cycle up to 2100V 50Hz cycle, and final (1000 to 5000)V (250 / 350W).

A full basket is on offer by Syko to chose the right pieces to achieve perfect tailored design for the end applications. ◆

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