

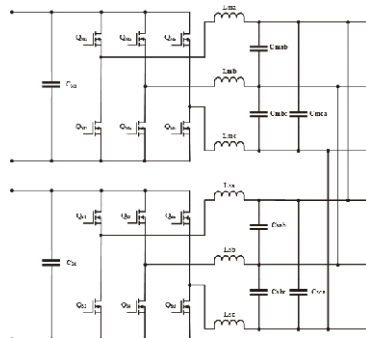
NEW

Power converter utilizing digital control is the development trend of the present industrial products. Digital control can elevate the function and performance of power converter to increase product's added value. More and more power converters are using the digital control technology. The objective of this course kit is to provide a learning platform for power converter using digital control. Users, via PSIM software and simulation, learn the principle, analysis and design of power converter.

Furthermore, the SimCoder tool of PSIM can be used to convert control circuit to digital control program as well as to operate a second simulation for circuit, which will be replaced by DSP. Finally, control program, via simulation verification, can be burned into DSP chip. DSP, via control and communications, verifies the correctness of designed circuit and controller.

PEK-530 is the development module of full digital controlled micro-grid inverter, aiming at the training of circuit analysis, design, simulation and experiment for researchers to conduct problem-oriented learning. The quantitative design of power circuit and controller is based upon converter's specifications. Users can further understand the related technology of micro-grid inverter through PSIM simulation verification and SimCoder programming processes.

With the comprehensive capabilities of realizing simulation, design, hardware circuit, PSIM is simulated software specifically designed for systems such as power electronics, motor driver and power conversion. PSIM features comprehensive functions, complete components, fast simulation, accurate simulation results and easy to use, and this software is often used by the international academics and industries for education and research.



Schematic of a Micro-Grid Inverter

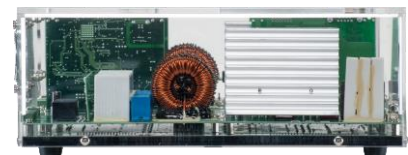
THE SPECIFICATIONS OF MICRO-GRID INVERTER DEVELOPMENT MODULE

PEK-530 Micro-grid Inverter							
1 st Three Phase Inverter (Master)							
Description	Symbol	Min	Typ	Max	Units	Comment	
DC Input	Voltage	V_{IN}	90	100	110	V	
	Current	I_{IN}			1.5	A	
AC Output	Voltage	V_{L-L}		50		V	
	Current	I_{OUT}	0		1.25	A	
	Power	P_{OUT}			125	W	
2 nd Three Phase Inverter (Slave)							
Description	Symbol	Min	Typ	Max	Units	Comment	
DC Input	Voltage	V_{IN}	90	100	110	V	
	Current	I_{IN}			1.5	A	
AC Output	Voltage	V_{L-L}		50		V	
	Current	I_{OUT}	0		1.45	A	
	Power	P_{OUT}			125	W	
Dimensions (L x W x H)		310 (mm) x 410 (mm) x 110 (mm)					
Weight		Approx. 6kg					

PEK-530

FEATURES

- Provide Analysis, Design, Simulation and Implementation Verification for Power Electronics
- Allow Students With no DSP Firmware Programming Capability to Easily Complete Programming so as to Swiftly Proceed to Digital Control Domain
- Provide Comprehensive After-sales Maintenance Services
- Provide a Complete Experiment Kit List
- Provide Circuit Diagram Files for Each Course Kit
- Provide DSP Hardware Planning, Setting and Program Burning Method
- Provide Detailed Principle and Design of Experiment Circuits



Experiment 1: Three Phase SVPWM Inverter

To get to know the principle of three phase SPWM and SVPWM. Realize the measurements of voltage and current via PEK-530 module, and learn the TI F28335 DSP IC pins, PWM and A/D hardware setting. Also understand how to proceed to DSP internal signal control and measurement via RS-232. (Refer to the fig. 1 for wiring)

Experiment 2: Three Phase Stand-alone Inverter

To get to know the way for modeling of three phase stand-alone inverter, and learn the design of both voltage loop and current loop controllers, further proceeding to the code programming via SimCoder, after well mapping out the hardware. (Refer to the fig. 1 for wiring)

Experiment 3: Three Phase Grid-connected Inverter

To get to know the fundamental with structure of three phase grid-connected inverter, and learn not only the design method of phase-lock loop, but the design of both voltage loop and current loop controllers as well, further proceeding to the code programming via SimCoder, after well mapping out the grid connected inverter. (Refer to the fig. 2 for wiring)

Experiment 4: PQ Control of Three-phase Grid-connected Inverter

In essence, PQ control decouples real power and reactive power before controlling them respectively. PEK-530 is able to proceed to code programming via SimCoder, after well mapping out the PQ control. (Refer to the fig. 2 for wiring)

Experiment 5: P- ω and Q-V Droop control of Three Phase Stand-alone Inverter

To learn the P- ω and Q-V droop control, and proceed to code programming via SimCoder, after well mapping out the PEK-530. (Refer to the fig. 1 for wiring)

Experiment 6: Parallel Operation of Multiple Stand-alone Inverters with Virtual Impedance and Droop Control Method

To get to know the parallel operation of multiple stand-alone inverters, and implement parallel operation for 2 sets of inverters, further proceeding to code programming via SimCoder, after well mapping out the PEK-530. (Refer to the fig. 3 for wiring)

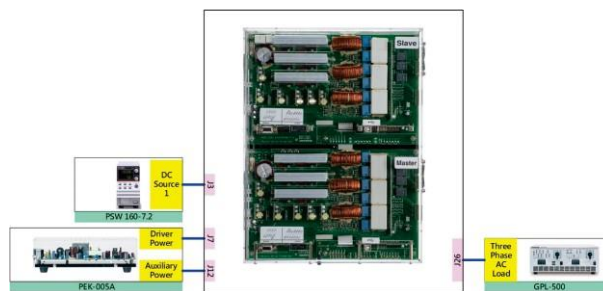


Fig1

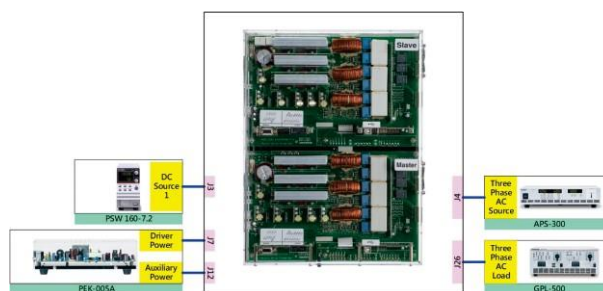


Fig2

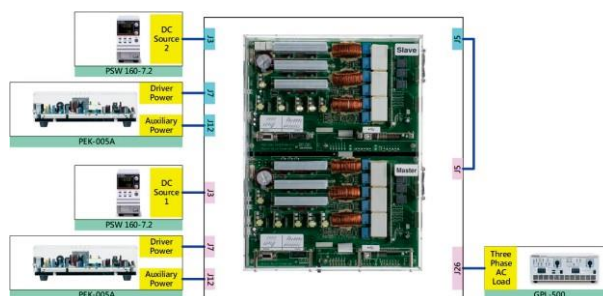


Fig3

ORDERING INFORMATION

PEK-530 Micro-Grid Inverter Developer's Kit
STANDARD ACCESSORIES
 Terminal, RS-232 Communications Cable

OPTIONAL ACCESSORIES

PEK-003 TMS320F28335 experiment board that isolates RS-232 interface
PEK-005A Multi-output auxiliary power supply
PEK-006 Isolated JTAG emulated adapter

* The required accessories for PEK-530 digital control module: PEK-005A x 2 and PEK-006 x 1

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