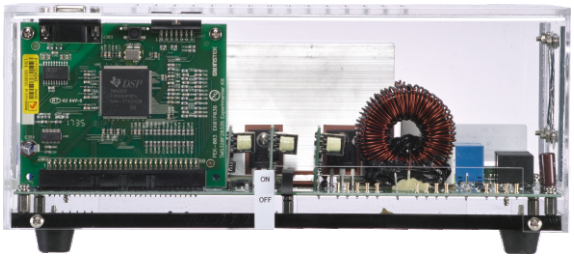
PEK-510 SINGLE PHASE PV INVERTER DEVELOPER'S KIT



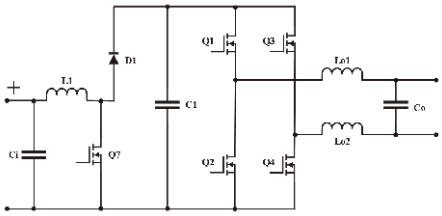
NEW

PEK-510

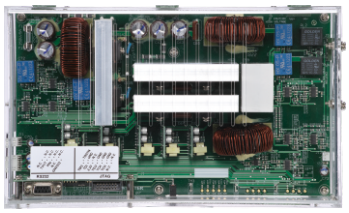
FEATURES

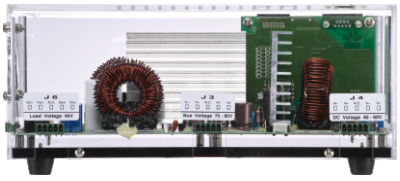
- Provide Analysis, Design, Simulation and Implementation Verification for Power Electronics
- Allow Students With no DSP Firmware Programming Capability to Easily Complete Programming so as to Swiftly Proceed to Digital Control Domain
- Provide Comprehensive After-sales Maintenance Services
- Provide 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

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-510 is the development module of fully digital control single phase PV 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 single phase PV 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 Single Phase PV Inverter





THE SPECIFICATIONS OF SINGLE PHASE PV INVERTER DEVELOPMENT MODULE

PEK-510 Single Phase PV Inverter							
Boost Converter							
Description		**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Comment**
DC Input	Voltage	V_{IN}	40	50	60	V	
	Current	I_{IN}			5	A	
DC Output	Voltage	V_{OUT}	70	80	90	V	
	Current	I_{OUT}	0	1.5	2	A	
	Power	P_{OUT}		120	140	W	
Single Phase Inverter							
Description		**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Comment**
DC Input	Voltage	V_{IN}	70	80	90	V	
	Current	I_{IN}	0		2	A	
AC Output	Voltage	V_{OUT}		40		V	
	Current	I_{OUT}	0	2.5	3	A	
	Power	P_{OUT}		100	120	W	
Dimensions (L×W×H)			285 (mm) × 170 (mm) × 110 (mm)				
Weight			Approx. 2.5kg				

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EXPERIMENTS

Experiment 1: Boost Converter
To get to know the principle and working mode of switching PWM boost converter. Realize the measurements of voltage and current via PEK-510 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)

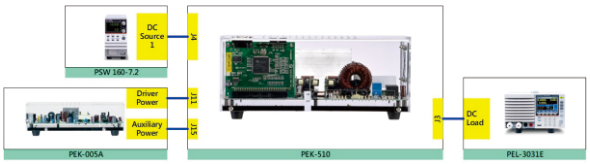

Fig1

Experiment 2: Input Voltage Control of Boost Converter
To get to know the small signal model derivation of boost converter, and learn the input voltage control, further proceeding to the code programming via SimCoder, after well mapping out the hardware. (Refer to the fig. 1 for wiring)

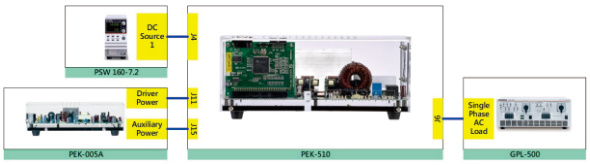

Fig2

Experiment 3: MPPT Control of Boost Converter
To get to know the characteristics of PV module and diversified MPPT method, and learn the code programming of Perturb and Observe method via SimCoder. Also, to validate experiment result via the PEK-510 boost converter. (Refer to the fig. 1 for wiring)

Experiment 4: Single Phase Boost Stand-alone Inverter
To get to know the way for modeling of single phase 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. 2 for wiring)

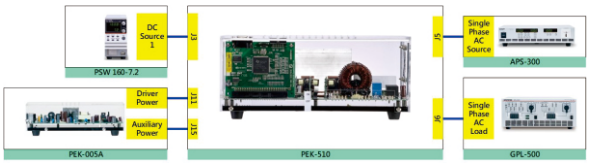

Fig3

Experiment 5: Single Phase Grid-connected Inverter
To get to know the fundamental with structure of single phase grid-connected inverter, and learn not only the design method of phase-lock loop of single phase grid-connected inverter, 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. 3 for wiring)

Experiment 6: Single Phase PV Grid-connected Inverter
To get to know the fundamental with structure of PV grid-connected inverter, and synthesize boost converter with single phase inverter to form the experiment of PV grid-connected inverter, further proceeding to the code programming via SimCoder, after well planning. (Refer to the fig. 4 for wiring)

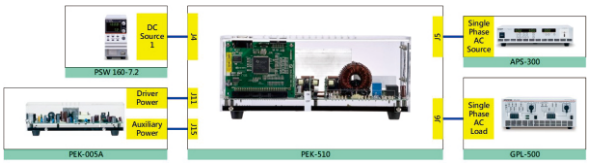

Fig4

Experiment 7: PQ Control of Single-phase PV Grid-connected Inverter
To get to know the verification capability of real power management and reactive power injection of smart inverter, and proceed to the code programming via SimCoder, after well mapping out the hardware. (Refer to the fig. 4 for wiring)

Experiment 8: Single Phase Islanding Protection Inverter
To get to know the purpose of islanding protection and the verification method of islanding test, and proceed to the code programming via SimCoder, after well mapping out the hardware. (Refer to the fig. 5 for wiring)

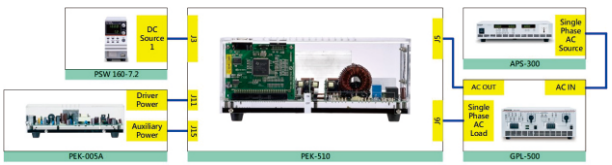

Fig5

ORDERING INFORMATION

PEK-510 Single Phase PV Inverter Developer's Kit

STANDARD ACCESSORIES
CD ROM (Including PSIM Example Files and User Manual), 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-510 digital control module: PEK-005A x1 and PEK-006 x1

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