

PEK-110

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 Trainings and 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-110 is the development module of full digital controlled single-phase 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 inverter through PSIM simulation verification and SimCoder programming processes.

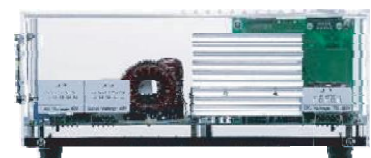
With the comprehensive capabilities of realizing simulation, design, hardware circuit, PSIM is a simulation software specifically designed for systems such as power electronics, motor driver and power conversion. PSIM features comprehensive functions, complete components, fast simulation, accurate simulation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

THE SPECIFICATIONS OF SINGLE-PHASE INVERTER DEVELOPMENT MODULE

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



Front Panel



Rear Panel

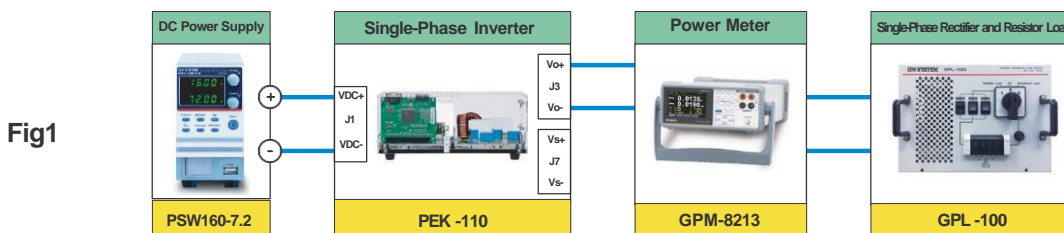
EXPERIMENTS

Experiment 1: Unipolar SPWM Inverter

Experiment objective is to learn the principle of Unipolar SPWM Inverter. Via PEK-110 module, students learn the voltage and current measurement method and the settings of TI F28335 DSP IC pin locations, PWM and A/D hardware as well as to understand how to conduct the control and measurement of DSP's internal signal by RS-232. (Refer to Fig1)

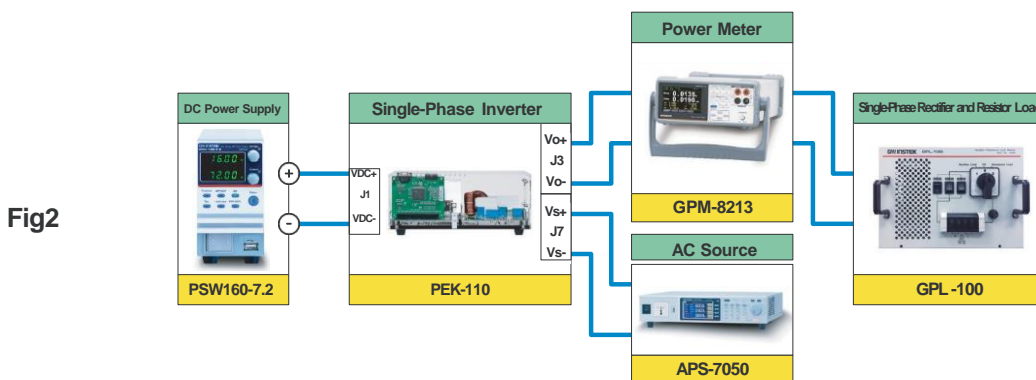
Experiment 2: Stand Alone Inverter with Dual Loop Inductor Current Control

Experiment objective is to learn the module establishment of single-phase inverter and the design of voltage and current loop controllers. After designing hardware SimCoder is utilized to conduct programming. (Refer to Fig1)



Experiment 3: Grid Connected Single Phase Inverter

Experiment objective is to understand the basic principle and structure of city grid paralleled with inverter; the design method of phase-locked loop of single-phase paralleled inverter, and the design of voltage and current loop controllers. After the designing city grid paralleled with inverter SimCoder is utilized to conduct programming. (Refer to Fig2)

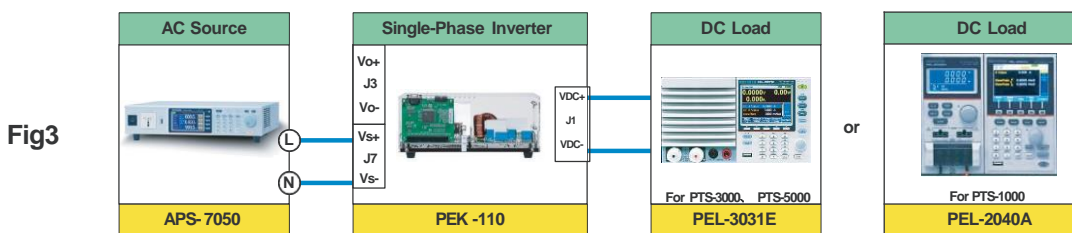


Experiment 4: Bridgeless PFC AC/DC Converter

Experiment objective is to understand the principle of Bridgeless PFC; current loop design; voltage loop design and hardware planning. SimCoder is utilized to conduct programming. (Refer to Fig3)

Experiment 5: Full-bridge AC/DC Switching Rectifier

Experiment objective is to understand the principle of Full-bridge AC/DC Switching Rectifier; current loop design, voltage loop design and hardware planning. SimCoder is utilized to conduct programming. (Refer to Fig3)



ORDERING INFORMATION

PEK-110 Single-Phase Inverter Developer's Kit

STANDARD ACCESSORIES

terminal, RS-232 communications cable

OPTIONAL ACCESSORIES

PEK-003 TMS320F28335 experiment board that isolates RS-232 interface

PEK-005(A) Multi-output auxiliary power supply

PEK-006 Isolated JTAG emulated adapter

* The required accessories for digital control module: PEK-005(A)x1 and PEK-006x1

Global Headquarters

GOOD WILL INSTRUMENT CO., LTD.

No.7-1, Jhongsing Road, Tucheng Dist., New Taipei City 236, Taiwan

T +886-2-2268-0389 F +886-2-2268-0639

E-mail: marketing@goodwill.com.tw

China Subsidiary

GOOD WILL INSTRUMENT (SUZHOU) CO., LTD.

No. 521, Zhujiang Road, Snd, Suzhou Jiangsu 215011 China

T +86-512-6661-7177 F +86-512-6661-7277

E-mail: marketing@instek.com.cn

Malaysia Subsidiary

GOOD WILL INSTRUMENT (SEA) SDN. BHD.

No. 1-3-18, Elit Avenue, Jalan Mayang Pasir 3,

11950 Bayan Baru, Penang, Malaysia

T +604-6111122 F +604-6115225

E-mail: sales@goodwill.com.my

Europe Subsidiary

GOOD WILL INSTRUMENT EURO B.V.

De Run 5427A, 5504DG Veldhoven, THE NETHERLANDS

T +31(0)40-2557790 F +31(0)40-2541194

U.S.A. Subsidiary

INSTEK AMERICA CORP.

5198 Brooks Street Montclair, CA 91763, U.S.A.

T +1-909-399-3535 F +1-909-399-0819

E-mail: sales@instekamerica.com

Japan Subsidiary

TEXIO TECHNOLOGY CORPORATION.

7F Towa Fudosan Shin Yokohama Bldg., 2-18-13 Shin

Yokohama, Kohoku-ku, Yokohama, Kanagawa,

222-0033 Japan

T +81-45-620-2305 F +81-45-534-7181

E-mail: info@texio.co.jp

Korea Subsidiary

GOOD WILL INSTRUMENT KOREA CO., LTD.

Room No.503, Gyeonginro 775 (Mullae-Dong 3Ga,

Ace Hightech-City B/D 1Dong), Yeongduengpo-Gu,

Seoul 150093, Korea.

T +82-2-3439-2205 F +82-2-3439-2207

E-mail: gwinstek@gwinstek.co.kr

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www.gwinstek.com www.facebook.com/GWinstek