THREE PHASE PMSM DRIVE AND CONTROL

Power Wire | Encoder Wire | Load Wire

NEW

PEK-190

FEATURES

- It Offers Analysis, Design, Simulation and Practical Verification for Power Electronics
- It Helps Trainee Unfamiliar With DSP Firmware Coding Promptly Access to Programming and Digital Control Realm With Ease
- It Provides Fully Educational Training and After-sales Warranty Service
- It Elaborates Circuit Diagram of Each Section of Module In Detail
- It Depicts DSP Hardware Layout, Setting and Way to Program Burning
- It Details Concept and Design of Experimental Circuit

Permanent-magnet synchronous motor, hereinafter referred to as PMSM, is widely utilized in the areas covering automatic production equipment, industry and business power supply, refrigerating air-conditioning ice maker and compressor motor, electric vehicle (EV), green energy related power generation, among others. PMSM, of which the drive and control that collectively dominate the expected performance and efficiency of system and play the key role in core technology leading to product development, has vast potentials in diverse markets.

PEK-190 module, not only providing motor-drive inverter, but offers PMSM (both electric motor and power generator) as well, which empowers user to profoundly realize the drive control technology of PMSM via the processes of analysis, design, simulation, circuit production, software coding, experimental verification, etc.

The experiments comprise motor vector control, measurement and estimation of motor parameter (both electrical and mechanical), initial rotor position detection and startup, position sensor less speed control including conventional sliding-mode observer, adaptive sliding-mode observer and model reference adaptive control, among others, all of which broadly cover the various significant control technologies relevant to this product genre.

PSIM, a simulating software specifically designed for power electronics as well as motor drive and power conversion system, is multi functional in its simulation, design and hardware circuit implementation with several features like all-dimensional, complete components, fast yet precise simulation, and user-friendly, just to name a few. Most importantly, it is currently the widely adopted teaching and researching software for academic and industrial fields.

PEK-190 PMSM Drive and Control

Description		Symbol	Min	Typ	Max	Units	Comment
DC Input	Voltage	V_{IN}	130	140	150	V	
	Current	I_{IN}			2.6	A	
AC Output (Inverter Output)	Voltage	V_{L-L}	45		65	V	
	Current	I_{OUT}			3	A	
	Power	P_{OUT}			300	W	
Dimensions (L × W × H)			285(mm)×170(mm)×110(mm)				
Weight			Approx. 2.5kg				
Motor Specifications		Delta (EMCAC30604PS) ; (3 Phase AC, 0.4KW)					
Experiment Items	1. Vector Control of PMSM						
	2. Parameter Identification of PMSM						
	3. Initial Angle Detection and Starting of PMSM						
	4. Position Sensor-less Control of PMSM with Sliding Mode Observer (SMO)						
	5. Position Sensor-less Control of PMSM with Self-adaptive Sliding Mode Observer						
	6. Position Sensor-less Control of PMSM with Model Reference Adaptive System (MRAS) Observer						

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EXPERIMENTS

Experiment 1 : Vector Control of PMSM
To mainly educate the Space Vector Pulse Width Modulation (SVPWM) technology. To understand, via PEK-190 module, the measuring method of both voltage and current, and learn the pin of TI F28335 DSP IC, PWM and A/D hardware settings. Also, to realize the way how to utilize RS-232 for DSP internal signal control and measurement. (refer to the figure 1 for wiring)

Experiment 2 : Parameter Identification of PMSM
To mainly educate the way to retrieve the PMSM initial rotor position info precisely so that stable startup for motor can be achieved. To bring up a brand-new PMSM initial rotor position detection for both steady startup and credible operation of motor. In addition, it proceeds to, via SimCoder, program coding after mapping out the hardware appropriately. (refer to the figure 1 for wiring)

Experiment 3 : Initial Angle Detection and Starting of PMSM
To mainly educate how to estimate motor impedance, inductive reactance, counter emf, and mechanical parameters of motor including torque, rotor of inertia, mechanical constant. In addition, to learn, via SimCoder, program coding after mapping out the algorithm appropriately. (refer to the figure 1 for wiring)

Experiment 4 : Position Sensor-less Control of PMSM with Sliding Mode Observer (SMO)
To learn “conventional sliding-mode observer” and program coding via SimCoder. (refer to the figure 2 for wiring)

Experiment 5 : Position Sensor-less Control of PMSM with Self-adaptive Sliding Mode Observer
To learn “adaptive sliding-mode observer” and program coding via SimCoder. (refer to the figure 2 for wiring)

Experiment 6 : Position Sensor-less Control of PMSM with Model Reference Adaptive System (MRAS) Observe
To learn “model reference adaptive control” and program coding via SimCoder. (refer to the figure 2 for wiring)

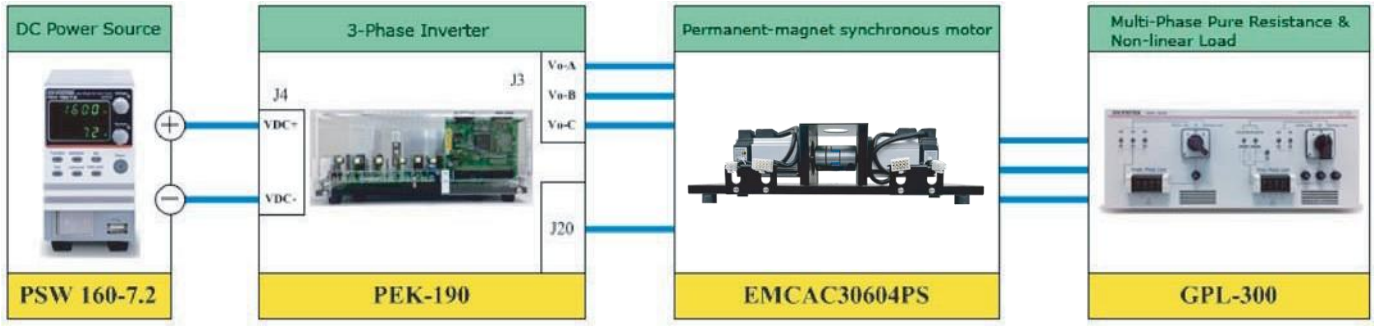

Fig1

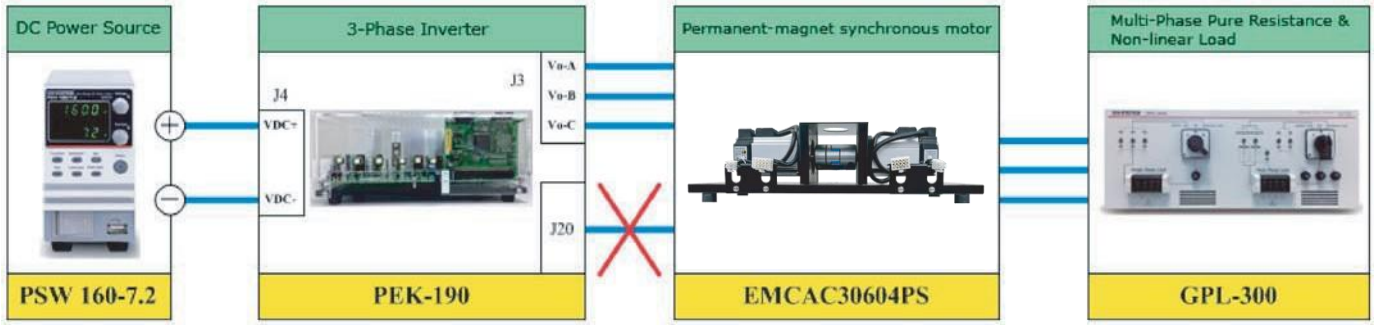

Fig2

ORDERING INFORMATION

PEK-190 3-Phase PMSM Control Development Kit

STANDARD ACCESSORIES

Terminals and RS232 Communication Cable

OPTIONAL ACCESSORIES

PEK-003 TMS320F28335 experimental board with RS-232 interface isolation
PEK-005 (A) Multiple output auxiliary power sources
PEK-006 JTAG simulating adaptor with isolation

* Required accessories for digital control module: PEK-005 (A) x 1, PEK -006 x 1

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