PEL-3031E Programmable D.C. Electronic Load New Product Announcement

GW Instek launches new PEL-3000E series programmable single-channel electronic load. In the series, PEL-3031E provides 300W (1V~150V/60A) current sink capability. Inherited from the PEL-3000 series, PEL-3031E has an easy-to-read LCD panel and user-friendly interface. This model features high speed and accurate measurement capability for electronic component, battery, portable charger and power products that require low to medium power consumption.

The PEL-3000E series is designed for current sink operation starting from 60mA and aims at measurement applications, including charger, adapter, various power supply equipment, and portable charger.

The PEL-3000E has seven operating modes. Among them, four basic operating modes are constant current, constant voltage, constant resistance, and constant power. Three other combined operating modes are constant current + constant voltage, constant resistance + constant voltage, constant power + constant voltage. Users can select operating modes based upon products' test requirements. For C.C. mode, electronic load will sink a constant current according to the set current value; for C.V. mode, electronic load will attempt to sink sufficient current to control the source voltage to the programmed value; for C.R. mode, electronic load will sink a current linearly proportional to input voltage according to the set resistance value; for C.P. mode, electronic load will initiate load power sinking operation (load voltage x load current) in accordance with the programmed power setting.

To meet the requirements of different test conditions, the Static function is to sink a constant current; the Dynamic function is to periodically switch between two sink conditions, and the Sequence function is to provide tests for more than two sink conditions. The sequence function can be divided into Normal Sequence and Fast Sequence. Normal Sequence are the most flexible means of generating complex sequences that can facilitate users to establish a set of changing current sink conditions based upon different sinking conditions (CC, CR, CV or CP mode) and time(adjustable range: 1ms to 999h 59min 59s). Fast sequence allows time resolution of 25us to be set for the smallest step. Setting parameters for multiple steps can simulate consecutive current changes of various real load conditions. For instance, while using an electronic load to test a power-driven tool's power supply we can first obtain waveforms by an oscilloscope and a current probe from the tool, and subsequently, use the obtained waveforms to edit simulated current waveforms, via electronic load's sequence function, to test the power-driven tool and to analyze its operational status. The Soft Start function allows users to determine the rise time of current sink that is to

decide the required time to reach electronic load's set current, resistance or power value. Setting a proper rise time for Soft Start is effective to counter output voltage fluctuation caused by DUT's (power supply) transient output current. It is worth noting, General DC loads do not have the soft start function. When conducting high speed current sink operation, the inductance effect on the cable connecting electronic load and DUT will lead to transient voltage drop on electronic load's input terminal, therefore, that will result in Voltage Non-monotonic increase. PEL-3000E's soft start function not only allows output voltage to be Monotonic increase, but also prevents inrush current and surge voltage from happening on DUT. For instance, tests using a power supply, LED and a DC load (activate the soft start function) can prevent inrush current and surge voltage from causing damages on LED.

The PEL-3000E is equipped with the count time function to obtain total time for electronic load's current sink that helps users estimate DUT's power capacity. The cut off time function is for users to control the total time of electronic load's current sink. Both flexible time control functions increase the test adaptability of electronic load. UVP can be applied on battery discharge tests. Electronic load will cease operation if battery's voltage is lower than the set UVP threshold to protect battery from over discharge. Other than that, PEL-3000E provides users with analog control terminal to control PEL-3000E from external voltage, external resistance and switch. Analog control terminal can also monitor electronic load's status and display protective alarms.

Operating Mode

The PEL-3000E series provides four fundamental operating modes and three add-on modes of CC, CR and CP separately combining with CV. Users can set different drawn current condition under different operating modes such as setting operating range for current sink level, Current Slew Rate, input voltage and current sink. The input voltage range has two levels --- high and low. The current sink operating range has two levels ---- high and low current levels which possess different resolutions to meet test requirements of different power product specifications.

The parameter settings and main functionality tests of CC, CR, CV, CP, and +CV are as follows:

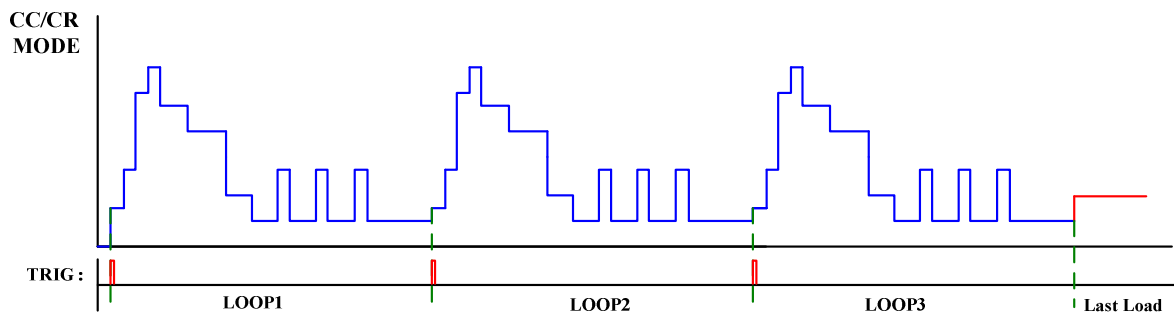| Operating mode	Parameter setting	Functionality tests
CC	Current	Voltage load regulation for power supply
CR	Resistance	Power supply activation and current limit
CV	Voltage	Power supply current limit and battery simulation to test battery charger
CP	Power	Overall rating power output for power supply
+CV	Voltage	Restrain load from sinking total current of power supply under test to protect DUT

Static/Dynamic/Sequence mode

The PEL-3000E series, according to different test conditions, step or continuous changes, test speeds, and selectable modes, has three operating functions: Static, Dynamic and Sequence. Detailed descriptions of these functions are as follows:
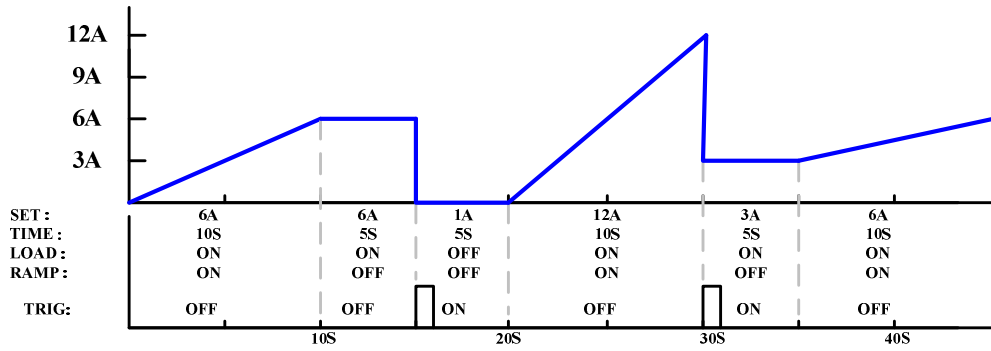
Operation Function	Static	Dynamic	Sequence	
			Fast	Normal
Operating condition selection	Single fixed condition	Switch between two conditions	Selection from more than two conditions	Selection from more than two conditions
Operating modes	All modes	Two conditions using same mode Support CC or CR	Each condition must use same mode Support CC or CR mode	Each condition is able to be used in different mode All modes
Adjustable condition setting	• Value A/ Value B • Slew Rate	• Level 1/Level 2 • Timer 1/Timer 2 • Slew Rate 1/ Slew Rate 2	• Level • Timer • Slew Rate • Others…	• Level • Timer • Slew Rate • Others…
Sequence step combination	N/A	N/A	• 1 Sequence • 1,000 steps • 25us/step	• 10 Sequence • 1,000 steps • 1ms/step
Other functions	N/A	Trigger Out function	Trigger Out function	• Trigger Out function • Ramp function

Fast Sequence & Normal Sequence

Set a complete sequence editing function to obtain following waveforms. Users can save development cost and time without using a PC to control electronic load and writing programs.
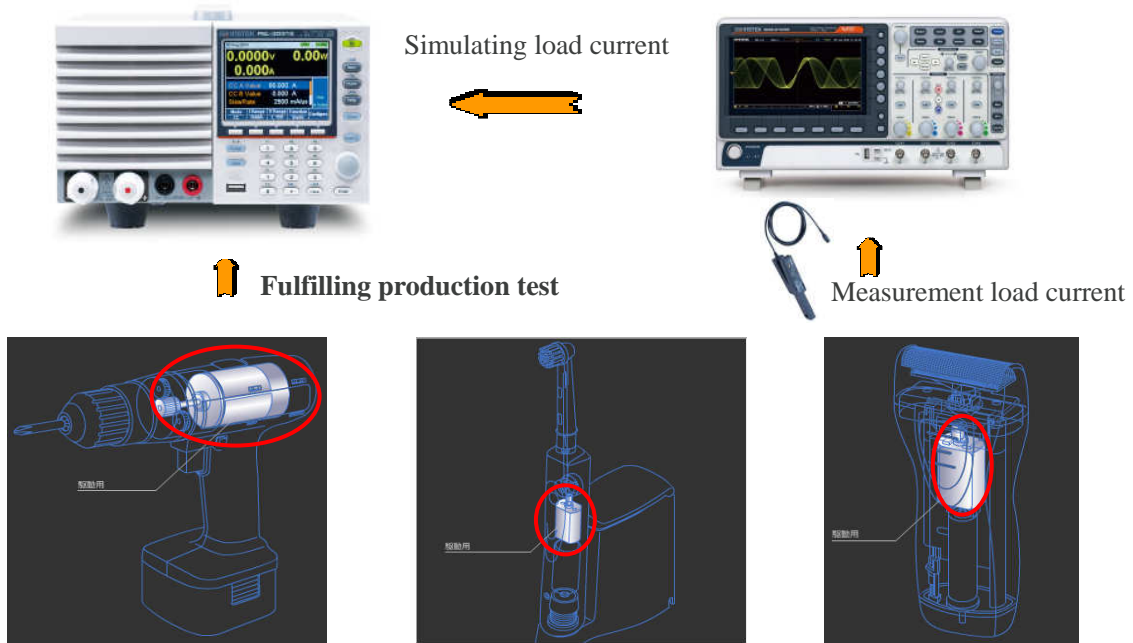

Fast Sequence Diagram

SET :	6A	6A	1A	12A	3A	6A
TIME :	10S	5S	5S	10S	5S	10S
LOAD :	ON	ON	OFF	ON	ON	ON
RAMP :	ON	OFF	OFF	ON	OFF	ON
TRIG :	OFF	OFF	ON	OFF	ON	OFF

Normal Sequence Diagram

EX. **Power-driven tools simulation test**

Simulating load current

Measurement load current

Fulfilling production test

Soft start

The Soft Start function of PEL-3000E allows users to determine the rise time of current sink that is to decide how much time is required to reach electronic load's set current, resistance or power value. PEL-3000E's soft start function prevents inrush current and surge voltage from happening on DUT. For instance, test applications using a power supply, LED and a DC load (activate the soft start function) can prevent inrush current and surge voltage from causing damages on LED.
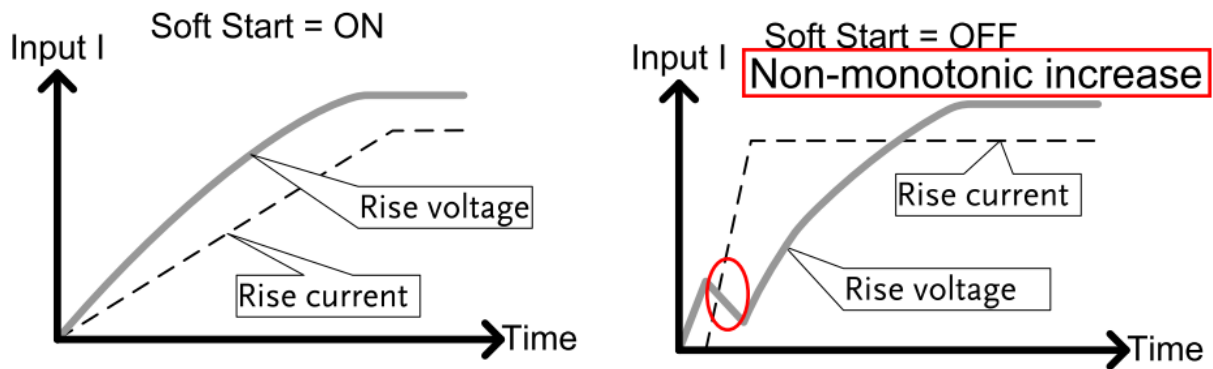
Protection Modes

The PEL-3000E series provides many protective functions including over current protection (OCP), over voltage protection (OVP), over power protection (OPP), over temperature protection (OTP) and under voltage protection (UVP). Except for OTP, all thresholds of protective functions are adjustable. When protective function is activated, electronic load will send out warning signal and terminate operation. Other than protective functions, Limit function can also be utilized to maintain electronic load in operation at a preset value. The related settings and selections are as follows:

Protection Functions	OCP	OVP	OPP	OTP	UVP
Adjustable thresholds	V	V	V	N/A	V
Load Off	V	V	V	Fixed	V
Limit Function	V	N/A	V	N/A	N/A

Analog Channel Control

The PEL-3000E series provides the external analog channel control function, which allows users to connect J1 connectors on the rear panel to input voltage or to connect resistance to control electronic load operation. Users can integrate this function into test system and utilize signals generated from the test system to control PEL-3000E.

Features, Advantages and Benefits

Features	Advantages	Benefits
Sequence Function	Via sequence editing function, system or single unit users can edit current sink conditions of arbitrary waveforms from the memory function on the panel without connecting with a computer.	Rapid editing of any current sink conditions to save users' cost of system development.
Adjustable protective points	Adjust protective points according to test requirements.	Prevent damages on DUT
Adjustable Slew Rate, the maximum of 2.5A/us	Faster Slew Rate satisfies the tests of high-speed power products	Conduct fast transient response variation tests for products.
Soft Start	Alleviate input voltage drops caused from the moment current sink is activated. During the activation, current sink follows the set slew rate variation that will not affect the overall test speed.	Prevent inrush current and surge voltage from causing damages on DUT and increase test stability of the moment current sink is activated.
External voltage control	Directly control electronic load operation and monitor sinking current.	Applicable to analog voltage control conditions.
Input voltage monitoring GO/NO GO function	When input voltage exceeds the set range, NG warning signal will be shown on the display screen.	Self-definite test conditions and upper limit/ lower limit for measurement and analysis of DUT.

Target Markets and Associated Features

1. Ideal for output characteristics evaluation for power supply products

2. UVP or Cut Off Time function is ideal for battery discharge tests

3. Quality inspection and reliability tests for electronic components such as switch, relay, connector, and fuse

4. Help power-driven tool manufacturers conduct product evaluation by sequence mode which simulates power-driven tool' operational current.

5. The soft start function can prevent inrush current and surge voltage from happening on DUT that is ideal for diode characteristics tests such as LED.

GW INSTEK
Simply Reliable

Feature Competition

	GW INSTEK	Prodigit	B &K	B &K
	PEL-3031E	**33xx**	**8500**	**8600**
Mode	**CC & CV & CR & CP & CC+CV & CR+CV & CP+CV**	**CC & CV & CR & CP**	**CC & CV & CR & CP**	**CC & CV & CR & CP**
Sequence mode	**Normal Sequence(1000 Step) / Fast Sequence(1000 Step) / Program(256 Step)**	**NO**	**LIST Mode (1000 Steps)**	**LIST Mode**
Program(Go/NoGo)	YES	YES	YES	YES(10 Memory)
Soft start	YES	NO	NO	NO
UVP	YES	NO	NO	NO
Elapsed time	YES	NO	NO	YES
Cut off time function	YES	NO	YES (Load on Timer)	YES (Configure Timed Input)
I Monitor	YES	YES	YES	YES
Trigger Input	YES	NO	YES	YES
Trigger Output	YES	NO	NO	NO
Preset	YES(0~9 / recall)	NO	NO	NO
Setup memories	YES(100 sets)	YES(150 sets)	YES(100 sets)	YES(100 sets)

Key Dates for Product Announcement

1. Distributor Announcement & Demo Unit order and Shipping : 13 th of April. 2016
2. Global Market Announcement & Mass Quantity Order Fulfillment : 11 th of May. 2016

Ordering Information

PEL-3031E (150V / 60A / 300W) programmable single-channel DC electronic load

Accessories

Quick Start Guide

User manual /Programming manual CD

Power cord (Region dependent)

Front terminal washers- Spring washer (M6) x2

GTL-105A   Remote sense cables, red x1, blackx1

Optional Accessories

GTL-248   GPIB cable, 2.0m

GTL-246   USB cable, Type A – Type B

PEL-010   Dust Filter

PEL-004   GPIB option

Service Policy

1. **1 year warranty.** PEl-3031E programmable single-channel DC electronic load carries a standard warranty for 1 year.

2. **Service Support** The service instructions in Service Manual will help distributors repair damaged units promptly. Parts-swapping service support is provided by Good Will Instrument to facilitate repair jobs done at the distributor's site.

Specifications

Model	PEL-3031E	
Power	300W	
Range	Low	High
Voltage	1~150V	1~150V
Current	0~6A	0~60A
Min. Operating Voltage(dc)	1V-6A	1V-60A
Static Mode		
Constant Current Mode		
Range	0~6A	0~60A
Setting Range	0~6.12A	0~61.2A
Resolution	0.2mA	2mA
Accuracy	$(T^{*1}) \pm (0.1\%$ of set $+0.1\%$ of F.S) $+Vin/500$ kΩ (Full scale of High range)	$(T^{*1}) \pm (0.1\%$ of set $+0.2\%$ of F.S) $+Vin/500$ kΩ (Full scale of High range)
Constant Resistance Mode		
Range	60S-0.002S(0.01666Ω~500Ω)(300W/15V); 6S-0.0002S(0.1666Ω -5kΩ)(300W/150V)	
Setting Range	60S-0.002S(0.01666Ω~500Ω)(300W/15V); 6S-0.0002S(0.1666Ω -5kΩ)(300W/150V)	
Resolution(30000 steps)	0.002S(15V) ; 0.0002S(150V)	
Accuracy	$(T^{*1}) \pm (0.3\%$ of set $+ 0.6S) + 0.002$mS	
Constant Voltage Mode		
Range	1~15V	1~150V

Setting Range	0~15.3V	0~153V
Resolution	0.5mV	5mV
Accuracy	$(T^{*1})\pm$ (0.1% of set + 0.1% of F.S) (Full scale of Low range)	$(T^{*1})\pm$ (0.1% of set + 0.1% of F.S) (Full scale of High range)
Constant Power Mode		
Range	3W-30W(6A)	30W-300W(60A)
Setting Range	0W-30.6W	0W-306W
Resolution	1mW	10mW
Accuracy	$(T^{*1})\pm$(0.6 % of set + 1.4 % of f.s (Full scale of H range)) + Vin^2/500 kΩ	
Dynamic Mode		
General		
T1& T2	0.05mS - 30mS / Res : 1uS; 30mS - 30S / Res : 1mS	
Accuracy	1uS / 1mS ± 200ppm	
Slew Rate (Accuracy 10%)	0.001~0.25A/uS	0.01~2.5A/uS
Slew Rate Resolution	0.001A/uS	0.01A/uS
Slew Rate Accuracy of Setting	$\pm$(10% + 15us) * Time to reach from 10% to 90% when the current is varied from 2% to 100% (20% to 100% in L range) of the rated current.	
Constant Current Mode		
Current	0~6A	0~60A
Setting range	0~6.12A	0~61.2A
Current Resolution	0.2mA	2mA
Current Accuracy	±0.8% F.S.	
Constant Resistance Mode		
Range	60S-0.002S(0.01666Ω~500Ω)(300W/15V); 6S-0.0002S(0.1666Ω -5kΩ)(300W/150V)	
Setting Range	60S-0.002S(0.01666Ω-500Ω)(300W/15V) 6S-0.0002S(0.1666Ω -5kΩ)(300W/150V)	
Resistance Resolution	30000 steps	
Resistance Accuracy	$\pm$(1%set + 0.6S) + 0.002mS	
Measurement		
Voltage Readback		
Range	0~15V	0~150V
Resolution	0.5mV	5mV
Accuracy	$(T^{*1})\pm$ (0.1% of rdg + 0.1% of F.S) (Full scale of Low range)	$(T^{*1})\pm$ (0.1% of rdg + 0.1% of F.S) (Full scale of High range)
Current Readback		
Range	0~6A	0~60A
Resolution	0.2mA	2mA
Accuracy	$(T^{*1})\pm$ (0.1% of rdg + 0.1% of F.S) (Full scale of High range)	$(T^{*1})\pm$ (0.1% of rdg + 0.2% of F.S) (Full scale of High range)
General		
Function		
Trigger In/Out terminal (BNC)	YES	
Current momitor output	YES	

Analog External Control	YES	
Soft Start	YES	
SEQUENCE (Normal/Fast)	YES	
PRESET DATA	10 Sets	
PROTECTION	OCP, OPP, UVP, OVP, OTP, RVP	
Other		
POWER SOURCE	**100-120VAC/ 200-240VAC, 47-63Hz**	
Interface	USB, GPIB(Option), Analog external control	
Dimensions & Weight	213.8(W) x 124.0(H) x 400.5(D)mm, Approx. 7.5Kg	

Note: *1 If the ambient temperature is over 30℃ or below 20℃, then T = ± | t − 25℃ | x 100ppm/℃ x Set

     If the ambient temperature is in the range of 20℃ ~ 30℃, then T = 0 (t is the ambient temperature)

Should you have any questions on the PEL-3031E announcement, please don't hesitate to contact us

Sincerely yours,

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