PEL-3000/3000H Series

Programmable D.C. Electronic Load

FEATURES

- Operating Voltage (DC) : 0~150V(PEL-3000)/0~800V(PEL-3000H)
- Operating Mode : C.C/C.V/C.R/C.P/C.C+C.V/C.R+C.V/C.P+C.V
- Parallel Connection of Inputs for Higher Capacity (Max : 9,450W)
- Support of High Slew Rate : Max 16A/μs(PEL-3000)/0.84A/μs(PEL-3000H)
- Run Program Function (Go/NoGo Test)
- Sequence Function for High Efficient Load Simulations
- Dynamic (Switching) Function : 0.0166Hz~20kHz
- Soft Start Function : Off/On (1~200ms, Res. 1ms)
- Adjustable OCP/OVP/OPP/UVP Setting
- Short Circuit Function
- Timer Function : Elapsed Time of Load on
- Cut Off Time (Auto Load Off Timer) : 1s to 999h 59min 59s or Off
- External Channel Control/Monitoring Via Analog Control Connector
- Setup Memories : 100 sets
- 3.5 Inch TFT LCD Display
- Multi Interface : USB 2.0 Device/Host, RS-232, GPIB/LAN (Optional)

GW INSTEK

Simply Reliable

Flexible Power Combinations, High-Speed and Versatile Load Simulations

The PEL-3000 Series, a single-channel, programmable D.C. electronic load with 0.01mA current resolution and 16A/ μ s current Slew Rate, is very ideal for testing server power supply and SPS (Switching Power Supply) for commercial and industrial computers. For a heavy-duty device like cloud ecosystem running 24-hour nonstop operations, a stable and high-power power supply, ranging from 350W to 1500W, is required to maintain the normal operation of server, Hub, and the equipment of data storage and internet communications. Owing to the increasing demand of data transmission and large scale data storage of telecommunications systems, the infrastructure of internet communications is in the pace of rapid expansion. This has greatly boosted the market demand of telecommunications equipment powered by power supply of 2000W and above. The flexible power combination of PEL-3000 Series meets the test requirements of present high-power power supply. The PEL-3000H Series programmable DC Electronic load, which not only inherited functions and features from the PEL-3000 Series but providing three current ranges for all PEL-3000H Series and adding voltage monitor BNC terminals on the front panel. The PEL-3000H Series, a single-channel, programmable D.C. electronic load with 800V and 0.84A/ μ s current Slew Rate, is ideal for the test of the high voltage devices such as the EV & HEV in-vehicle chargers, DC/DC converters or high-voltage batteries. With respect to battery testing applications such as rechargeable battery for electrical tools, battery module and automobile battery, PEL-3000(H) Series has three stand-alone models to offer including 175W, 350W, 1050W and Booster. By connecting Booster 2100W units with master units, the maximum load capacity of the whole system can reach 9,450W. Hence, the PEL-3000(H) Series fulfills various power testing requirements including medium to low power or high-power power supply.

The PEL-3000(H) Series has seven operating modes and three operating functions. Among the seven operating modes, four of them are basic operating modes, including constant current, constant voltage, constant resistance, and constant power, and the other three are advanced operating modes including constant current + constant voltage, constant resistance + constant voltage, and constant power + constant voltage. Users must first select operating mode and then operating function based upon the test requirements. Static, Dynamic and Sequence operating functions can be applied to different testing conditions including a fixed load level, switching between two levels or switching among more than two levels. Sequence function is divided into Fast Sequence and Normal Sequence according to the test time of each step. Both Dynamic and Sequence are to assist users to simulate the genuine load change. For instance, PEL-3000(H) Series can simulate HEV current consumption to make sure that automobile battery can supply HEV with sufficient power need on the road. By so doing, manufacturers can elevate product quality and reliability.

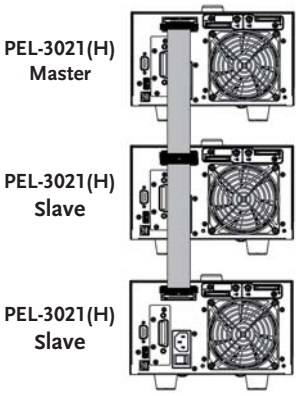
The Soft Start function of the PEL-3000(H) Series can set current rise time for the moment PEL-3000(H) Series is turned on to reduce the abnormal situation of the voltage drop of power supply under test. The adjustable Under Voltage Protection (UVP), GO/NO GO voltage input monitoring function, current monitoring function and Timer Function to control load activation time can be jointly applied to the characteristic tests of battery bleeding to avoid battery damage during bleeding operation. Based upon the functionalities described above, the PEL-3000(H) Series can test a vast variety of power supply ranging from the fundamental static sink current to complex dynamic load simulations so as to enhance product quality and reliability.

The single unit D.C Electronic Load of PEL-3000(H) Series

The PEL-3000(H) Series is a high speed, single channel and programmable D.C. electronic load and its power, functionality, parallel combination and size are listed on the following chart :

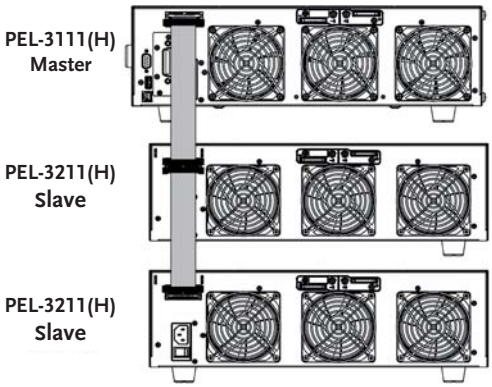
MODEL	PEL-3021(H)	PEL-3041(H)	PEL-3111(H)	PEL-3211(H)
Power	175W	350W	1,050W	2,100W Booster
Function	Full-function Single Unit	Full-function Single Unit	Full-function Single Unit	No control panel, can not be operated alone
Parallel Combination	Parallel with same model, 5 units the maximum	Parallel with same model, 5 units the maximum	Parallel with same model, 5 units the maximum Parallel with the maximum of four PEL-3211(H)s	Parallel with PEL-3111(H)
Size	Half Rack	Half Rack	Full Rack	Full Rack

A. OPERATING FUNCTION FOR MASTER AND SLAVE IN PARALLEL



Three PEL-3021(H) in Parallel

PEL-3000(H) Series connects with loads via MIL 20-pin interface and connecting cables to designate a master to control other slave units in parallel. One PEL-3111(H) and four PEL-3211(H) in parallel provide the maximum power of 9,450W.



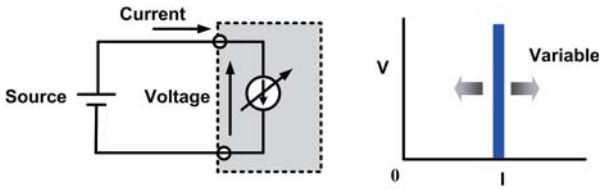
One PEL-3111(H) connects with two PEL-3211(H) in Parallel

Parallel arrangement allows users to flexibly select and apply different power arrangement which enhances equipment utilization efficiency to save R&D cost.

B. OPERATING MODE

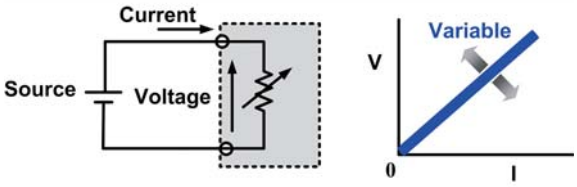
The PEL-3000(H) series provides four fundamental operating modes and three add-on modes of CC, CR and CP separately combining with CV. Users can set different load condition under different operating modes such as setting operating range for load level, Current Slew Rate, input voltage and load current.

The input voltage range has two levels - high and low. The load current operating range has three levels - high, medium and low current levels which possess different resolution to meet test requirements of different power product specifications.



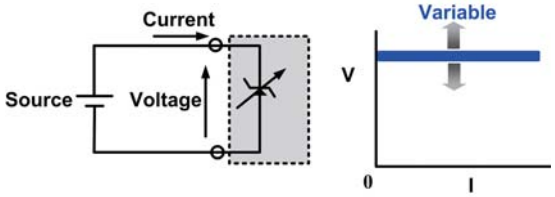
CC Mode

Under constant current mode, electronic load will sink the amount of current users has set. Different current settings via CC mode allow users to test the voltage changes of DC power supply which is called load regulation test.



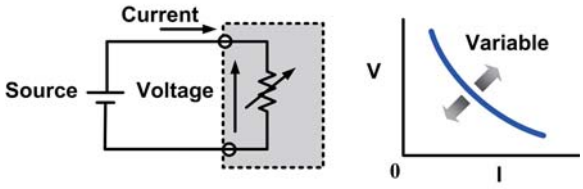
C.R Mode

Under constant resistance mode, electronic load will sink load current, which is linearly direct proportion to input voltage. This mode can be utilized in testing voltage or the activation and current limit of power supply.



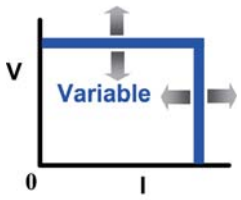
C.V Mode

Under constant voltage mode, electronic load will sink sufficient current to regulate the voltage source to the set value. This mode allows users not only to test current limit function of power supply, but also to simulate battery operation in testing battery chargers.

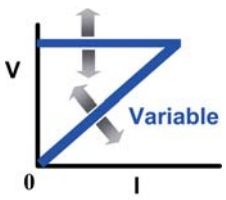


C.P Mode

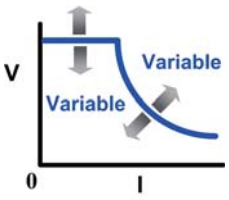
Under constant power mode, electronic load will sink load current, which is indirect proportion to input voltage to reach preset constant power requirement. Hence, the changes of input voltage will have indirect proportion effect on current sinking so as to reach constant power control.



CC+CV Mode



CR+CV Mode



CP+CV Mode

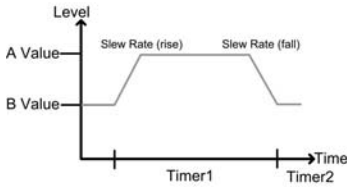
+CV mode can be selected under CC, CR or CP mode. When +CV mode function is turned on and electronic load sinks more current than the maximum current of power supply under test, electronic load will automatically switch to CV mode. It is because that the current sunk is the maximum current of power device. Therefore, power supply will switch to CC mode and PEL-3000(H) will switch to CV mode to limit electronic load from sinking the total current of power supply so as to prevent power supply under test from damaging. Electronic load will cease operation once the voltage of DUT is lower than the set voltage under +CV mode.

C. THREE OPERATING FUNCTIONS

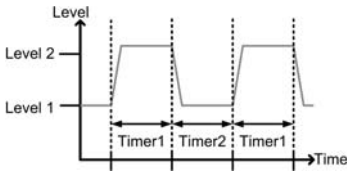
The PEL-3000(H) series, according to different test conditions, step or continuous changes, test speeds, and selectable modes, has three operating functions: Static, Dynamic and Sequence, which can be separately applied on a fixed load test; between two loads; or among more than two loads. Detailed descriptions of these functions are as follows:

Static function provides a fixed load to test output stability of power supply. Switching load value A to B will be manually operated. Under Dynamic function, two test conditions can be switched automatically and every set of parameter includes Level, Timer and Slew Rate. Timer can be set to the fastest of 25μs to accommodate response time of different power supply and assist testing power supply output status when load is unstable in order to enhance products' reliability and quality.

Operation / Function	Static	Dynamic	Sequence	
			Fast	Normal
Operating Condition Selection	Single fixed condition	Selection between two conditions	Selection among more than two conditions	Selection from more than two conditions
Operating Modes	All modes	• Two conditions using same mode • CR, CC,CP modes	• Each condition must use same mode • Support CC or CR mode	• Each condition using different mode • All modes
Adjustable Condition Setting	• A/B Value • Slew Rate	• Level 1/Level 2 • Timer 1/Timer 2 (25μs) • 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 • 25μs/step • Res. 1μs	• 10 Sequence • 1,000 steps • 10μs/step • Res. 10μs
Other Functions	N/A	N/A	• Trigger Out function	• Trigger Out function • Ramp function

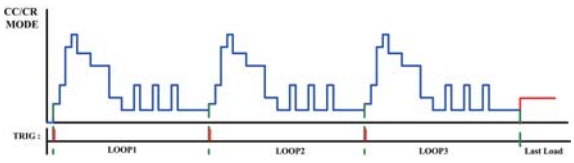


Static Mode

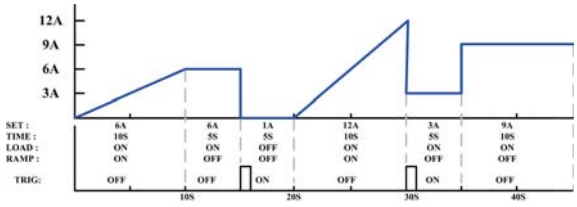


Dynamic Mode

In Sequence function, waveforms of load current edited by Fast Sequence are steps and every step can reach the fastest of 25μs to provide the high slew rate for electronic loads.



Fast Sequence Diagram



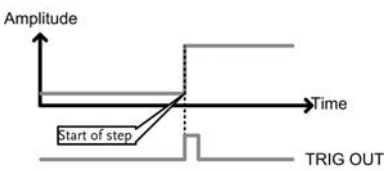
Normal Sequence Diagram

Normal Sequence provides RAMP function to users, according to their requirements, to select between slope and step method under set time to sink current.

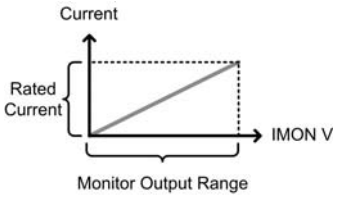
By applying a complete sequence editing function, users can control electronic load without using a computer or writing a program so as to save cost and time of R&D.

D. TRIGGER SIGNAL AND CURRENT MONITORING (IMON)

BNC connectors on the front panel



TRIG OUT = ON

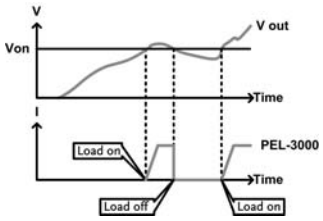


IMON OUTPUT

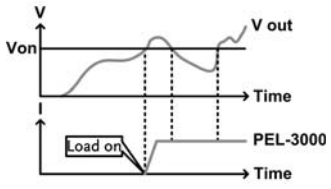
The front panel of PEL-3000(H), via BNC connectors provides two output signals, which are Trigger Signal and IMON. Under Dynamic or Sequence function, the moment the load current setting is changed BNC on the front panel will output a 4.5V and 2μs pulse voltage. This trigger signal can be set to open or close for every step. Users can use trigger signal to synchronize other devices inside the system.

Current monitoring signals, using a BNC connector to compare with the full scale of real load current, output 0 ~ 1V(0~10V for PEL-3000H) at high and low current levels and 0 ~ 0.1V(0~1V for PEL-3000H) at medium current level. Therefore, users can monitor load current change without using current probe to save cost.

E. VON VOLTAGE AND VON LATCH FUNCTION



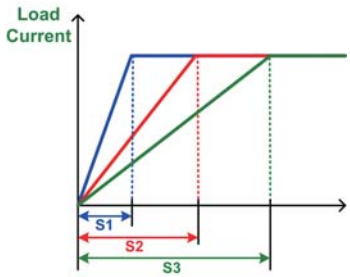
Von Latch = OFF



Von Latch = ON

Von Voltage is the threshold voltage for electronic load to activate or terminate sinking current. When Von Latch is set to off, electronic load operation will be activated if input voltage is higher than Von Voltage and electronic load operation will be terminated if input voltage is lower than Von Voltage. When Von Latch is set to on, electronic load operation will be activated if input voltage is higher than Von Voltage and will continue operation even input voltage is lower than Von Voltage. Von Voltage function can test the transient maximum current capability provided by power supply.

F. SOFT START



Three different load waveforms of Soft Start Time

Soft Start regulates the time of current rising from 0 to preset value during the moment load is activated. This function is to prevent voltage from dropping due to the fast transient rising speed of load current. Sudden voltage drop will result in an unsuccessful activation of electronic load or DUT and a damaged DUT.

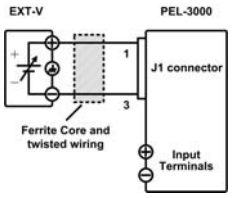
G. PROTECTION MODES

Functions \ Protection	OCP	OVP	OPP	OTP	UVP	RVP
Adjustable Thresholds	✓	✓	✓	Fixed	✓	N/A
Load Off	✓	✓	✓	N/A	✓	Fixed
Limit Function	✓	N/A	✓	N/A	N/A	N/A

The PEL-3000(H) 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 above: Take UVP as an example. In battery bleeding tests, electronic load will cease operation if battery voltage is lower than the set protective threshold value in order to prevent battery from over bleeding.

H. ANALOG CHANNEL CONTROL

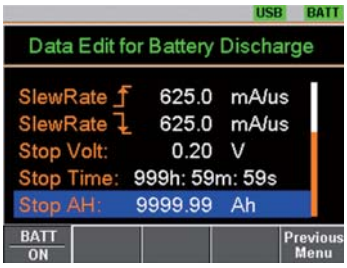
Rear Panel



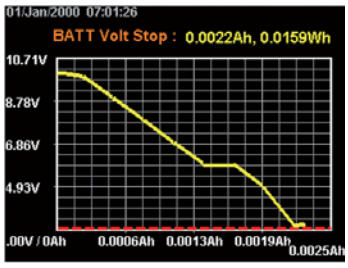
External Voltage Connection

The PEL-3000(H) Series provides the external analog channel control function, which allows users to connect J1 and J2 MIL 20 pin standard connectors on the rear panel to input voltage or to connect resistance to control electronic load operation. Input voltage is limited to the range of 0 ~ 10V; connecting resistance is limited to the range of 0Ω ~ 10kΩ; and related to load level are 0~100%. For instance, when operating PEL-3021under CC mode and 35A, external input voltage is 1V and sink current is 3.5A. Users can integrate this function into test system and utilize signals generated from the test system to control PEL-3000(H) Series.

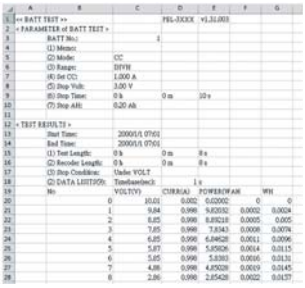
I. BATT TEST AUTOMATION



BATT Test Automation Editing



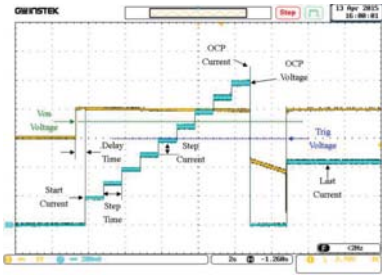
Waveform of TEST Result



Sample of Data Log

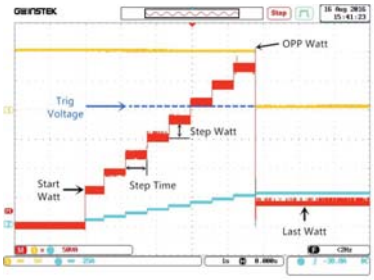
The built-in BATT Test Automation of PEL-3000(H) provides battery discharge applications with more flexible discharge stop time setting as well as rise and fall Slew Rate for discharge current settings. Under CP, CC or CR mode, the conditions for stop discharge can be set respectively. For instance, set the input voltage for stop discharge current, the execution time for discharge current or total discharge current*time (AH) to satisfy the verification of battery capability.

J. OCP TEST AUTOMATION



OCP test Automation for DUT(Power Supply), provide users with high resolution OCP measurement values to verify DUT's OCP activation point. It also provides users with measurement results so as to help them determine whether DUT's actual OCP activation point meets the regulations. It can test the value of OCP by setting load current increment from start current to stop current. OCP's activation point can be accurately measured.

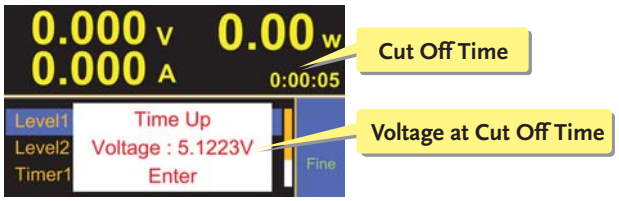
K. OPP TEST AUTOMATION



OPP test Automation for DUT(Power Supply), provide users with high resolution OPP measurement values to verify DUT's OPP activation point. It also provides users with measurement results so as to help them determine whether DUT's actual OPP activation point meets the regulations. It can test the value of OPP by setting power increment from start power to stop power. OPP's activation point can be accurately measured.

L. TIMER FUNCTIONS

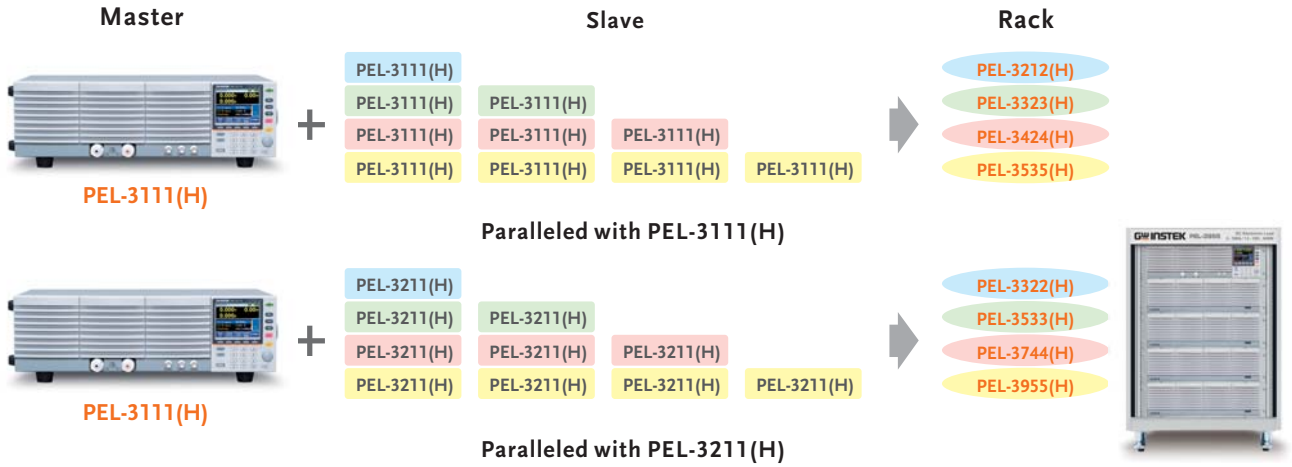
Elapsed Time



Voltage at Cut Off Time

The PEL-3000(H) Series provides count time and cut off time functions. The display screen will show present activation time when electronic load is activated. When electronic load operation is terminated count time will stop and the total operation time will be shown on the display screen.
The activation time of cut off time can be set to the maximum length of 999h 59min 59s. When electronic load is activated this function will start counting time. Electronic load will cease operation (load off) and show the final input voltage on the screen when preset time is reached. Timer function can provides information and application related to time. Users can obtain the total time of limiting electronic load operation to increase the agility of electronic load tests.

M. MATER/SLAVE PARALLEL CONTROL



PEL-3111(H) can be used as either master or Slave. PEL-3111(H) can also be connected in parallel with PEL-3211(H) (Booster unit). Customers, based upon their DUT requirements, can collocate different models to meet their power requirements. The system collocation connection and terminals are all copper bar structure. System Rack is also available. When the Master/Slave control mode is selected, Master will automatically calculate current sunk as soon as load has been activated. The system will automatically distribute current to each Master/Slave unit. For Master/Slave parallel collocation, users only enter settings and edit programs on Master. Logically speaking, Master/Slave parallel collocation can be regarded as one single load unit. Therefore, this collocation can safely provide load capacity with actual current and power in the respective level. Parallel collocation can also meet different current and power requirements.

N. RACK MODEL COLLOCATION AND RATED POWER

Model	PEL-3322	PEL-3533	PEL-3744	PEL-3955
Watt	3150W	5250W	7350W	9450W
Current	0~630A	0~1050A	0~1470A	0~1890A
Collocation	PEL-3111+PEL-3211	PEL-3111+PEL-3211 x 2	PEL-3111+PEL-3211 x 3	PEL-3111+PEL-3211 x 4

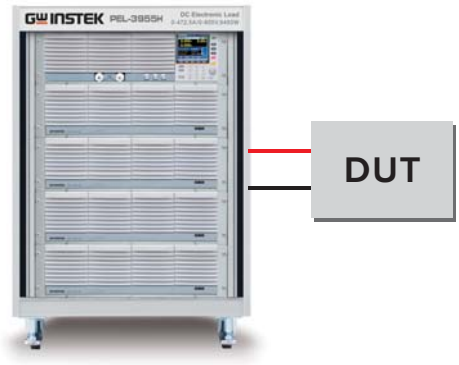
Model	PEL-3322H	PEL-3533H	PEL-3744H	PEL-3955H
Watt	3150W	5250W	7350W	9450W
Current	0~157.5A	0~262.5A	0~367.5A	0~472.5A
Collocation	PEL-3111H+PEL-3211H	PEL-3111H+PEL-3211H x 2	PEL-3111H+PEL-3211H x 3	PEL-3111H+PEL-3211H x 4

Model	PEL-3212	PEL-3323	PEL-3424	PEL-3535
Watt	2100W	3150W	4200W	5250W
Current	0~420A	0~630A	0~840A	0~1050A
Collocation	PEL-3111 x 2	PEL-3111 x 3	PEL-3111 x 4	PEL-3111 x 5

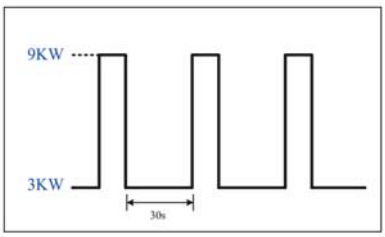
Model	PEL-3212H	PEL-3323H	PEL-3424H	PEL-3535H
Watt	2100W	3150W	4200W	5250W
Current	0~105A	0~157.5A	0~210A	0~262.5A
Collocation	PEL-3111H x 2	PEL-3111H x 3	PEL-3111H x 4	PEL-3111H x 5

O. SUCCESS CASE OF HIGH POWER MODEL IN PARALLEL

Load's Waveform Shown on Right Diagram :



Connection Diagram of Application



Example the Waveform of Load

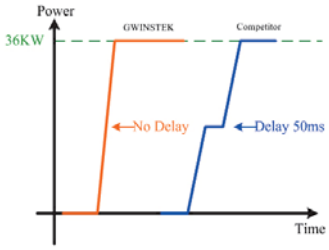
Some large power supply system has a stable load of 3kW under the normal duty operation and its dynamic load of transient peak will reach 9kW. This system uses PEL-3955 to simulate load patterns so as to assist engineers in analyzing and testing DUT. The procedures:

* Select load mode as CC or CP
* Select appropriate operational level: Both I & V range in High
* Select operational mode as Dynamic mode or Sequence
* Set related load arguments sequentially Level1, Level2, Slew Rate and Duration Time
* If Sequence is selected, each segment's load condition must be set according to users' requirements
* Execute load operation

P. HIGH POWER MODEL AUGMENTATION AND PARALLEL

To meet customers' larger sink current, larger power and flexible application of electronic load requirements, the design concept of the PEL-3000 series not only meets the requirement of low power products with high resolution, but also supports the measurement of high power and large current. Single unit of the series can satisfy various load conditions. For higher power requirements, users can consider purchasing additional Slave control system to collocate the system in parallel through system connection. For operating PEL-3955(1.5~150V/1890A/9.45kW), six units of PEL-3955 are arranged in parallel to reach load capacity of 56.7kW. Bus bar connection can guarantee the safety of large power and large current operations.

Q. LARGER POWER MODEL DYNAMIC SYNCHRONIZATION CONTROL

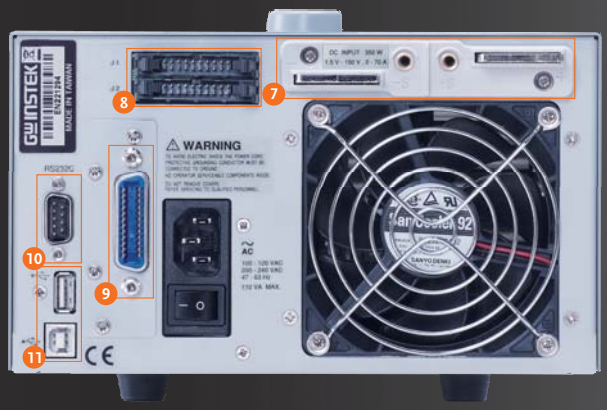


Waveform of power load

To ensure each Rack can execute synchronized parallel load operation and to simulate the real dynamic load operation. The orange curve of the above diagram shows PEL-3955 executing dynamic synchronized control under external parallel. Comparing with other electronic loads in parallel, the PEL-3000 series does not delay. PEL-3955, with its superior performance and distinct characteristics, has been widely used as test and verification equipment in the power test field. In addition to single unit electronic load of 1kW, larger power models have power outputs including 3kW/5kW/7kW/9kW/18kW/27kW/36kW/54kW, which provide the most important test and verification platform for R&D and QA in the fields of server power system, communications power system, hybrid power pack, solar power module.

PANEL INTRODUCTION

CE | USB | GPIB | Analog Control | RS-232



PEL-3000 Series

1. ON / STBY
2. LCD Display
3. Function Keys
4. Operation Key
5. Front Panel Input Terminals
6. I MON, TRIG OUT Terminals
7. Rear Panel Inputs Terminals
8. Frame Control Ports, J1, J2
9. GPIB/LAN
10. RS232C Port
11. USB Port

PEL-3000H Series

1. ON / STBY
2. LCD Display
3. Function Keys
4. Operation Key
5. Front Panel Input Terminals
6. VMON, I MON, TRIG OUT Terminals
7. Rear Panel Inputs Terminals
8. Frame Control Ports, J1, J2
9. GPIB/LAN
10. RS232C Port
11. USB Port
12. Variable Resistors

SPECIFICATIONS

Model			PEL-3021			PEL-3041			PEL-3111			PEL-3211
Voltage Current Power Input Resistance Min. Operating Voltage(DC)(Typ.)			0V~150V 35A 175W 500 kΩ 0.75V@17.5A 1.5V@35A			0V~150V 70A 350W 500 kΩ 0.75V@35A 1.5V@70A			0V~150V 210A 1050W 500 kΩ 0.75V@105A 1.5V@210A			0V~150V 420A 2100W 500 kΩ 0.75V@210A 1.5V@420A
CONSTANT CURRENT MODE												
Operating Range	H,M,L		0~35A	0~3.5A	0~0.35A	0~70A	0~7A	0~0.7A	0~210A	0~21A	0~2.1A	420A
Accuracy of Setting	H,M		±(0.2 % of set + 0.1 % of f.s[*1]) + Vin[*2]/500 kΩ									±(1.2% of set+1.1% of f.s)
Accuracy of Setting	L		±(0.2 % of set + 0.1 % of f.s[*1]) + Vin[*2]/500 kΩ									N/A
Accuracy of Setting(Parallel)			±(1.2% of set +1.1% of f.s.[*3])									±(1.2% of set+1.1% of f.s)
Resolution	H,M,L		1mA	0.1mA	0.01mA	2mA	0.2mA	0.02mA	10mA	1mA	0.1mA	N/A
CR MODE												
Operating Range	Range	H	23.3336S~400μS (42.857mΩ~2.5kΩ)			46.6672S~800μS (21.428mΩ~1.25kΩ)			140.0016S~2.4mS (7.1427mΩ~416.6667Ω)			280.0032s~4.8ms (3.5714mΩ~208.3334Ω)
		M	2.33336S~40μS (428.566mΩ~25kΩ)			4.6667S~80μS (214.28mΩ~12.5kΩ)			14.0001S~242.4μS (71.427mΩ~4.16667kΩ)			28.0032s~484.8μs (35.7135mΩ~2.083334Ω)
		L	0.233336S~4μS (4.28566Ω~250kΩ)			0.46667S~8μS (2.1428Ω~125kΩ)			1.40001S~24.24μS (714.27mΩ~41.6667kΩ)			N/A
Accuracy of Setting	H,M		±(0.5 % of set[*6] + 0.5 % of f.s[*1]) + Vin[*3]/500kΩ									±(1.2% of set +1.1% of f.s)
Accuracy of Setting	L		±(0.5 % of set[*6] + 0.5 % of f.s[*1]) + Vin[*3]/500kΩ									N/A
Parallel			±(1.2 % of set + 1.1 % of f.s[*3])									N/A
Resolution	H,M,L		400μS	40μS	4μS	800μS	80μS	8μS	2.4mS	240μS	24μS	N/A
CONSTANT VOLTAGE MODE												
Operating Range	Range	H	1.5V~150V									1.5V~150V
		L	1.5V~15V									1.5V~15V
Accuracy of Setting	H,L		±(0.1 % of set + 0.1 % of f.s)									N/A
Resolution	H,L		10mV/1mV									
CONSTANT POWER MODE												
Operating Range	Range	H	17.5W~175W			35W~350W			105W~1050W			210W~2100W
		M	1.75W~17.5W			3.5W~35W			10.5W~105W			21W~210W
		L	0.175W~1.75W			0.35W~3.5W			1.05W~10.5W			N/A
Accuracy of Setting	H,M,L		±(0.6 % of set [*5] + 1.4 % of f.s[*3]) + Vin[*2]/500kΩ									N/A
Resolution	H,M,L		10mW	1mW	0.1mW	10mW	1mW	0.1mW	100mW	10mW	1mW	
PARALLEL Mode												
Capacity			875W			1750W			5250W			PEL-3111 with 4 booster units : Max 9.45kW
SLEW RATE												
Operation Mode			CC, CR			CC, CR			CC, CR			N/A
Setting Range (CC mode)	Range	H	2.5mA/μs~2.5A/μs			5mA/μs~5A/μs			16mA/μs~16A/μs			N/A
		M	250μA/μs~250mA/μs			500μA/μs~500mA/μs			1.6mA/μs~1.6A/μs			
		L	25μA/μs~25mA/μs			50μA/μs~50mA/μs			160μA/μs~160mA/μs			
Setting Range (CR Mode)	Range	H	250μA/μs~250mA/μs			500μA/μs~500mA/μs			1.6mA/μs~1.6A/μs			N/A
		M	25μA/μs~25mA/μs			50μA/μs~50mA/μs			160μA/μs~160mA/μs			
		L	2.5μA/μs~2.5mA/μs			5μA/μs~5mA/μs			16μA/μs~16mA/μs			
Accuracy of Setting	H,M,L		±(10 % of set[*9] + 5μs)									N/A
Resolution			1mA(250mA~2.5A/μs) 100μA(25mA~250mA/μs) 10μA(2.5mA~25mA/μs) 1μA(250μA~2.5mA/μs) 100nA(25μA~250μA/μs) 10nA(2.5μA~25μA/μs)			2mA(500mA~5A/μs) 200μA(50mA~500mA/μs) 20μA(5mA~25mA/μs) 2μA(500μA~5mA/μs) 200nA(50μA~500μA/μs) 20nA(5μA~50μA/μs)			6mA(1.6A~16A/μs) 600μA(160mA~1.6A/μs) 60μA(16mA~160mA/μs) 6μA(1.6mA~16mA/μs) 600nA(160μA~1.6mA/μs) 60nA(16μA~160μA/μs)			N/A
METER												
Voltmeter Ammeter Ammeter(Parallel Operation)	Accuracy Accuracy Accuracy		±(0.1 % of rdg + 0.1 % of f.s) ±(0.2 % of rdg + 0.3 % of f.s) ±(1.2% of rdg +1.1% of f.s.)									N/A
DYNAMIC MODE												
Operation Mode T1 & T2 Accuracy			CC , CR and CP 0.025mS~10mS/Res : 1μs ; 1ms~60s/Res : 1ms 100ppm of setting									
Slew Rate (CC Mode)	Range	H	2.5mA/μs~2.5A/μs			5mA/μs~5A/μs			16mA/μs~16A/μs			N/A
		M	250μA/μs~250mA/μs			500μA/μs~500mA/μs			1.6mA/μs~1.6A/μs			
		L	25μA/μs~25mA/μs			50μA/μs~50mA/μs			160μA/μs~160mA/μs			
Slew Rate (CR Mode)	Range	H	250μA/μs~250mA/μs			500μA/μs~500mA/μs			1.6mA/μs~1.6A/μs			N/A
		M	25μA/μs~25mA/μs			50μA/μs~50mA/μs			160μA/μs~160mA/μs			
		L	2.5μA/μs~2.5mA/μs			5μA/μs~5mA/μs			16μA/μs~16mA/μs			
Current Accuracy			±0.4%F.S.			±0.4%F.S.			±0.4%F.S.			±(1.2%of set+1.1% of F.S.)
PROTECTION FUNCTION												
Functions			Overvoltage protection(OVP), Overcurrent protection(OCP), Overpower protection(OPP), Overheat protection(OHP), Undervoltage protection(UVP), Reverse connection protection(REV)									
GENERAL												
Input Range			90VAC~132VAC/180VAC~250VAC Single-phase; 47Hz~63Hz									
Power(Max.)			90VA			110VA			190VA			230VA
Interface			USB/RS232/Analog Control (Standard) ; GPIB/LAN(Option)									
Dimensions & Weight			214.5(W)x124(H)x400(D)mm; Approx. 6kg			214.5(W)x124(H)x400(D)mm; Approx. 7kg			429.5(W)x128(H)x400(D)mm; Approx. 17kg			427.7(W)x128(H)x592.5(D)mm; Approx. 23kg

SPECIFICATIONS

Model			PEL-3212	PEL-3323	PEL-3424	PEL-3535	PEL-3322	PEL-3533	PEL-3744	PEL-3955
Voltage			0V~150V	0V~150V	0V~150V	0V~150V	0V~150V	0V~150V	0V~150V	0V~150V
Current			0~420A	0~630A	0~840A	0~1050A	0~630A	0~1050A	0~1470A	0~1890A
Power			2100W	3150W	4200W	5250W	3150W	5250W	7350W	9450W
Input Resistance			250 kΩ	166.7 kΩ	125 kΩ	100 kΩ	500 kΩ	500 kΩ	500 kΩ	500 kΩ
Min. Operating Voltage(DC)(Typ.)			0.75V@210A 1.5V@420A	0.75V@315A 1.5V@630A	0.75V@420A 1.5V@840A	0.75V@525A 1.5V@1050A	0.75V@315A 1.5V@630A	0.75V@525A 1.5V@1050A	0.75V@735A 1.5V@1470A	0.75V@945A 1.5V@1890A
CONSTANT CURRENT MODE										
Operating Range	H,M,L		0~420A / 0~42A / 0~4.2A	0~630A / 0~63A / 0~6.3A	0~840A / 0~84A / 0~8.4A	0~1050A / 0~105A / 0~10.5A	0~630A / 0~63A / N/A	0~1050A / 0~105A / N/A	0~1470A / 0~147A / N/A	0~1890A / 0~189A / N/A
Accuracy of Setting	H,M,L		±(0.2 % of set + 0.1 % of f.s[*1]) + Vin[*2]/(500/N kΩ)							
Resolution	H,M,L		20mA / 2mA / 0.2mA	30mA / 3mA / 0.3mA	40mA / 4mA / 0.4mA	50mA / 5mA / 0.5mA	30mA / 3mA / N/A	50mA / 5mA / N/A	70mA / 7mA / N/A	90mA / 9mA / N/A
CR MODE										
Operating Range	Range	H	280.0032S~4.8mS (3.57138mΩ~208.333Ω)	420.0048S~7.2mS (2.38092mΩ~138.888Ω)	560.0064S~9.6mS (1.78569mΩ~104.166Ω)	700.008S~12mS (1.42855mΩ~83.3333Ω)	420.0048S~7.2mS (2.38092mΩ~138.888Ω)	700.008S~12mS (1.42855mΩ~83.3333Ω)	980.0112S~16.8mS (1.02039mΩ~59.5238Ω)	1260.0144S~21.6mS (793.641uΩ~46.2963Ω)
		M	28.00032S~480μS (35.7138mΩ~2083.33Ω)	42.00048S~720μS (23.8092mΩ~1388.88Ω)	56.00064S~960μS (17.8569mΩ~1041.66Ω)	70.0008S~1.2mS (14.2855mΩ~833.333Ω)	42.00048S~720μS (23.8092mΩ~1388.88Ω)	70.0008S~1.2mS (14.2855mΩ~833.333Ω)	98.00112S~1.68mS (10.2039mΩ~595.238Ω)	126.00144S~2.16mS (7.93641mΩ~462.963Ω)
		L	2.800032S~48μS (357.138mΩ~20.8333kΩ)	4.200048S~72μS (238.092mΩ~13.8888kΩ)	5.600064S~96μS (178.569mΩ~10.4166kΩ)	7.00008S~120μS (142.855mΩ~8.33333kΩ)	N/A	N/A	N/A	N/A
Accuracy of Setting	H,M,L		±(0.5 % of set[*6] + 0.5 % of f.s[*3]) + Vin[*2]/(500/N kΩ)							
Resolution	H,M,L		4.8mS / 480μS / 48μS	7.2mS / 720μS / 72μS	9.6mS / 960μS / 96μS	12mS / 1.2mS / 120μS	7.2mS / 720μS / –	12mS / 1.2mS / –	16.8mS / 1.68mS / –	21.6mS / 2.16mS / –
CONSTANT VOLTAGE MODE										
Operating Range	Range	H	1.5V~150V							
		L	1.5V~15V							
Accuracy of Setting	H,L		±(0.1 % of set + 0.1 % of f.s)							
Resolution	H,L		10mV/1mV							
CONSTANT POWER MODE										
Operating Range	Range	H	210W~2100W	315W~3150W	420W~4200W	525W~5250W	315W~3150W	525W~5250W	735W~7350W	945W~9450W
		M	21W~210W	31.5W~315W	42W~420W	52.5W~525W	31.5W~315W	52.5W~525W	93.5W~735W	94.5W~945W
		L	2.1W~21W	3.15W~31.5W	4.2W~42W	5.25W~52.5W	N/A	N/A	N/A	N/A
Accuracy of Setting	H,M,L		±(0.6 % of set + 1.4 % of f.s[*3]) + Vin x Vin /(500/N MΩ): alone operation specifications							
Resolution	H,M,L		200mW / 20mW / 2mW	300mW / 30mW / 3mW	400mW / 40mW / 4mW	500mW / 50mW / 5mW	300mW / 30mW / –	500mW / 50mW / –	700mW / 70mW / –	900mW / 90mW / –
PARALLEL Mode										
Capacity			–	–	–	–	–	–	–	–
SLEW RATE										
Operation Mode			CC, CR	CC, CR	CC, CR	CC, CR	CC, CR	CC, CR	CC, CR	CC, CR
Setting Range (CC mode)	Range	H	32mA/μs~16A/μs	48mA/μs~16A/μs	64mA/μs~16A/μs	80mA/μs~16A/μs	48mA/μs~16A/μs	80mA/μs~16A/μs	112mA/μs~16A/μs	144mA/μs~16A/μs
		M	3.2mA/μs~1.6A/μs	4.8mA/μs~1.6A/μs	6.4mA/μs~1.6A/μs	8mA/μs~1.6A/μs	4.8mA/μs~1.6A/μs	8mA/μs~1.6A/μs	11.2mA/μs~1.6A/μs	14.4mA/μs~1.6A/μs
		L	320μA/μs~160mA/μs	480μA/μs~160mA/μs	640μA/μs~160mA/μs	800μA/μs~160mA/μs	N/A	N/A	N/A	N/A
Setting Range (CR Mode)	Range	H	3.2mA/μs~1.6A/μs	4.8mA/μs~1.6A/μs	6.4mA/μs~1.6A/μs	8mA/μs~1.6A/μs	4.8mA/μs~1.6A/μs	8mA/μs~1.6A/μs	11.2mA/μs~1.6A/μs	14.4mA/μs~1.6A/μs
		M	320μA/μs~160mA/μs	480μA/μs~160mA/μs	640μA/μs~160mA/μs	800μA/μs~160mA/μs	480μA/μs~160mA/μs	800μA/μs~160mA/μs	1.12mA/μs~160mA/μs	1.44mA/μs~160mA/μs
		L	32μA/μs~16mA/μs	48μA/μs~16mA/μs	64μA/μs~16mA/μs	80μA/μs~16mA/μs	N/A	N/A	N/A	N/A
Accuracy of Setting	H,M,L		±(10 % of set[*9] + 5μs)							
Resolution			12mA(1.6A~16A/μs) 1.2mA(160mA~1.6A/μs) 120μA(16mA~160mA/μs) 12μA(1.6mA~16mA/μs) 1.2μA(160μA~1.6mA/μs) 120nA(16μA~160μA/μs)	18mA(1.6A~16A/μs) 1.8mA(160mA~1.6A/μs) 180μA(16mA~160mA/μs) 18μA(1.6mA~16mA/μs) 1.800μA(160μA~1.6mA/μs) 180nA(16μA~160μA/μs)	24mA/μs(1.6A~16A/μs) 2.4mA/μs(160mA~1.6A/μs) 240μA/μs(16mA~160mA/μs) 24μA/μs(1.6mA~16mA/μs) 2.4μA/μs(160μA~1.6mA/μs) 240nA/μs(16μA~160μA/μs)	30mA(1.6A~16A/μs) 3mA(160mA~1.6A/μs) 300μA(16mA~160mA/μs) 30μA(1.6mA~16mA/μs) 3μA(160μA~1.6mA/μs) 300nA(16μA~160μA/μs)	18mA(1.6A~16A/μs) 1.8mA(160mA~1.6A/μs) 180μA(16mA~160mA/μs) 18μA(1.6mA~16mA/μs) 1.8μA(160μA~1.6mA/μs) N/A	30mA(1.6A~16A/μs) 3mA(160mA~1.6A/μs) 300μA(16mA~160mA/μs) 30μA(1.6μA~16mA/μs) 3μA(160μA~1.6mA/μs) N/A	42mA(1.6A~16A/μs) 4.2mA(160mA~1.6A/μs) 420μA(16mA~160mA/μs) 42μA(1.6mA~16mA/μs) 4.2μA(160μA~1.6mA/μs) N/A	54mA(1.6A~16A/μs) 5.4mA(160mA~1.6A/μs) 540μA(16mA~160mA/μs) 54μA(1.6mA~16mA/μs) 5.4μA(160μA~1.6mA/μs) N/A
METER										
Voltmeter Accuracy	Accuracy		±(0.1 % of rdg + 0.1 % of f.s)							
Ammeter Accuracy	Accuracy		±(0.2 % of rdg + 0.3 % of f.s)							
DYNAMIC MODE										
Operation Mode T1 & T2 Accuracy			CC and CR 0.025mS~10mS/Res : 1μs ; 1mS~30S/Res : 1mS 1μS/1ms ± 100ppm							
Slew Rate (CC Mode)	Range	H	32mA/μs~16A/μs	48mA/μs~16A/μs	64mA/μs~16A/μs	80mA/μs~16A/μs	48mA/μs~16A/μs	80mA/μs~16A/μs	112mA/μs~16A/μs	144mA/μs~16A/μs
		M	3.2mA/μs~1.6mA/μs	4.8mA/μs~1.6A/μs	6.4mA/μs~1.6A/μs	8mA/μs~1.6A/μs	4.8mA/μs~1.6A/μs	8mA/μs~1.6A/μs	11.2mA/μs~1.6A/μs	14.4mA/μs~1.6A/μs
		L	320μA/μs~160mA/μs	480μA/μs~160mA/μs	640μA/μs~160mA/μs	800μA/μs~160mA/μs	N/A	N/A	N/A	N/A
Slew Rate (CR Mode)	Range	H	3.2mA/μs~1.6A/μs	4.8mA/μs~1.6A/μs	6.4mA/μs~1.6A/μs	8mA/μs~1.6A/μs	4.8mA/μs~1.6A/μs	8mA/μs~1.6A/μs	11.2mA/μs~1.6A/μs	14.4mA/μs~1.6A/μs
		M	320μA/μs~160mA/μs	480μA/μs~160mA/μs	640μA/μs~160mA/μs	800μA/μs~160mA/μs	480μA/μs~160mA/μs	800μA/μs~160mA/μs	1.12mA/μs~160mA/μs	1.44mA/μs~160mA/μs
		L	32μA/μs~16mA/μs	48μA/μs~16mA/μs	64μA/μs~16mA/μs	80μA/μs~16mA/μs	N/A	N/A	N/A	N/A
Current Accuracy			±0.4%F.S.	±0.4%F.S.	±0.4%F.S.	±0.4%F.S.	±0.4%F.S.	±0.4%F.S.	±0.4%F.S.	±0.4%F.S.
PROTECTION FUNCTION										
Functions			Overvoltage protection(OVP), Overcurrent protection(OCP), Overpower protection(OPP), Overheat protection(OHP), Undervoltage protection(UVP), Reverse connection protection(REV)							
GENERAL										
Input Range			90VAC~132VAC/180VAC~250VAC Single-phase; 47Hz~63Hz							
Power(Max.)			380VA	570VA	760VA	950VA	420VA	650VA	880VA	1110VA
Interface			USB/RS232/Analog Control (Standard) ; GPIB/LAN(Option)							
Dimensions & Weight			598(W)x877(H)x706(D)mm; Approx. 67.5kg	598(W)x877(H)x706(D)mm; Approx. 85.5kg	598(W)x877(H)x706(D)mm; Approx. 110kg	598(W)x877(H)x706(D)mm; Approx. 127.5kg	598(W)x877(H)x706(D)mm; Approx. 73kg	598(W)x877(H)x706(D)mm; Approx. 96.5kg	598(W)x877(H)x706(D)mm; Approx. 125kg	598(W)x877(H)x706(D)mm; Approx. 149kg

SPECIFICATIONS

Model			PEL-3021H			PEL-3041H			PEL-3111H			PEL-3211H		
Voltage Current Power Input Resistance Min. Operating Voltage(DC)(Typ.)			0V~800V 8.75A 175W 3.24MΩ 5V@8.75A 2.5V@4.375A			0V~800V 17.5A 350W 3.24MΩ 5V@17.5A 2.5V@8.75A			0V~800V 52.5A 1050W 3.24MΩ 5V@52.5A 2.5V@26.25A			0V~800V 105A 2100W 3.24MΩ 5V@105A 2.5V@52.5A		
CONSTANT CURRENT MODE														
Operating Range	H,M,L		0~8.75A	0~875mA	0~87.5mA	0~17.5A	0~1.75A	0~175mA	0~52.5A	0~5.25A	0~525mA	0~105A	0~10.5A	0~1.05A
Accuracy of Setting	H,M		±(0.2 % of set + 0.1 % of f.s[*1]) + Vin[*2]/3.24MΩ									±(1.2% of set+1.1% of f.s)		
Accuracy of Setting	L		±(0.2 % of set + 0.1 % of f.s[*1]) + Vin[*2]/3.24MΩ									N/A		
Accuracy of Setting(Parallel)			±(1.2% of set +1.1% of f.s.[*3])									N/A		
Resolution	H,M,L		300μA	30μA	3μA	0.6mA	60μA	6μA	2mA	200μA	20μA	N/A		
CR MODE														
Operating Range	Range	H	1.75S~30μS (571mΩ~33.3kΩ)			3.5S~60μS (285mΩ~16.6kΩ)			10.5S~180μS (95.2mΩ~5.55kΩ)			21S~360μS (47.6mΩ~2.777kΩ)		
		M	175mS~3μS (5.71Ω~333kΩ)			350mS~6μS (2.85Ω~166kΩ)			1.05S~18μS (952mΩ~55.5kΩ)			2.1S~36μS (476mΩ~27.77kΩ)		
		L	17.5mS~0.3μS (57.1Ω~3.33MΩ)			35mS~0.6μS (28.5Ω~1.66MΩ)			105mS~1.8μS (9.52Ω~555kΩ)			210mS~3.6μS (4.762Ω~277.7kΩ)		
Accuracy of Setting	H,M		±(0.5% set + 0.5% f.S[*1]) + Vin[*2]/3.24MΩ									±(1.2% of set +1.1% of f.s)TYP		
Accuracy of Setting	L		±(0.5% set + 0.5% f.S[*1]) + Vin[*2]/3.24MΩ									N/A		
Parallel			±(1.2 % of set + 1.1 % of f.s[*3])									N/A		
Resolution	H,M,L		30μS	3μS	0.3μS	60μS	6μS	0.6μS	180μS	18μS	1.8μS	N/A		
CONSTANT VOLTAGE MODE														
Operating Range	Range	H	5V~800V									5V~800V		
		L	5V~80V									5V~80V		
Accuracy of Setting	Range	H,L	±(0.2% of set + 0.2% of f.s)									±(0.2% of set + 0.2% of f.s)		
	Parallel	TYP	±(0.2% of set + 0.2% of f.s)									±(0.2% of set + 0.2% of f.s)		
Resolution	Range	H,L	20mV/2mV									N/A		
CONSTANT POWER MODE														
Operating Range	Range	H	17.5W~175W			35W~350W			105W~1050W			210W~2100W		
		M	1.75W~17.5W			3.5W~35W			10.5W~105W			21W~210W		
		L	0.175W~1.75W			0.35W~3.5W			1.05W~10.5W			2.1W~21W		
Accuracy of Setting	H,M		±(0.6 % of set + 1.4 % of f.s)+Vin/3.24MΩ									±(5 % of f.s)TYP		
Resolution	H,M,L		10mW	1mW	0.1mW	10mW	1mW	0.1mW	100mW	10mW	1mW	N/A		
PARALLEL Mode														
Capacity			875W			1750W			5250W			PEL-3111H with 4 booster units : Max 9.45kW		
SLEW RATE														
Operation Mode			CC, CR			CC, CR			CC, CR			N/A		
Setting Range (CC mode)	Range	H	0.14mA/μs~140mA/μs			0.280mA/μs~280.0mA/μs			0.840mA/μs~840mA/μs			N/A		
		M	0.014μA/μs~14mA/μs			0.0280mA/μs~28.00mA/μs			0.0840mA/μs~84.00mA/μs					
		L	1.4μA/μs~1400μA/μs			2.80μA/μs~2800μA/μs			0.00840mA/μs~8.400mA/μs					
Setting Range (CR Mode)	Range	H	0.014mA/μs~14mA/μs			0.0280mA/μs~28.00mA/μs			0.0840mA/μs~84.00mA/μs			N/A		
		M	0.0014mA/μs~1.4mA/μs			0.00280mA/μs~2.800mA/μs			0.00840mA/μs~8.400mA/μs					
		L	0.14μA/μs~140μA/μs			0.280μA/μs~280.0μA/μs			0.000840mA/μs~0.8400mA/μs					
Accuracy of Setting	H,M,L		±(10 % of set + 25μs)									N/A		
Resolution			50μA(14mA~140mA/μs) 5μA(1.4mA~14mA/μs) 0.5μA(140μA~1.4mA/μs) 50nA(14μA~140μA/μs) 5nA(1.4μA~14μA/μs) 0.5nA(0.14μA~1.4μA/μs)			100μA(28mA~280mA/μs) 10μA(2.8mA~28mA/μs) 1μA(280μA~2.8mA/μs) 0.1μA(28μA~280μA/μs) 10nA(2.8μA~28μA/μs) 1nA(0.28μA~2.8μA/μs)			300μA(84mA~0.84A/μs) 30μA(8.4mA~84mA/μs) 3μA(840μA~8.4mA/μs) 0.3μA(84μA~840μA/μs) 30nA(8.4μA~84μA/μs) 3nA(0.84μA~8.4μA/μs)			N/A		
METER														
Voltmeter Ammeter Ammeter(Parallel Operation)	Accuracy Accuracy Accuracy		±(0.1 % of rdg + 0.1 % of f.s) ±(0.2 % of rdg + 0.3 % of f.s) ±(1.2% of rdg +1.1% of f.s.)									±(0.1 % of rdg + 0.1 % of f.s)TYP N/A ±(1.2% of rdg +1.1% of f.s.)TYP		
DYNAMIC MODE														
Operation Mode T1 & T2 Accuracy			CC, CR, CP 0.025mS~10mS/Res : 1μs ; 10ms~30s/Res : 1ms ± 100ppm of setting									N/A N/A ± 100ppm of setting		
Slew Rate (CC Mode)	Range	H	0.140mA/μs~140.0mA/μs			0.280mA/μs~280.0mA/μs			0.840mA/μs~840.0mA/μs			N/A		
		M	0.014mA/μs~14.00mA/μs			0.028mA/μs~28.00mA/μs			0.084mA/μs~84.00mA/μs					
		L	1.400μA/μs~1400.0μA/μs			2.800μA/μs~2800μA/μs			0.0084mA/μs~8.400mA/μs					
Slew Rate (CR Mode)	Range	H	0.014mA/μs~14.000mA/μs			0.028mA/μs~28.00mA/μs			0.084mA/μs~84.00mA/μs			N/A		
		M	0.0014mA/μs~1.4000mA/μs			2.8μA/μs~2.800mA/μs			0.0084mA/μs~8.400mA/μs					
		L	0.1400μA/μs~140.00μA/μs			0.280μA/μs~280.0μA/μs			0.00084mA/μs~0.8400mA/μs					
Current Accuracy			±0.4%F.S.			±0.4%F.S.			±0.4%F.S.			±0.4%F.S.		
PROTECTION FUNCTION														
Functions			Overvoltage protection(OVP), Overcurrent protection(OCP), Overpower protection(OPP), Overheat protection(OHP), Undervoltage protection(UVP), Reverse connection protection(REV)											
GENERAL														
Input Range			90VAC~132VAC/180VAC~250VAC Single-phase; 47Hz~63Hz											
Power(Max.)			90VA			110VA			190VA			230VA		
Interface			Std : USB/RS232/Analog Control ; Opt : GPIB/LAN											
Dimensions & Weight			213.8(W)x124(H)x400.5(D)mm; Approx. 6kg			213.8(W)x124(H)x400.5(D)mm; Approx. 7kg			427.8(W)x124(H)x400.5(D)mm; Approx. 17kg			427.7(W)x127.8(H)x553.5(D)mm; Approx. 23kg		

SPECIFICATIONS

Model			PEL-3212H	PEL-3323H	PEL-3424H	PEL-3535H	PEL-3322H	PEL-3533H	PEL-3744H	PEL-3955H
Voltage			0V~800V	0V~800V	0V~800V	0V~800V	0V~800V	0V~800V	0V~800V	0V~800V
Current			0~105A	0~157.5A	0~210A	0~262.5A	0~157.5A	0~262.5A	0~367.5A	0~472.5A
Power			2100W	3150W	4200W	5250W	3150W	5250W	7350W	9450W
Input Resistance			1.62MΩ	1.08MΩ	0.81MΩ	0.648MΩ	3.24MΩ	3.24MΩ	3.24MΩ	3.24MΩ
Min. Operating Voltage(DC)(Typ.)			2.5V@52.5A	2.5V@78.75A	2.5V@105A	2.5V@131.25A	2.5V@78.75A	2.5V@131.25A	2.5V@183.75A	2.5V@236.25A
CONSTANT CURRENT MODE										
Operating Range	H,M,L		0~105A / 0~10.5A / 0~1.05A	0~157.5A / 0~15.75A / 0~1.575A	0~210A / 0~21A / 0~2.1A	0~262.5A / 0~26.25A / 0~2.625A	0~157.5A / 0~15.75A / 0~1.575A	0~262.5A / 0~26.25A / 0~2.625A	0~367.5A / 0~36.75A / 0~3.675A	0~472.5A / 0~47.25A / 0~4.725A
Accuracy of Setting	H,M,L		±(0.2 % of set + 0.1 % of f.s[*1]) + Vin[*2]/(3.24 / N) MΩ[*3]				±(1.2 % of set + 1.1 % of f.s[*1]) + Vin[*2]/3.24MΩ[*3]			
Resolution	H,M,L		4mA / 0.4mA / 0.04mA	6mA / 0.6mA / 0.06mA	8mA / 0.8mA / 0.08mA	10mA / 1mA / 0.1mA	6mA / 0.6mA / 0.06mA	10mA / 1mA / 0.1mA	14mA / 1.4mA / 0.14mA	18mA / 1.8mA / 0.18mA
CR MODE										
Operating Range[*4]	Range	H	21S~360μS (47.619mΩ~ 2.778kΩ)	31.5S~540μS (31.746mΩ~ 1.85185kΩ)	42S~0.72mS (23.8095mΩ~ 1.3889kΩ)	52.5S~0.9mS (19.0476mΩ~ 1.11111kΩ)	31.5S~540μS (31.746mΩ~ 1.85185kΩ)	52.5S~0.9mS (19.0476mΩ~ 1.11111kΩ)	73.5S~1.26mS (13.6054mΩ~ 793.651Ω)	94.5S~1.26mS (10.582mΩ~ 617.284Ω)
		M	2.1S~36μS (476.19mΩ~ 27.778kΩ)	3.15S~540μS (317.46mΩ~ 18.5185kΩ)	4.2S~0.72mS (238.095mΩ~ 13.8889kΩ)	5.25S~0.9mS (190.476mΩ~ 11.1111kΩ)	3.15S~540μS (317.46mΩ~ 18.5185kΩ)	5.25S~90μS (190.476mΩ~ 11.1111kΩ)	7.35S~126μS (136.054mΩ~ 7.93651kΩ)	9.45S~126μS (105.82mΩ~ 6.17284kΩ)
		L	210mS~3.6μS (4.7619Ω~ 277.78kΩ)	315mS~540μS (3.1746Ω~ 185.185kΩ)	420mS~0.72mS (2.38095Ω~ 138.888kΩ)	525mS~0.9mS (1.90476Ω~ 111.111kΩ)	315mS~540μS (3.1746Ω~ 185.185kΩ)	525mS~9μS (1.90476Ω~ 111.111kΩ)	735mS~12.6μS (1.36054Ω~ 79.365kΩ)	945mS~162μS (1.0582Ω~ 61.7284kΩ)
Accuracy of Setting[*5]	H,M,L		±(0.5 % of set[*6] + 0.5 % of f.s[*1]) + Vin[*2]/(3.24 / N MΩ) : Alone operation specifications							
Resolution			360μS / 36μS / 3.6μS	540μS / 54μS / 5.4μS	720μS / 72μS / 7.2μS	900μS / 90μS / 9μS	540μS / 54μS / 5.4μS	900μS / 90μS / 9μS	1.26mS / 126μS / 12.6μS	1.62mS / 162μS / 16.2μS
CONSTANT VOLTAGE MODE										
Operating Range	Range	H	5V~800V							
		L	5V~80V							
Accuracy of Setting[*7]	Range	H,L	±(0.2 % of set + 0.2 % of f.s)							
Resolution	Range	H,L	20mV/2mV							
CONSTANT POWER MODE										
Operating Range	Range	H	0W~2100W	0W~3150W	0W~4200W	0W~5250W	0W~3150W	0W~5250W	0W~7350W	0W~9450W
		M	0W~210W	0W~315W	0W~420W	0W~525W	0W~315W	0W~525W	0W~735W	0W~945W
		L	0W~21W	0W~31.5W	0W~42W	0W~52.5W	0W~31.5W	0W~52.5W	0W~73.5W	0W~94.5W
Accuracy of Setting[*8]	H,M,L		±(0.6 % of set + 1.4 % of f.s[*3]) + Vin x Vin[*3]/(3.24 / N MΩ) : Alone operation specifications							
Resolution			200mW / 20mW / 2mW	300mW / 30mW / 3mW	400mW / 40mW / 4mW	500mW / 50mW / 5mW	300mW / 30mW / 3mW	500mW / 50mW / 5mW	700mW / 70mW / 7mW	900mW / 90mW / 9mW
PARALLEL Mode										
Capacity			–	–	–	–	–	–	–	–
SLEW RATE										
Operation Mode			CC, CR	CC, CR	CC, CR	CC, CR	CC, CR	CC, CR	CC, CR	CC, CR
Setting Range (CC mode)	Range	H	1.68mA/μs~840mA/μs	2.52mA/μs~839.7mA/μs	3.36mA/μs~840mA/μs	4.2mA/μs~840mA/μs	2.52mA/μs~839.70mA/μs	4.2mA/μs~840mA/μs	5.88mA/μs~840mA/μs	7.56mA/μs~839.7mA/μs
		M	168μA/μs~84mA/μs	252μA/μs~83.97mA/μs	336μA/μs~84mA/μs	420μA/μs~84mA/μs	252μA/μs~83.97mA/μs	420μA/μs~84mA/μs	588μA/μs~84mA/μs	756μA/μs~83.97mA/μs
		L	16.8μA/μs~8.4mA/μs	25.2μA/μs~8.397mA/μs	33.6μA/μs~8.4mA/μs	42μA/μs~8.4mA/μs	25.2μA/μs~8.397mA/μs	42μA/μs~8.4mA/μs	58.8μA/μs~8.4mA/μs	75.6μA/μs~8.397mA/μs
Setting Range (CR Mode)	Range	H	168μA/μs~84mA/μs	252μA/μs~83.97mA/μs	336μA/μs~84mA/μs	420μA/μs~84mA/μs	252μA/μs~83.97mA/μs	420μA/μs~84mA/μs	588μA/μs~84mA/μs	756μA/μs~83.97mA/μs
		M	16.8μA/μs~8.4mA/μs	25.2μA/μs~8.397mA/μs	33.6μA/μs~8.4mA/μs	42μA/μs~8.4mA/μs	25.2μA/μs~8.397mA/μs	42μA/μs~8.4mA/μs	58.8μA/μs~8.4mA/μs	75.6μA/μs~8.397mA/μs
		L	1.68μA/μs~840μA/μs	2.52μA/μs~839.7μA/μs	3.36μA/μs~840μA/μs	4.2μA/μs~840μA/μs	2.52μA/μs~839.7μA/μs	4.2μA/μs~840μA/μs	5.88μA/μs~840μA/μs	7.56μA/μs~839.7μA/μs
Accuracy of Setting[*9]	H,M,L		±(10 % of set + 25μs)							
Resolution			600μA(168mA~840mA/μs) 60μA(16.8mA~84mA/μs) 6μA(1.68mA~8.4mA/μs) 600nA(0.1680mA~84mA/μs) 60nA(0.01680mA~8.4mA/μs) 6nA(0.00168mA~0.84mA/μs)	900μA(252mA~839.7mA/μs) 90μA(25.2mA~83.97mA/μs) 9μA(2.52mA~8.397mA/μs) 900nA(252nA~83.97mA/μs) 90nA(25.2μA~8.397μA/μs) 9nA(2.52μA~0.8397μA/μs)	1.2mA(336mA~840mA/μs) 120μA(33.6mA~84mA/μs) 12μA(3.36mA~8.4mA/μs) 1.2μA(336μA~84mA/μs) 120nA(33.6μA~8.4mA/μs) 12nA(3.36μA~0.84mA/μs)	1.5mA(420mA~840mA/μs) 150μA(42mA~84mA/μs) 15μA(4.2mA~8.4mA/μs) 1.5μA(420μA~84mA/μs) 150nA(42μA~8.4mA/μs) 15nA(4.2μA~0.84mA/μs)	900μA(252mA~839.7mA/μs) 90μA(25.2mA~83.97mA/μs) 9μA(2.52mA~8.397mA/μs) 900nA(252nA~83.97mA/μs) 90nA(25.2μA~8.397mA/μs) 9nA(2.52μA~0.8397mA/μs)	1.5mA(420mA~840mA/μs) 150μA(42mA~84mA/μs) 15μA(4.2mA~8.4mA/μs) 1.5μA(420μA~84mA/μs) 150nA(42μA~8.4mA/μs) 15nA(4.2μA~0.84mA/μs)	2.1mA(588mA~840mA/μs) 210μA(58.8mA~84mA/μs) 21μA(5.88mA~8.4mA/μs) 2.1μA(588μA~84mA/μs) 210nA(58.8μA~8.4mA/μs) 21nA(5.88μA~0.84mA/μs)	2.7mA(756mA~839.70mA/μs) 270μA(75.6mA~83.974mA/μs) 27μA(7.56mA~8.397mA/μs) 2.7μA(756μA~83.97mA/μs) 270nA(75.6μA~8.397mA/μs) 27nA(7.56μA~0.8397mA/μs)
METER										
Voltmeter	Accuracy		±(0.1 % of rdg + 0.1 % of f.s)							
Ammeter	Accuracy		±(1.2 % of rdg + 1.1 % of f.s)							
DYNAMIC MODE										
Operation Mode T1 & T2 Accuracy			CC and CR 0.025mS~10mS/Res : 1μs ; 10mS~30S/Res : 1mS 1μS/1ms ± 100ppm							
Slew Rate (CC Mode)	Range	H	1.68mA/μs~840mA/μs	2.52mA/μs~839.7mA/μs	3.36mA/μs~840mA/μs	4.2mA/μs~840mA/μs	2.52mA/μs~839.7mA/μs	4.2mA/μs~840mA/μs	5.88mA/μs~840mA/μs	7.56mA/μs~839.7mA/μs
		M	168μA/μs~84mA/μs	252μA/μs~83.97mA/μs	336μA/μs~84mA/μs	420μA/μs~84mA/μs	252μA/μs~83.97mA/μs	420μA/μs~84mA/μs	588μA/μs~84mA/μs	756μA/μs~83.97mA/μs
		L	16.8μA/μs~8.4mA/μs	25.2μA/μs~8.397mA/μs	33.6μA/μs~8.4mA/μs	42μA/μs~8.4mA/μs	25.2μA/μs~8.397mA/μs	42μA/μs~8.4mA/μs	58.8μA/μs~8.4mA/μs	75.6μA/μs~8.397mA/μs
Slew Rate (CR Mode)	Range	H	168μA/μs~8.4mA/μs	252μA/μs~83.97mA/μs	336μA/μs~84mA/μs	420μA/μs~84mA/μs	252μA/μs~83.97mA/μs	420μA/μs~84mA/μs	588μA/μs~84mA/μs	756μA/μs~83.97mA/μs
		M	16.8μA/μs~8.4mA/μs	25.2μA/μs~8.397mA/μs	33.6μA/μs~8.4mA/μs	42μA/μs~8.4mA/μs	25.2μA/μs~8.397mA/μs	42μA/μs~8.4mA/μs	58.8μA/μs~8.4mA/μs	75.6μA/μs~8.397mA/μs
		L	1.68μA/μs~840μA/μs	2.52μA/μs~839.7μA/μs	3.36μA/μs~840μA/μs	4.2μA/μs~840μA/μs	2.52μA/μs~839.7μA/μs	4.2μA/μs~840μA/μs	5.88μA/μs~840μA/μs	7.56μA/μs~839.7μA/μs
Current Accuracy			±0.4%F.S.	±0.4%F.S.	±0.4%F.S.	±0.4%F.S.	±0.4%F.S.	±0.4%F.S.	±0.4%F.S.	±0.4%F.S.
PROTECTION FUNCTION										
Functions			Overvoltage protection(OVP), Overcurrent protection(OCP), Overpower protection(OPP), Overheat protection(OHP), Undervoltage protection(UVP), Reverse connection protection(REV)							
GENERAL										
Input Range			90VAC~132VAC/180VAC~250VAC Single-phase; 47Hz~63Hz							
Power(Max.)			380VA	570VA	760VA	950VA	420VA	650VA	880VA	1110VA
Interface			Std : USB/RS232/Analog Control ; Opt. : GPIB/LAN							
Dimensions & Weight			598(W)x877(H)x 706(D)mm; Approx. 67.5kg	598(W)x877(H)x 706(D)mm; Approx. 85.5kg	598(W)x877(H)x 706(D)mm; Approx. 110kg	598(W)x877(H)x 706(D)mm; Approx. 127.5kg	598(W)x877(H)x 706(D)mm; Approx. 73kg	598(W)x877(H)x 706(D)mm; Approx. 96.5kg	598(W)x877(H)x 706(D)mm; Approx. 125kg	598(W)x877(H)x 706(D)mm; Approx. 149kg

Note: *1. Full scale of H range
*2. Vin: input terminal voltage of electronic load
*3. M range applies to the full scale of H range
*4. Siemens[S] = Input current[A] / Input voltage[V] = 1/resistance[Ω]
*5. Converted value at the input current. At the input current. It is not applied for the condition of the parallel operation.
*6. set = Vin/Rset
*7. At the sensing point during remote sensing under the operating range of the input voltage. It is also applied for the condition of the parallel operation.
*8. It is not applied for the condition of the parallel operation.
*9. Time to reach from 10 % to 90 % when the current is varied from 2 % to 100 % (20 % to 100 % in M range) of the rated current.
*10. N = Number of units in parallel (same model)
*11. N = Number of units in parallel (same model) or N = 1 + 2 x (Number of units in parallel [PEL-3211])

ORDERING INFORMATION

PEL-3021	(150V/35A/175W) Single-Channel Programmable D.C. Electronic Load
PEL-3041	(150V/70A/350W) Single-Channel Programmable D.C. Electronic Load
PEL-3111	(150V/210A/1050W) Single-Channel Programmable D.C. Electronic Load
PEL-3211	(150V/420A/2100W) 2100W Booster for PEL-3111 only
PEL-3212	(150V/420A/2100W) Single-Channel Programmable D.C. Electronic Load
PEL-3322	(150V/630A/3150W) Single-Channel Programmable D.C. Electronic Load
PEL-3323	(150V/630A/3150W) Single-Channel Programmable D.C. Electronic Load
PEL-3424	(150V/840A/4200W) Single-Channel Programmable D.C. Electronic Load
PEL-3533	(150V/1050A/5250W) Single-Channel Programmable D.C. Electronic Load
PEL-3535	(150V/1050A/5250W) Single-Channel Programmable D.C. Electronic Load
PEL-3744	(150V/1470A/7350W) Single-Channel Programmable D.C. Electronic Load
PEL-3955	(150V/1890A/9450W) Single-Channel Programmable D.C. Electronic Load
PEL-3021H	(800V/8.75A/175W) Single-Channel Programmable D.C. Electronic Load
PEL-3041H	(800V/17.5A/350W) Single-Channel Programmable D.C. Electronic Load
PEL-3111H	(800V/52.5A/1050W) Single-Channel Programmable D.C. Electronic Load
PEL-3211H	(800V/105A/2100W) 2100W Booster for PEL-3111H only
PEL-3212H	(800V/105A/2100W) Single-Channel Programmable D.C. Electronic Load
PEL-3322H	(800V/157.5A/3150W) Single-Channel Programmable D.C. Electronic Load
PEL-3323H	(800V/157.5A/3150W) Single-Channel Programmable D.C. Electronic Load
PEL-3424H	(800V/210A/4200W) Single-Channel Programmable D.C. Electronic Load
PEL-3533H	(800V/262.5A/5250W) Single-Channel Programmable D.C. Electronic Load
PEL-3535H	(800V/262.5A/5250W) Single-Channel Programmable D.C. Electronic Load
PEL-3744H	(800V/367.5A/7350W) Single-Channel Programmable D.C. Electronic Load
PEL-3955H	(800V/472.5A/9450W) Single-Channel Programmable D.C. Electronic Load

ACCESSORIES

Quick Start Guide
CD (User Manual/Programming Manual)
Power Cord
PEL-011 Load Input Terminal Cover
PEL-012 Terminal Fittings Kits
PEL-013 Flexible Terminal Cover
PEL-014 J1/J2 Protection Plug
Front Terminal Washers
GTL-255 Frame Link Cable 300mm

OPTIONAL ACCESSORIES

CR123A	3V Lithium Battery for Clock.
GRA-413	Rack Mount Bracket for Booster PEL-3211(H) (EIA+JIS)
GRA-414-E	Rack Mount Frame for PEL-3021(H),PEL-3041(H),PEL-3111(H)/EIA
GRA-414-J	Rack Mount Frame for PEL-3021(H),PEL-3041(H),PEL-3111(H)/JIS
GTL-120	Test Lead (Max. 40A)
GTL-248	GPIB Cable, 2.0m
GTL-246	USB Cable Type A- Type B
PEL-010	Dust Filter
PEL-004	GPIB Option
PEL-005	Connect Cu Plate
PEL-006	Connect Cu Plate
PEL-007	Connect Cu Plate
PEL-008	Connect Cu Plate
PEL-009	Connect Cu Plate
PEL-018	LAN Card

FREE DOWNLOAD

Driver	LabView Driver

Specifications subject to change without notice. PEL-3000/3000HGD1BH

PEL-3000 SERIES

PEL-3322(H)

PEL-3533(H)

PEL-3744(H)

PEL-3955(H)

PEL-3212(H)

PEL-3323(H)

PEL-3424(H)

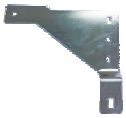
PEL-3535(H)

PEL-005 Connect Cu Plate

PEL-006 Connect Cu Plate

PEL-007 Connect Cu Plate

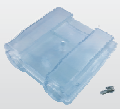
PEL-008 Connect Cu Plate



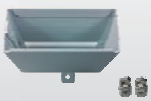
PEL-009 Connect Cu Plate

PEL-018 LAN Card

PEL-011 Load Input Terminal Cover

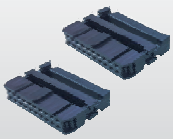


PEL-012 Terminal Fittings Kits



PEL-013 Flexible Terminal Cover

PEL-014 J1/J2 Protection Plug



GTL-255 Frame Link Cable

GTL-120 Test Lead

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

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

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

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

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

India Subsidiary
GW INSTEK INDIA LLP.
No.2707/B&C, 1st Floor UNNATHI Building,
E-Block, Sahakara Nagar, Bengaluru-560 092. India
T +91-80-6811-0600 **F** +91-80-6811-0626

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