

GW Instek

PEL-3000H Series Programmable DC Electronic Load

New Product Announcement



This document allows GW Instek's partners to quickly grasp product's main features, FAB and ordering information.

GW Instek introduces new PEL-3000H 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 batteries for electrical tools, battery module and automobile battery, PEL-3000H has three stand-alone models to offer including 175W, 350W and 1050W. By connecting Booster (2100W) units with master units, the maximum load capacity of those models can reach 9,450W. Hence, the PEL-3000H series fulfils various power testing requirements including medium to low-power or high-power power supply.

The PEL-3000H 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-3000H 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 adjustable high speed Slew Rate of 0.84A/ μ s simulates rise and fall speed of different load current so as to test the adequacy of the Response time of power supply. The Soft Start function of the PEL-3000H series can set current rise time for the moment PEL-3000H 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-3000H 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.

Features

- 3.5 inch TFT LCD Display
- Operating Voltage: 0V ~ 800V,
Operating Current: 8.75A~ 472.5A,
Operating Watts: 175W~9450W,
Min. Operating Voltage: 5V@Rating Current
- Minimum Current Setting Resolution 3uA(L range)
- Soft Start Function
- Operating Mode: CC, CR, CV, CP, CC+CV, CR+CV, CP+CV
- Normal/ Fast Sequence function
- Dynamic Mode: 0.0166Hz ~ 20kHz
- Isolated Voltage/ Current Monitor
- Protection: OVP, OCP, OPP, OHP, UVP, RVP
- Simultaneous Voltage, Current and Power Display

Customers and Applications

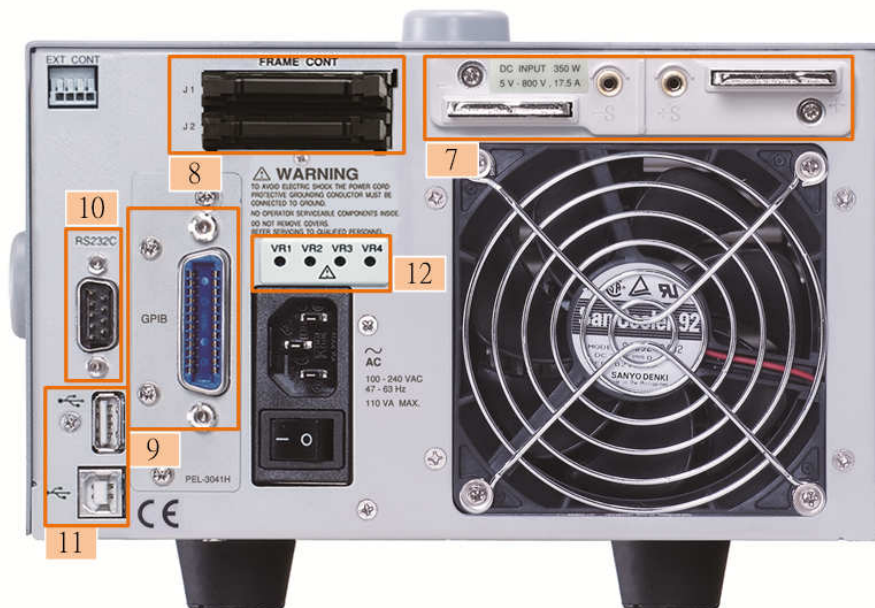
<u>Customers</u>	<u>Applications</u>
The Electric Car Industry High-Voltage DC Power Supply The Renewable Energy Market Various High Voltage Devices	EV & HEV in-vehicle chargers DC/DC converters PV Power Generation System/ Fuel Cells / Secondary Batteries Power Semiconductor / Fuse / Connector

Appearance

Front panel



Rear panel



Front panel	Rear panel
1. ON/STBY	7. Rear Panel Inputs Terminals
2. LCD Display	8. Frame Control Ports J1, J2
3. Function Keys	9. GPIB
4. Operation Key	10. RS-232C Port
5. Front Panel Input Terminals	11. USB Port
6. V MON, I MON, TRIG OUT Terminals	12. Variable Resistor

Important Information of Product Ordering

Key Dates for Product Announcement

1. NPI release and sample order (Apr 30, 2019)
2. Global Market Announcement (May 13, 2019)

Service Policy

1. PEL-3000H Series Programmable D.C. Electronic Load carries one year warranty.
2. Contact GW Instek Service Department for maintenance information.

Ordering Information

- 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) Single-Channel Programmable D.C. Electronic Load
- 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

Standard 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-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

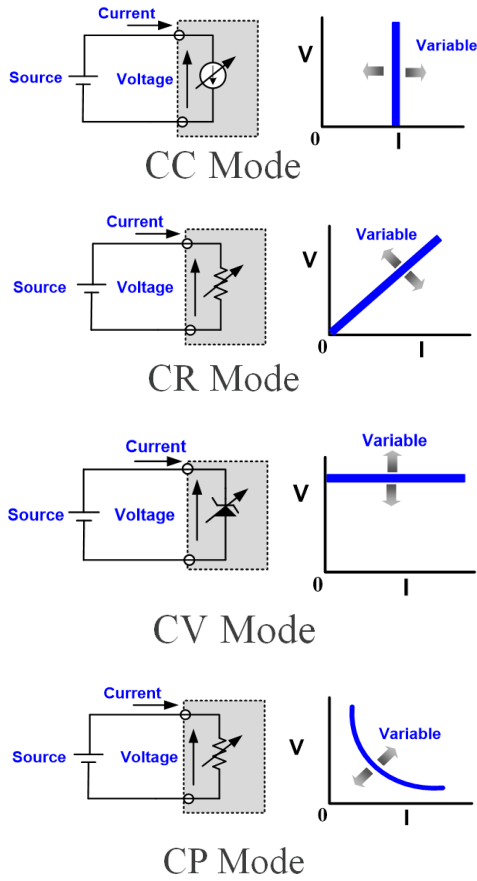
PEL-009 Connect Cu Plate

Detailed Product Information

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Detailed Descriptions for Features

Operating Mode



The PEL-3000H 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. The parameter setting and main functionality tests of CC, CR, CV, CP, and +CV are as follows:

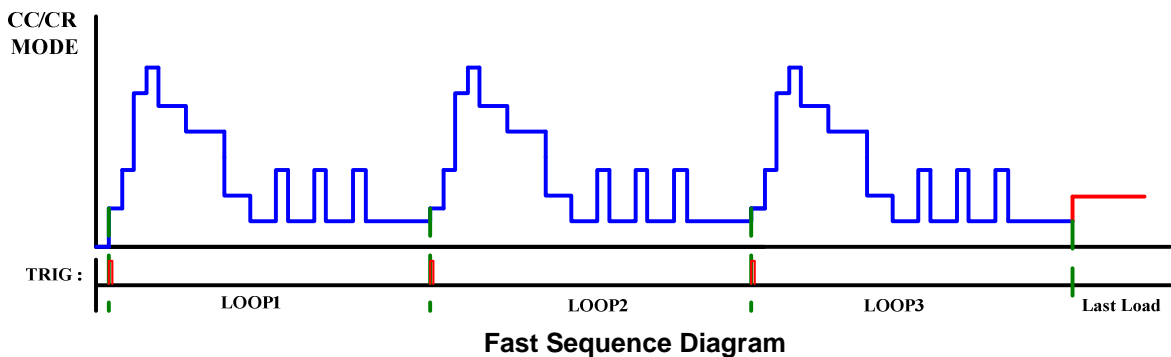
Operating mode	Parameter setting	Functionality tests
CC	Current	Voltage load regulation for power supply
CR	Resistance	Power supply activation and current limit
CV	Voltage	Power supply current limit and battery simulation to test battery charger
CP	Power	Overall rating power output for power supply
+CV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

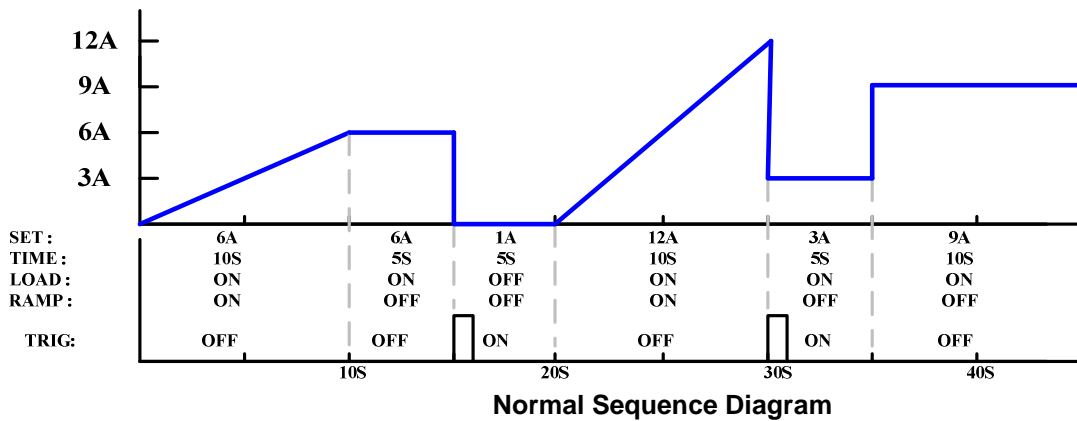
Static, Dynamic and Sequence Functions

The PEL-3000H 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	Selection between two conditions	Selection among more than two conditions	Selection from more than two conditions
Operating modes	All modes	<ul style="list-style-type: none"> • Two conditions using same mode • CR, CC, CP modes 	<ul style="list-style-type: none"> • Each condition must use same mode • Support CC or CR mode 	<ul style="list-style-type: none"> • Each condition using different mode • All modes
Adjustable condition setting	<ul style="list-style-type: none"> • A / B Value • Slew Rate 	<ul style="list-style-type: none"> • Level 1/Level 2 • Timer 1/Timer 2 • Slew Rate 1/ Slew Rate 2 	<ul style="list-style-type: none"> • Level • Timer • Slew Rate • Others... 	<ul style="list-style-type: none"> • Level • Timer • Slew Rate • Others...
Sequence step combination	N/A	N/A	<ul style="list-style-type: none"> • 1 Sequence • 1,000 steps • 25us/step 	<ul style="list-style-type: none"> • 10 Sequence • 1,000 steps • 1ms/step
Other functions	N/A	N/A	<ul style="list-style-type: none"> • Trigger Out function 	<ul style="list-style-type: none"> • Trigger Out function • Ramp function

Please refer to the following charts for edited load current waveforms using Fast and Normal Sequence functions.

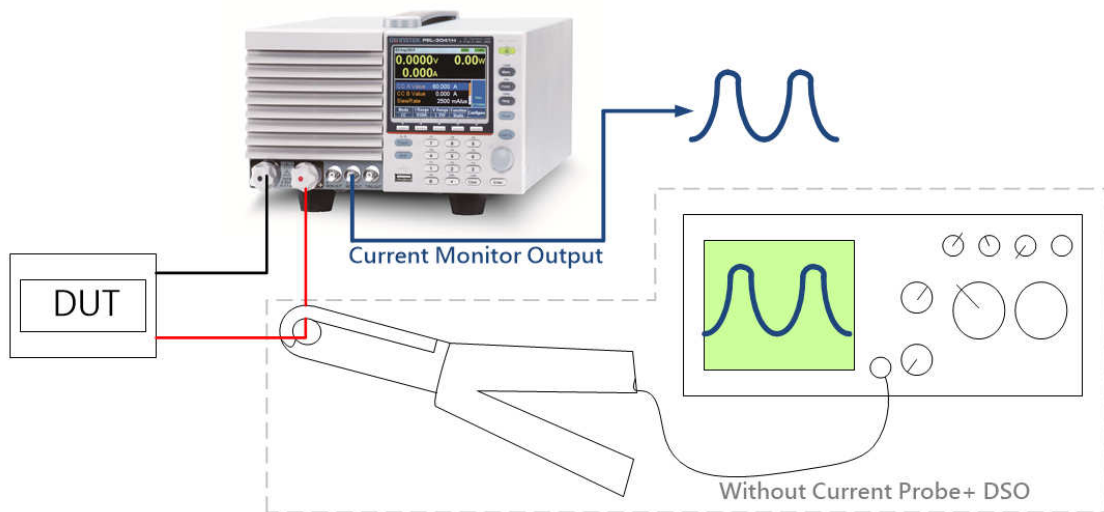




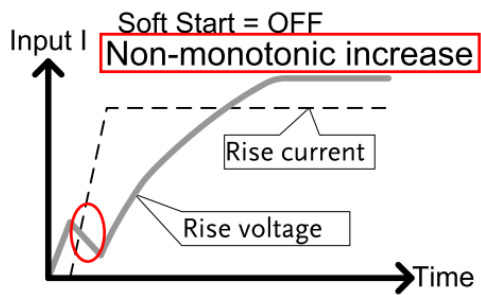
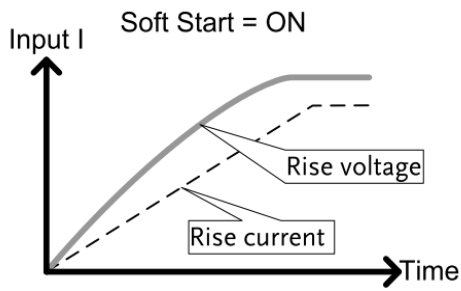
By applying a complete sequence editing function, users can control electronic load without using a computer or writing a program so as to save cost and time of R&D.

Load current monitoring function (IMON)

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

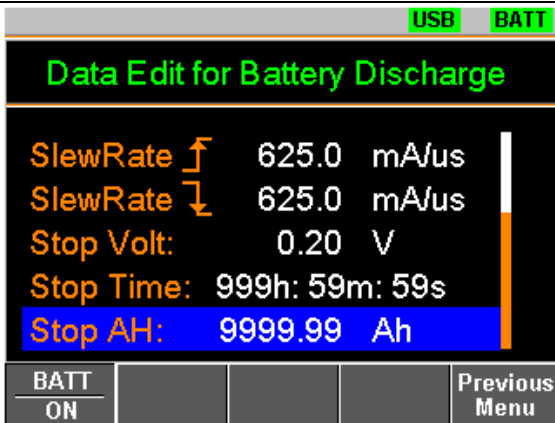


Soft Start

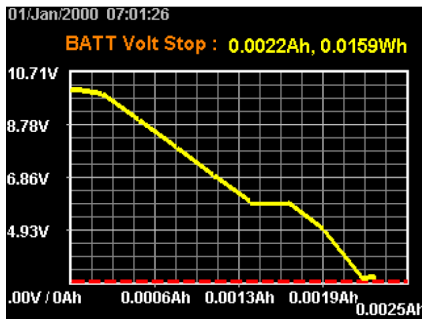


The Soft Start function of PEL-3000H allows users to determine the rise time of current sink that is to decide how much time is required to reach electronic load's set current, resistance or power value. PEL-3000H's soft start function prevents inrush current and surge voltage from happening on DUT. 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.

BATT Test Automation



BATT Test Automation editing



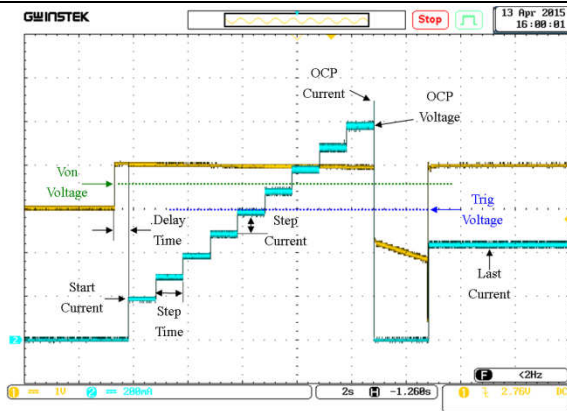
Waveform of TEST Result

	A	B	C	D	E	F	G
1	<< BATT TEST >>			PEL-3XXX	v1.31.003		
2	< PARAMETER of BATT TEST >						
3		BATT No.:	1				
4		(1) Memo:					
5		(2) Mode:	CC				
6		(3) Range:	IHVH				
7		(4) Set CC:	1.000 A				
8		(5) Stop Volt:	3.00 V				
9		(6) Stop Time:	0 h	0 m	10 s		
10		(7) Stop AH:	0.20 Ah				
11							
12	< TEST RESULTS >						
13		Start Time:	2000/1/1 07:01				
14		End Time:	2000/1/1 07:01				
15		(1) Test Length:	0 h	0 m	8 s		
16		(2) Recorder Length:	0 h	0 m	8 s		
17		(3) Stop Condition:	Under VOLT				
18		(2) DATA LISITS(9):	Timebase(sec):	1 s			
19		No	VOLT(V)	CURR(A)	POWER(WAH	WH	
20		0	10.01	0.002	0.02002	0	0
21		1	9.84	0.998	9.82032	0.0002	0.0024
22		2	8.85	0.998	8.89218	0.0005	0.005
23		3	7.85	0.998	7.8343	0.0008	0.0074
24		4	6.85	0.998	6.84628	0.0011	0.0096
25		5	5.87	0.998	5.85626	0.0014	0.0115
26		6	5.85	0.998	5.8383	0.0016	0.0131
27		7	4.86	0.998	4.85028	0.0019	0.0145
28		8	2.86	0.998	2.85428	0.0022	0.0157
29							

Sample of Data log

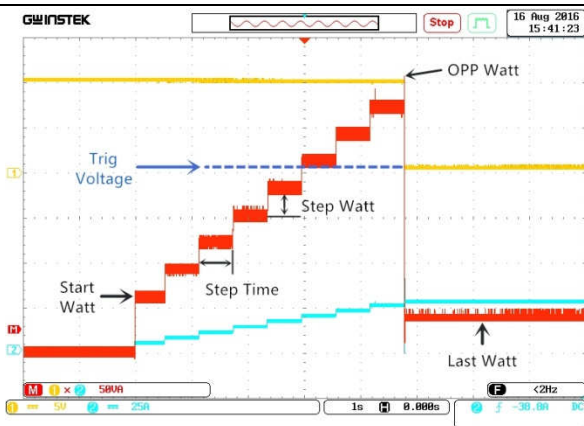
The built-in BATT Test Automation of PEL-3000H provides battery discharge applications with more flexible discharge stop time setting as well as rise and fall Slew Rate for discharge current settings. Under CP, CC or CR mode, the conditions for stop discharge can be set respectively. For instance, set 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.

OCP Test Automation



OCP test Automation for DUT(Power Supply), provides 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.

OPP Test Automation



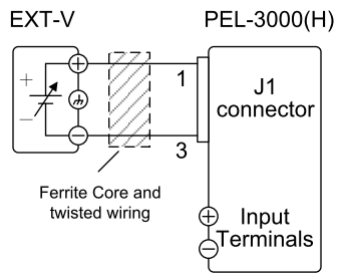
OPP test Automation for DUT(Power Supply), provides users with high resolution OPP measurement values to verify DUT' s OPP activation point. It also provides users with measurement results so as to help them determine whether DUT ' s actual OPP activation point meets the regulations. It can test the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

Protection Modes

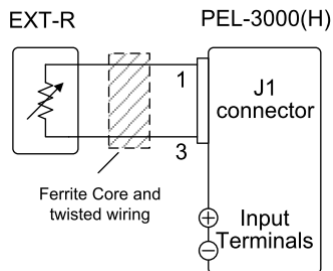
The PEL-3000H series provides many protective functions including over current protection (OCP), over voltage protection (OVP), over power protection (OPP), over temperature protection (OTP) and under voltage protection (UVP). Except for OTP and RVP, all thresholds of protective functions are adjustable. 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	Protection					
	OCP	OVP	OPP	OTP	UVP	RVP
Adjustable thresholds	V	V	V	N/A	V	N/A
Load Off	V	V	V	Fixed	V	Fixed
Limit Function	V	N/A	V	N/A	N/A	N/A

Analog Channel Control



External voltage controls PEL-3000H



External resistor controls PEL-3000H






The PEL-3000H series provides the external analog channel control function, which allows users to connect J1 and J2 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-3000H.

Comparison

Features, Advantages and Benefits

Features	Advantages	Customers ' Benefits
Maximum input voltage: 800V	Support test of the high-voltage equipment	Applicable to test of the EV, HEV, PV power generation, High voltage device and so on
Isolated I & V monitor with BNC connectors	Ease to monitor testing current & voltage	Without additional measuring tools for the current & voltage monitor
Sequence Function	Via sequence editing function, system or single unit users can edit sink current condition of arbitrary waveforms from the memory function on the panel without connecting with a computer.	Rapid editing of any sink current conditions to save users' cost of system development.
Adjustable protective points	Adjust protective points according to test requirements.	Increase safety of DUT to reduce loss.
Adjustable Slew Rate, the maximum of 0.84A/ μ s	Faster Slew Rate satisfies the tests of high-speed power products	Capable of conducting tests of higher performance products
Soft Start	Reduce current change during sudden load activation which causes abnormal situation of the voltage drop. During the activation, load current follows the set slew rate variation that will not affect the overall test speed.	Increase test reliability during sudden load activation when high Slew Rate is in operation.
Load current measurement	Electronic load directly provides proportional load current waveforms via the BNC connector.	Users can observe load current waveforms without using a current probe.
External voltage control	Directly control electronic load operation and monitor load current via external voltage.	Applicable to analog voltage control situation.

Features Comparison

Model	GW INSTEK	KIKUSUI	KG	Chroma	ITECH
Pictures					
Model	PEL-30 x x H	PLZ-4WH	Load Station	Model 63200A series	IT8300 Series
Max Input Voltage	⊙ 800V	650V	500V	⊙ 600V / 1200V	⊙ 800V
Operation mode	⊙ CC/CR/CV/CP ⊙ CC+CV/CR+CV ⊙ CP+CV	⊙ CC/CR/CV/CP ⊙ CC+CV/CR+CV	⊙ CC/CR/CV/CP ⊙ CC->CR/CC->CV ⊙ CC->CP ⊙ CR->CV/CR->CP ⊙ CV->CR/CV->CP ⊙ CP->CR/CP->CV	⊙ CC/CR/CV/CP ⊙ CR+CC/CV+CR ⊙ CV+CC ⊙ CZ	⊙ CC/CR/CV/CP
Booster MaxPower	⊙ ○ (M:1+S:4) 472.5A 800V 9.45kW	⊙ ○ (M:1+S:6) 650A 650V 13kW	⊙ × Parallel operation available up to 10units	⊙ × Parallel operation available	⊙ × Parallel operation available
Imonitor(BNC)	⊙ (Isolated)	⊙ (Isolated)	△ (not isolated)	⊙ (Isolated)	×
Vmonitor(BNC)	⊙ (Isolated)	⊙ (Isolated)	×	⊙ (Isolated)	×
CC resolution (L range)	⊙ 3uA (PEL-3021H)	3uA (PLZ164WH)	20uA (LCC-300C-G6)	300uA	10uA (IT8312)
Response speed setting	⊙ 4steps (CC/CR) 5steps (CV)	⊙ 4steps (CC/CR) 5steps (CV)	2steps (CV)	⊙ 3 Step	×
Sequence operation	⊙ 2modes available (Normal/Fast Sequence) 1000 Step	⊙ 2modes available (Normal/Fast Sequence)	1mode only	⊙ Sequence 255 Step	List 100 Step
Interface	⊙ RS232, USB, External Analog GPIB(opt.)	⊙ GPIB, RS232, USB, External Analog	⊙ USB, External Analog GPIB(opt.)	⊙ USB GPIB(opt.), LAN(opt.)	△ RS232, RS485, USB, LAN, CAN

Display	⊙	Color LCD		Monochrome LCD	⊙	Color LCD		VFD		VFD
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⊙ : Excellent ○ : Good △ : Bad ✕ : None

Specifications

Model			PEL-3021H	PEL-3041H	PEL-3111H	PEL-3211H
Operation Voltage			0V ~ 800V	0V ~ 800V	0V ~ 800V	0V ~ 800V
Current			8.75A	17.5A	52.5A	105A
Power			175W	350W	1050W	2100W
Input Resistance			3.24MΩ	3.24MΩ	3.24MΩ	---
Min. Operating Voltage			5V at 8.75A 2.5V at 4.375A	5V at 17.5A 2.5V at 8.75A	5V at 52.5A 2.5V at 26.25A	5V at 105A 2.5V at 52.5A
CC mode						
Operating Range	Range	H	0A ~ 8.75A	0A ~ 17.5A	0A ~ 52.5A	0A ~ 105A
		M	0A ~ 875mA	0A ~ 1.75A	0A ~ 5.25A	0A ~ 10.5A
		L	0A ~ 87.5mA	0A ~ 175mA	0A ~ 525mA	0A ~ 1.05A
Setting Range	Range	H	0A ~ 9.1875A	0A ~ 18.375A	0A ~ 55.126A	0A ~ 110.25A
		M	0A ~ 918.75mA	0A ~ 1.8375A	0A ~ 5.5126A	0A ~ 11.025A
		L	0A ~ 91.875mA	0A ~ 183.75A	0A ~ 551.26mA	0A ~ 1.1025A
Resolution	Range	H	300μA	0.6mA	2mA	NA
		M	30μA	60μA	200μA	NA
		L	3μA	6μA	20μA	NA
Accuracy of Setting	Range	H · M	$\pm (0.2\% \text{set} + 0.1\% \text{fs}^{-1}) + \text{Vin}^2 / 3.24\text{M}\Omega$			$\pm (1.2\% \text{set} + 1.1\% \text{fs})$
		L	$\pm (0.2\% \text{set} + 0.1\% \text{fs}) + \text{Vin}^2 / 3.24\text{M}\Omega$			$\pm (1.2\% \text{set} + 1.1\% \text{fs})$
	Parallel	$\pm (1.2\% \text{set} + 1.1\% \text{fs}^{-3})$			$\pm (1.2\% \text{set} + 1.1\% \text{fs})$	
Input Voltage Variation	Range	H · M	$20\text{mA} + \text{Vin}^2 / 3.24\text{M}\Omega$			NA
		L	$2\text{mA} + \text{Vin}^2 / 3.24\text{M}\Omega$			NA
Ripple	rms		2mA	4mA	NA	NA
	P-P		20mA	40mA	NA	NA
*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						

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(95.2mΩ ~ 2.777kΩ)
		M	175mS ~ 3μS (5.71Ω ~ 333MΩ)	350mS ~ 6μS (2.85mΩ ~ 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 (28.5mΩ ~ 1.66MΩ)	105mS ~ 1.8μS (9.52Ω ~ 555kΩ)	210mS ~ 3.6μS(4.762Ω ~ 277.7kΩ)
Setting Range	Range	H	1.8375S ~ 0S (544.22mΩ ~ OPEN)	3.675S ~ 0S (272.11mΩ ~ OPEN)	11.025S ~ 0S (90.7mΩ ~ OPEN)	22.05S ~ 0S (45.35mΩ ~ 2.7778kΩ,OPEN)
		M	183.75mS ~ 0mS (5.44218Ω ~ OPEN)	367.5mS ~ 0mS (2.72109Ω ~ OPEN)	1.1025S ~ 0S (907.03mΩ ~ OPEN)	2.205S ~ 0S (0.4535Ω ~ 27.7778kΩ,OPEN)
		L	18.375mS ~ 0mS (54.4218Ω ~ OPEN)	36.75mS ~ 0mS (27.2109Ω ~ OPEN)	110.25mS ~ 0mS (9.07029Ω ~ OPEN)	220.05mS ~ 0mS (4.5351Ω ~ 277.78kΩ,OPEN)
Resolution	Range	H	30μS	60μS	180 μS	NA
		M	3μS	6μS	18 μS	NA
		L	0.3μS	0.6μS	1.8 μS	NA
Accuracy of Setting	Range	H · M	$\pm (0.5\%set+0.5\%fs^1) + Vin^2/3.24M\Omega$			$\pm (1.2\%set+1.1\%fs)$ TYP
		L	$\pm (0.5\%set+0.5\%fs) + Vin^2/3.24M\Omega$			NA
	Parallel (TYP)	$\pm (1.2\%set+1.1\%fs^3)$			NA	
<p>*1 Full scale of H range</p> <p>*2 Vin: input terminal voltage of electronic load</p> <p>*3 M range applies to the full scale of H range</p>						
CV mode						
Operating Range	Range	H	5V ~ 800V	5V ~ 800V	5V ~ 800V	5V ~ 800V
		L	5V ~ 80V	5V ~ 80V	5V ~ 80V	5V ~ 80V
Setting Range	Range	H	0V ~ 840V	0V ~ 840V	0V ~ 840V	0V ~ 840V
		L	0V ~ 84V	0V ~ 84V	0V ~ 84V	0V ~ 84V
Resolution	Range	H	20mV	20mV	20mV	NA
		L	2mV	2mV	2mV	NA
Accuracy of Setting	H, L Range		$\pm (0.2\%set+0.2\%fs)$	$\pm (0.2\%set+0.2\%fs)$	$\pm (0.2\%set+0.2\%fs)$	$\pm (0.2\%set+0.2\%fs)$
	Parallel (TYP)		$\pm (0.2\%set+0.2\%fs)$	$\pm (0.2\%set+0.2\%fs)$	$\pm (0.2\%set+0.2\%fs)$	$\pm (0.2\%set+0.2\%fs)$
Input Voltage Variation	5V · 10% ~ 100% current		80mV	80mV	80mV	NA
CP mode						
Operating Range	Range	H	17.5W ~ 175W	35W ~ 350W	105W ~ 1050W	210W ~ 2100W
		M	1.75W ~ 17.5W	3.5W ~ 350W	10.5W ~ 105W	21W ~ 210W
		L	0.175W ~ 1.75W	0.35W ~ 10.5W	1.05W ~ 10.5W	2.1W ~ 21W
Setting	Range	H	0W ~ 183.75W	0W ~ 367.5W	0W ~ 1102.5W	0W ~ 2205W

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Range		M	0W ~ 18.375W	0W ~ 36.75W	0W ~ 110.25W	0W ~ 220.5W
		L	0W ~ 1.8375W	0W ~ 3.675W	0W ~ 11.025W	0W ~ 22.05W
Resolution	Range	H	10mW	10mW	100mW	NA
		M	1mW	1mW	10mW	NA
		L	0.1mW	0.1mW	1mW	NA
Accuracy of Setting	Range	H · M	$\pm (0.6\% \text{set} + 1.4\% \text{fs}) + V_{in}/3.24M\Omega$			$\pm (5\% \text{fs}) \text{TYP}$
Meter						
Voltmeter	Range	H	0.00V ~ 800.00V	0.00V ~ 800.00V	0.00V ~ 800.00V	NA
		L	0.000V ~ 80.000V	0.000V ~ 80.000V	0.000V ~ 80.000V	NA
	Parallel Accuracy TYP			$\pm (0.1\% \text{red} + 0.1\% \text{fs})$	$\pm (0.1\% \text{red} + 0.1\% \text{fs})$	$\pm (0.1\% \text{red} + 0.1\% \text{fs})$
Ammeter	Range	H · M	0.0000A ~ 8.7500A	0.000A ~ 17.500A	0.000A ~ 52.500A	NA
		L	0.000mA ~ 87.500mA	0.00mA ~ 175.00mA	0.00mA ~ 525.00mA	NA
		Accuracy	$\pm (0.2\% \text{red} + 0.3\% \text{fs})$	$\pm (0.2\% \text{red} + 0.3\% \text{fs})$	$\pm (0.2\% \text{red} + 0.3\% \text{fs})$	NA
	Parallel Accuracy TYP			$\pm (1.2\% \text{red} + 1.1\% \text{fs})$		
Wattmeter	Range	H · M	0.00W ~ 175.00W	0.00W ~ 350.00W	0.0W ~ 1050.0W	NA
		L(CC/CR/CV mode)	0.000W ~ 56.875W	0.00W ~ 113.75W	0.00W ~ 341.25W	NA
		L(CP mode)	0.0000W ~ 1.7500W	0.0000W ~ 3.5000W	0.0000W ~ 10.500W	NA
Dynamic mode (SW)						
Operation Mode			CC · CR · CP	CC · CR · CP	CC · CR · CP	NA
T1&T2			0.025ms ~ 10ms : 1 μ s	0.025ms ~ 10ms : 1 μ s	0.025ms ~ 10ms : 1 μ s	NA
			10ms ~ 60s : 1ms	10ms ~ 60s : 1ms	10ms ~ 60s : 1ms	NA
Duty Cycle of Setting (Freq./Duty)			1% ~ 99% · 0.1% step	1% ~ 99% · 0.1% step	1% ~ 99% · 0.1% step	NA
Frequency Range (Freq./Duty)			1Hz ~ 20kHz	1Hz ~ 20kHz	1Hz ~ 20kHz	NA
Frequency Resolution	1Hz ~ 10Hz		0.1Hz			NA
	10Hz ~ 100Hz		1Hz			NA
	100Hz ~ 1kHz		10Hz			NA
	1kHz ~ 4kHz		100Hz			NA
Frequency Accuracy of Setting			$\pm (0.5\% \text{set})$			NA
Slew Rate						
Operation Mode			CC · CR	CC · CR	CC · CR	NA

Setting Range	Range	CC H	0.14mA/μs ~ 140mA/μs	0.280mA/μs ~ 280.0mA/μs	0.840mA/μs ~ 840mA/μs	NA
		CC M	0.014μA/μs ~ 14mA/μs	0.0280mA/μs ~ 28.00mA/μs	0.0840mA/μs ~ 84.00mA/μs	NA
		CC L	1.4μA/μs ~ 1400μA/μs	2.80μA/μs ~ 2800μA/μs	0.00840mA/μs ~ 8.400mA/μs	NA
		CR H	0.014mA/μs ~ 14mA/μs	0.0280mA/μs ~ 28.00mA/μs	0.0840mA/μs ~ 84.00mA/μs	NA
		CR M	0.0014mA/μs ~ 1.4mA/μs	0.00280mA/μs ~ 2.800mA/μs	0.00840mA/μs ~ 8.400mA/μs	NA
		CR L	0.11μA/μs ~ 140μA/μs	0.280μA/μs ~ 280.0μA/μs	0.000840mA/μs ~ 0.8400mA/μs	NA
Resolution			50μA/μs (13.2mA ~ 132mA/μs)	100μA/μs (26.4mA ~ 264mA/μs)	300μA/μs (80mA ~ 0.8A/μs)	NA
			5μA/μs (1.32mA ~ 13.2mA/μs)	10μA/μs (2.64mA ~ 26.4mA/μs)	30μA/μs (8mA ~ 80mA/μs)	NA
			0.5μA/μs (132μA ~ 1.32mA/μs)	1μA/μs (264μA ~ 2.64mA/μs)	3μA/μs (800μA ~ 8mA/μs)	NA
			50nA/μs (13.2μA ~ 132μA/μs)	0.1μA/μs (26.4μA ~ 264μA/μs)	0.3μA/μs (80μA ~ 800μA/μs)	NA
			5nA/μs (1.32μA ~ 13.2μA/μs)	10nA/μs (2.64μA ~ 26.4μA/μs)	30nA/μs (8μA ~ 80μA/μs)	NA
			0.5nA/μs (0.132μA ~ 1.32μA/μs)	1nA/μs (0.264μA ~ 2.64μA/μs)	3nA/μs (0.8μA ~ 8μA/μs)	NA
Accuracy of Setting			± (10%set+25μs)	± (10%set+25μs)	± (10%set+25μs)	NA

Model			PEL-3212H	PEL-3323H	PEL-3424H	PEL-3535H
Operating voltage(DC)			0V~800V	0V~800V	0V~800V	0V~800V
Current			0~105A	0~157.5A	0~210A	0~262.5A
Power			2100W	3150W	4200W	5250W
CC mode						
Operating range	Range	H	0A~105A	0~157.5A	0~210A	0~262.5A
		M	0A~10.5A	0A~15.75A	0~21A	0~26.25A
		L	0A~1.05A	0A~1.575A	0~2.1A	0~2.625A
Setting range	Range	H	0A~110.252A	0A~165.378A	0A~220.504A	0A~275.630A
		M	0A~11.0252A	0A~16.5378A	0A~22.0504A	0A~27.5630A
		L	0A~1.10252A	0A~1.65378A	0A~2.20504A	0A~2.75630A
Default setting	Range	H	0A	0A	0A	0A
		M	0A	0A	0A	0A
		L	0A	0A	0A	0A
Resolution		H	4mA	6mA	8mA	10mA
		M	0.4mA	0.6mA	0.8mA	1mA
		L	0.04mA	0.06mA	0.08mA	0.1mA

PEL-3000H series programmable D.C. Electronic Load

Accuracy of setting		H,M	$\pm(0.2\% \text{ of set} + 0.1\% \text{ of f.s.}^{*1}) + \text{Vin}^2/(3.24/\text{N}) \text{ M}\Omega^{*3}$			
		L	$\pm(0.2\% \text{ of set} + 0.1\% \text{ of f.s.}) + \text{Vin}^2/(3.24/\text{N}) \text{ M}\Omega$			
		N*7	2	3	4	5
*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 When the input voltage is varied from 5V to 800V at a current of rated power/800V						
*5 Measurement frequency bandwidth : 10Hz to 1MHz						
*6 Measurement frequency bandwidth : 10Hz to 15MHz						
*7 Parallel connection number						
CR mode						
Operating range ^{*1}	Range	H	21S~360uS(47.619mΩ ~2.778kΩ)	31.5S~540uS(31.746mΩ ~1.85185kΩ)	42S~0.72mS(23.8095mΩ ~1.3889kΩ)	52.5S~0.9mS(19.0476mΩ ~1.11111kΩ)
		M	2.1S~36uS(476.19mΩ ~27.778kΩ)	3.15S~540uS(317.46mΩ ~18.5185kΩ)	4.2S~0.72mS(238.095mΩ ~13.8889kΩ)	5.25S~0.9mS(190.476mΩ ~11.1111kΩ)
		L	210mS~3.6uS(4.7619Ω ~277.78kΩ)	315mS~540uS(3.1746Ω ~185.185kΩ)	420mS~0.72mS(2.38095Ω ~138.888kΩ)	525mS~0.9mS(1.90476Ω ~111.111kΩ)
Setting range	Range	H	22.05S~0S(45.35 mΩ ~OPEN)	33.075S~0 S(30.23 mΩ~OPEN)	44.1S~0S(22.68 mΩ~OPEN)	55.125S~0S(18.14 mΩ~OPEN)
		M	2.205S~0S(453.51 mΩ ~OPEN)	3.3075S~0 S(302.34 mΩ ~OPEN)	4.41S~0S(226.76 mΩ~OPEN)	5.5125S~0S(181.41 mΩ ~OPEN)
		L	220.5mS~0S(4.53515 Ω ~OPEN)	330.75mS~0 S(3.02343 Ω ~OPEN)	441mS~0S(2.2676 Ω~OPEN)	551.25mS~0S(1.81406 Ω ~OPEN)
Resolution		H	360uS	540uS	720uS	900uS
		M	36uS	54uS	72uS	90uS
		L	3.6uS	5.4uS	7.2uS	9uS
Accuracy of setting ^{*2}		H,M	$\pm(0.5\% \text{ of set}^{*3} + 0.5\% \text{ of f.s.}^{*4}) + \text{Vin}^5/(3.24/\text{N}) \text{ M}\Omega$: Alone operation specifications			
		L	$\pm(0.5\% \text{ of set}^{*3} + 0.5\% \text{ of f.s.}) + \text{Vin}^5/(3.24/\text{N}) \text{ M}\Omega$: Alone operation specifications			
		N*6	2	3	4	5
*1 Siemens[S] = Input current[A] / Input voltage[V] = 1 / resistance[Ω]						
*2 Converted value at the input current. At the input current. It is not applied for the condition of the parrallel operation.						
*3 set = Vin / Rset						
*4 f.s. = Full scsale of High Range						
*5 Vin = Input terminal voltage of Electronic Load						
*6 Parallel connection number						
CV mode						
Operating range	Range	H	5V~800V	5V~800V	5V~800V	5V~800V

		L	5V~80V	5V~80V	5V~80V	5V~80V
Setting range	Range	H	0V~880V			
		L	0V~88V			
Resolution		H	20mV			
		L	2mV			
Accuracy of setting ¹	Range	H,L	±(0.1 % of set + 0.1 % of f.s)			
Input current variation ²			No specifications			
*1 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.						
*2 With respect to a change in the current of 10 % to 100 % of the rating at an input voltage of 5 V (during remote sensing).						
CP mode						
Operating range	Range	H	0W~2100W	0W~3150W	0W~4200W	0W~5250W
		M	W~210W	0W~315W	0W~420W	0W~525W
		L	0W~21W	0W~31.5W	0W~42W	0W~52.5W
Setting range	Range	H	0W~2205W	0W~3307.5W	0W~4410W	0W~5512.5W
		M	0W~220.5W	0W~330.75W	0W~441W	0W~551.25W
		L	0W~22.05W	0W~33.075W	0W~44.1W	0W~55.125W
Resolution		H	200mW	300mW	400mW	500mW
		M	20mW	30mW	40mW	50mW
		L	2mW	3mW	4mW	5mW
Accuracy of setting ¹		H,M	±(0.6 % of set + 1.4 % of f.s ²) + Vin*Vin ³ /(3.24/N MΩ) : Alone operation specifications			
		L	±(0.6 % of set + 1.4 % of f.s) + Vin*Vin ³ /(3.24/N MΩ) : Alone operation specifications			
		N*4	2	3	4	5
*1 It is not applied for the condition of the parallel operation.						
*2 M range applies to the full scale of H range.						
*3 Vin = Input terminal voltage of Electronic Load						
*4 Parallel connection number						
Slew rate						
Setting range (CC mode)	Range	H	1.68mA/us~840mA/us	2.52mA/us~839.7mA/us	3.36mA/us~840mA/us	4.2mA/us~840mA/us
		M	168uA/us~84mA/us	252uA/us~83.97mA/us	336uA/us~84mA/us	420uA/us~84mA/us
		L	16.8uA/us~8.4mA/us	25.2uA/us~8.397mA/us	33.6uA/us~8.4mA/us	42uA/us~8.4mA/us
Setting range (CR mode)	Range	H	168uA/us~84mA/us	252uA/us~83.97mA/us	336uA/us~84mA/us	420uA/us~84mA/us
		M	16.8uA/us~8.4mA/us	25.2uA/us~8.397mA/us	33.6uA/us~8.4mA/us	42uA/us~8.4mA/us
		L	1.68uA/us~840uA/us	2.52uA/us~839.7uA/us	3.36uA/us~840uA/us	4.2uA/us~840uA/us

Resolution	600uA	900uA	1.2mA	1.5mA		
Setting	168mA/us~840mA/us	252mA/us~839.7mA/us	336mA/us~840mA/us	420mA/us~840mA/us		
Resolution	60uA	90uA	120uA	150uA		
Setting	16.8mA/us~168mA/us	25.2mA/us~252mA/us	33.6mA/us~336mA/us	42mA/us~420mA/us		
Resolution	6uA	9uA	12uA	15uA		
Setting	1.68mA/us~16.8mA/us	2.52mA/us~25.2mA/us	3.36mA/us~33.6mA/us	4.2mA/us~42mA/us		
Resolution	600nA	900nA	1.2uA	1.5uA		
Setting	168uA/us~1.68mA/us	252nA/us~2.52mA/us	336uA/us~3.36mA/us	420uA/us~4.2mA/us		
Resolution	60nA	90nA	120nA	150nA		
Setting	16.8uA/us~168uA/us	25.2uA/us~252uA/us	33.6uA/us~336uA/us	42uA/us~420uA/us		
Resolution	6nA	9nA	12nA	15nA		
Setting	1.68uA/us~16.8uA/us	2.52uA/us~25.2uA/us	3.36uA/us~33.6uA/us	4.2uA/us~42uA/us		
Accuracy of setting ¹	±(10% of set + 25us)					
*1 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.						
Meter						
Voltmeter	Range	800V	0.00V~800.00V			
		80V	0.000V~80.000V			
	Accuracy	±(0.1 % of rdg + 0.1 % of f.s)				
Ammeter	Range	H	0.000A~105.00A	0.000A~157.50A	0.000A~210.00A	0.000A~262.50A
		M	0.0000A~10.500A	0.0000A~15.750A	0.0000A~21.000A	0.0000A~26.250A
		L	0.00mA~1050.0mA	0.00mA~1575.0mA	0.00mA~2100.0mA	0.00mA~2625.0mA
	Accuracy	±(1.2 % of rdg + 1.1 % of f.s)				
Wattmeter	Range	H,M	0.0W~2100.0W	0.0W~3150.0W	0.0W~4200.0W	0.0W~5250W
		L(CC/CR/CV mode)	0.000W~682.50W	0.000W~1023.7W	0.000W~1365.0W	0.000W~1706.2W
		L(CP mode)	0.000W~ 21.000W	0.000W~ 31.500W	0.000W~ 42.000W	0.000W~ 52.500W
Dynamic mode						
Operation mode		CC and CR				
T1&T2		0.025ms ~ 10ms / Res : 1us 10ms ~ 30s / Res : 1ms				
Accuracy		1uS / 1mS ± 100ppm				
Frequency Range(Freq./Duty)		1 Hz ~20k Hz				
Frequency resolution	1 Hz ~ 9.9 Hz	0.1 Hz				

	10 Hz ~ 99 Hz	1 Hz				
	100 Hz ~ 990Hz	10 Hz				
	1 kHz ~ 20kHz	100 Hz				
Frequency Accuracy of setting		(0.5% of set)				
Duty cycle setting(Freq./Duty)		1% ~99% , 0.1% step				
		The minimum time width is 10 us.Between 1kHz and 20kHz, the maximum duty cycle is limited by the minimum time width.				
Slew Rate Setting range (CC mode)	Range	H	1.68mA/us~840mA/us	2.52mA/us~839.7mA/us	3.36mA/us~840mA/us	4.2mA/us~840mA/us
		M	168uA/us~84mA/us	252uA/us~83.97mA/us	336uA/us~84mA/us	420uA/us~84mA/us
		L	16.8uA/us~8.4mA/us	25.2uA/us~8.397mA/us	33.6uA/us~8.4mA/us	42uA/us~8.4mA/us
Slew Rate Setting range (CR mode)	Range	H	168uA/us~84mA/us	252uA/us~83.97mA/us	336uA/us~84mA/us	420uA/us~84mA/us
		M	16.8uA/us~8.4mA/us	25.2uA/us~8.397mA/us	33.6uA/us~8.4mA/us	42uA/us~8.4mA/us
		L	1.68uA/us~840uA/us	2.52uA/us~839.7uA/us	3.36uA/us~840uA/us	4.2uA/us~840uA/us
Resolution			600uA	900uA	1.2mA	1.5mA
Setting			168mA/us~840mA/us	252mA/us~839.7mA/us	336mA/us~840mA/us	420mA/us~840mA/us
Resolution			60uA	90uA	120uA	150uA
Setting			16.8mA/us~168mA/us	25.2mA/us~252mA/us	33.6mA/us~336mA/us	42mA/us~420mA/us
Resolution			6uA	9uA	12uA	15uA
Setting			1.68mA/us~16.8mA/us	2.52mA/us~25.2mA/us	3.36mA/us~33.6mA/us	4.2mA/us~42mA/us
Resolution			600nA	900nA	1.2uA	1.5uA
Setting			168uA/us~1.68mA/us	252nA/us~2.52mA/us	336uA/us~3.36mA/us	420uA/us~4.2mA/us
Resolution			60nA	90nA	120nA	150nA
Setting			16.8uA/us~168uA/us	25.2uA/us~252uA/us	33.6uA/us~336uA/us	42uA/us~420uA/us
Resolution			6nA	9nA	12nA	15nA

Setting			1.68uA/us~16.8uA/us	2.52uA/us~25.2uA/us	3.36uA/us~33.6uA/us	4.2uA/us~42uA/us
Slew Rate Accuracy of setting			±(10% of set + 25us)			
Current Operating range	Range	H	0A~105A	0~157.5A	0~210A	0~262.5A
		M	0A~10.5A	0A~15.75A	0~21A	0~26.25A
		L	0A~1.05A	0A~1.575A	0~2.1A	0~2.625A
Current Setting range	Range	H	0A~110.252A	0A~165.378A	0A~220.504A	0A~275.630A
		M	0A~11.0252A	0A~16.5378A	0A~22.0504A	0A~27.5630A
		L	0A~1.10252A	0A~1.65378A	0A~2.20504A	0A~2.75630A
Current Resolution		H	4mA	6mA	8mA	10mA
		M	0.4mA	0.6mA	0.8mA	1mA
		L	0.04mA	0.06mA	0.08mA	0.1mA
Current Accuracy			±0.4%F.S.			
Operating range ^{*1}	Range	H	21S~360uS(47.619mΩ ~2.778kΩ)	31.5S~540uS(31.746mΩ ~1.85185kΩ)	42S~0.72mS(23.8095mΩ ~1.3889kΩ)	52.5S~0.9mS(19.0476mΩ ~1.1111kΩ)
		M	2.1S~36uS(476.19mΩ ~27.778kΩ)	3.15S~540uS(317.46mΩ ~18.5185kΩ)	4.2S~0.72mS(238.095mΩ ~13.8889kΩ)	5.25S~0.9mS(190.476mΩ ~11.1111kΩ)
		L	210mS~3.6uS(4.7619Ω ~277.78kΩ)	315mS~540uS(3.1746Ω ~185.185kΩ)	420mS~0.72mS(2.38095Ω ~138.888kΩ)	525mS~0.9mS(1.90476Ω ~111.111kΩ)
Setting range	Range	H	22.05S~0S(45.35 mΩ ~OPEN)	33.075S~0 S(30.23 mΩ~OPEN)	44.1S~0S(22.68 mΩ~OPEN)	55.125S~0S(18.14 mΩ~OPEN)
		M	2.205S~0S(453.51 mΩ ~OPEN)	3.3075S~0 S(302.34 mΩ ~OPEN)	4.41S~0S(226.76 mΩ~OPEN)	5.5125S~0S(181.41 mΩ ~OPEN)
		L	220.5mS~0S(4.53515 Ω ~OPEN)	330.75mS~0 S(3.02343 Ω ~OPEN)	441mS~0S(2.2676 Ω~OPEN)	551.25mS~0S(1.81406 Ω ~OPEN)
Resolution		H	360uS	540uS	720uS	900uS
		M	36uS	54uS	72uS	90uS
		L	3.6uS	5.4uS	7.2uS	9uS
Accuracy of setting ^{*2}		H,M	±(0.5 % of set ^{*3} + 0.5 % of f.s. ^{*4}) + Vin ^{*5} /(3.24/N) MΩ : Alone operation specifications			
		L	±(0.5 % of set ^{*3} + 0.5 % of f.s.) + Vin ^{*5} /(3.24/N) MΩ : Alone operation specifications			
		N*6	2	3	4	5
*1 Siemens[S] = Input current[A] / Input voltage[V] = 1 / resistance[Ω]						
*2 Converted value at the input current. At the input current. It is not applied for the condition of the parallel operation.						
*3 set = Vin / Rset						

*4 f.s. = Full scale of High Range

*5 Vin = Input terminal voltage of Electronic Load

*6 Parallel connection number

Model			PEL-3322H	PEL-3533H	PEL-3744H	PEL-3955H
Operating voltage(DC)			0V~800V	0V~800V	0V~800V	0V~800V
Current			0~157.5A	0~262.5A	0~367.5A	0~472.5A
Power			3150W	5250W	7350W	9450W
CC mode						
Operating range	Range	H	0~157.5A	0~262.5A	0~367.5A	0~472.5A
		M	0~15.75A	0~26.25A	0~36.75A	0~47.25A
		L	0~1.575A	0~2.625A	0~3.675A	0~4.725A
Setting range	Range	H	0A~165.378A	0A~275.630A	0A~385.882A	0A~496.134A
		M	0A~16.5378A	0A~27.5630A	0A~38.5882A	0A~49.6134A
		L	0A~1.65378A	0A~2.75630A	0A~3.85882A	0A~4.96134A
Default setting	Range	H	0A	0A	0A	0A
		M	0A	0A	0A	0A
		L	0A	0A	0A	0A
Resolution		H	6mA	10mA	14mA	18mA
		M	0.6mA	1mA	1.4mA	1.8mA
		L	0.06mA	0.1mA	0.14mA	0.18mA
Accuracy of setting	H,M		$\pm(1.2\% \text{ of set} + 1.1\% \text{ of f.s}^{*1}) + V_{in}^{*2}/(3.24/N) \text{ M}\Omega^{-*3}$			
		L	$\pm(1.2\% \text{ of set} + 1.1\% \text{ of f.s}) + V_{in}^{*2}/(3.24/N) \text{ M}\Omega$			
	N*7	2	3	4	5	
*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 When the input voltage is varied from 5V to 800V at a current of rated power/800V						
*5 Measurement frequency bandwidth : 10Hz to 1MHz						
*6 Measurement frequency bandwidth : 10Hz to 15MHz						
*7 Parallel connection number						
CR mode						

Operating range ¹	Range	H	31.5S~540uS(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	3.15S~540uS(317.46mΩ ~18.5185kΩ)	5.25S~0.9mS(190.476mΩ ~11.1111kΩ)	7.35S~126uS(136.054mΩ ~7.93651kΩ)	9.45S~126uS(105.82mΩ ~6.17284kΩ)
		L	315mS~540uS(3.1746Ω ~185.185kΩ)	525mS~0.9mS(1.90476Ω ~111.111kΩ)	735mS~12.6uS(1.36054Ω ~79.3651kΩ)	945mS~162uS(1.0582Ω ~61.7284kΩ)
Setting range	Range	H	33.075S~0 S(30.23 mΩ ~OPEN)	55.125S~0S(18.14 mΩ ~OPEN)	77.175S~0 S(12.96 mΩ ~OPEN)	99.225S~0 S(10.08 mΩ ~OPEN)
		M	3.3075S~0 S(302.34 mΩ ~OPEN)	5.5125S~0S(181.41 mΩ ~OPEN)	7.7175S~0 S(129.58 mΩ ~OPEN)	9.9225S~0 S(100.78 mΩ ~OPEN)
		L	330.75mS~0 S(3.02343 Ω ~OPEN)	551.25mS~0S(1.81406 Ω ~OPEN)	771.75mS~0 S(1.29576 Ω ~OPEN)	992.25mS~0 S(1.00781 Ω ~OPEN)
Resolution		H	540uS	900uS	1.26mS	1.62mS
		M	54uS	90uS	126uS	162uS
		L	5.4uS	9uS	12.6uS	16.2uS
Accuracy of setting ²		H,M	±(0.5 % of set ³ + 0.5 % of f.s. ⁴) + Vin ⁵ /(3.24/N MΩ) : Alone operation specifications			
		L	±(0.5 % of set ³ + 0.5 % of f.s.) + Vin ⁵ /(3.24/N MΩ) : Alone operation specifications			
		N*6	2	3	4	5
*1 Siemens[S] = Input current[A] / Input voltage[V] = 1 / resistance[Ω]						
*2 Converted value at the input current. At the input current. It is not applied for the condition of the parrallel operation.						
*3 set = Vin / Rset						
*4 f.s. = Full scsale of High Range						
*5 Vin = Input terminal voltage of Electronic Load						
*6 Parallel connection number						
CV mode						
Operating range	Range	H	5V~800V	5V~800V	5V~800V	5V~800V
		L	5V~80V	5V~80V	5V~80V	5V~80V
Setting range	Range	H	0V~880V			
		L	0V~88V			
Resolution	Range	H	20mV			
		L	2mV			
Accuracy of setting ¹	Range	H,L	±(0.1 % of set + 0.1 % of f.s)			
Input current variation ²			NA			

*1 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.						
*2 With respect to a change in the current of 10 % to 100 % of the rating at an input voltage of 5 V (during remote sensing).						
CP mode						
Operating range	Range	H	0W~3150W	0W~5250W	0W~7350W	0W~9450W
		M	0W~315W	0W~525W	0W~735W	0W~945W
		L	0W~31.5W	0W~52.5W	0W~73.5W	0W~94.5W
Setting range	Range	H	0W~3307.5W	0W~5512.5W	0W~7717.5W	0W~9922.5W
		M	0W~330.75W	0W~551.25W	0W~771.75W	0W~992.25W
		L	0W~33.075W	0W~55.125W	0W~77.175W	0W~99.225W
Resolution	Range	H	300mW	500mW	700mW	900mW
		M	30mW	50mW	70mW	90mW
		L	3mW	5mW	7mW	9mW
Accuracy of setting ⁻¹	Range	H,M	$\pm(0.6\% \text{ of set} + 1.4\% \text{ of f.s}^2) + V_{in} \cdot V_{in}^3 / (3.24 / N \text{ M}\Omega)$: Alone operation specifications			
		L	$\pm(0.6\% \text{ of set} + 1.4\% \text{ of f.s}) + V_{in} \cdot V_{in}^3 / (3.24 / N \text{ M}\Omega)$: Alone operation specifications			
	N*4	2	3	4	5	
*1 It is not applied for the condition of the parallel operation.						
*2 M range applies to the full scale of H range.						
*3 V_{in} = Input terminal voltage of Electronic Load						
*4 Parallel connection number						
Slew rate						
Setting range (CC mode)	Range	H	2.52mA/us~839.7mA/us	4.2mA/us~840mA/us	5.88mA/us~840mA/us	7.56mA/us~839.7mA/us
		M	252uA/us~83.97mA/us	420uA/us~84mA/us	588uA/us~84mA/us	756uA/us~83.97mA/us
		L	25.2uA/us~8.397mA/us	42uA/us~8.4mA/us	58.8uA/us~8.4mA/us	75.6uA/us~8.397mA/us
Setting range (CR mode)	Range	H	252uA/us~83.97mA/us	420uA/us~84mA/us	588uA/us~84mA/us	756uA/us~83.97mA/us
		M	25.2uA/us~8.397mA/us	42uA/us~8.4mA/us	58.8uA/us~8.4mA/us	75.6uA/us~8.397mA/us
		L	2.52uA/us~839.7uA/us	4.2uA/us~840uA/us	5.88uA/us~840uA/us	7.56uA/us~839.7uA/us
Resolution			900uA	1.5mA	2.1mA	2.7mA
Setting			252mA/us~839.7mA/us	420mA/us~840mA/us	588mA/us~840A/us	756mA/us~839.7mA/us
Resolution			90uA	150uA	210uA	270uA
Setting			25.2mA/us~252mA/us	42mA/us~420mA/us	58.8mA/us~588mA/us	75.6mA/us~756mA/us
Resolution			9uA	15uA	21uA	27uA
Setting			2.52mA/us~25.2mA/us	4.2mA/us~42mA/us	5.88mA/us~58.8mA/us	7.56mA/us~75.6mA/us
Resolution			900nA	1.5uA	2.1uA	2.7uA
Setting			252nA/us~2.52mA/us	420uA/us~4.2mA/us	588uA/us~5.88mA/us	756uA/us~7.56mA/us

Resolution			90nA	150nA	210nA	270nA
Setting			25.2uA/us~252uA/us	42uA/us~420uA/us	58.8uA/us~588uA/us	75.6uA/us~756uA/us
Resolution			9nA	15nA	21nA	27nA
Setting			2.52uA/us~25.2uA/us	4.2uA/us~42uA/us	5.88uA/us~58.8uA/us	7.56uA/us~75.6uA/us
Accuracy of setting ⁻¹			±(10% of set + 25us)			
*1 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.						
Meter						
Voltmeter	Range	800V	0.00V~800.00V			
		80V	0.000V~80.000V			
	Accuracy	±(0.1 % of rdg + 0.1 % of f.s)				
Ammeter	Range	H	0.000A~157.50A	0.000A~262.50A	0.000A~367.50A	0.000A~472.50A
		M	0.0000A~157.50A	0.0000A~26.250A	0.0000A~36.750A	0.0000A~47.250A
		L	0.00mA~1575.0mA	0.00mA~2625.0mA	0.00mA~3675.0mA	0.00mA~4725.0mA
	Accuracy	±(1.2 % of rdg + 1.1 % of f.s)				
Wattmeter	Range	H,M	0.0W~3150.0W	0.0W~5250W	0.0W~7350.0W	0.0W~9450.0W
		L(CC/CR/CV mode)	0.000W~1023.7W	0.000W~1706.2W	0.000W~2388.7W	0.000W~3071.2W
		L(CP mode)	0.000W~ 31.500W	0.000W~ 52.500W	0.000W~ 73.500W	0.000W~ 94.500W
Dynamic mode						
Operation mode			CC and CR			
T1&T2			0.025ms ~ 10ms / Res : 1us 10ms ~ 30s / Res : 1ms			
Accuracy			1uS / 1mS ± 100ppm			
Frequency Range(Freq./Duty)			1 Hz ~20k Hz			
Frequency resolution	1 Hz ~ 9.9 Hz		0.1Hz			
	10 Hz ~ 99 Hz		1 Hz			
	100 Hz ~ 990Hz		10 Hz			
	1 kHz ~ 20kHz		100 Hz			
Frequency Accuracy of setting			(0.5% of set)			
Duty cycle setting(Freq./Duty)			1% ~99% , 0.1% step The minimum time width is 10 us.Between 1kHz and 20kHz, the maximum duty cycle is limited by the minimum time width.			
Slew Rate	Range	H	2.52mA/us~839.7mA/us	4.2mA/us~840mA/us	5.88mA/us~840mA/us	7.56mA/us~839.7mA/us

Setting range (CC mode)		M	252uA/us~83.97mA/us	420uA/us~84mA/us	588uA/us~84mA/us	756uA/us~83.97mA/us
		L	25.2uA/us~8.397mA/us	42uA/us~8.4mA/us	58.8uA/us~8.4mA/us	75.6uA/us~8.397mA/us
Slew Rate Setting range (CR mode)	Range	H	252uA/us~83.97mA/us	420uA/us~84mA/us	588uA/us~84mA/us	756uA/us~83.97mA/us
		M	25.2uA/us~8.397mA/us	42uA/us~8.4mA/us	58.8uA/us~8.4mA/us	75.6uA/us~8.397mA/us
		L	2.52uA/us~839.7uA/us	4.2uA/us~840uA/us	5.88uA/us~840uA/us	7.56uA/us~839.7uA/us
Resolution			900uA	1.5mA	2.1mA	2.7mA
Setting			252mA/us~839.7mA/us	420mA/us~840mA/us	588mA/us~840A/us	756mA/us~839.7mA/us
Resolution			90uA	150uA	210uA	270uA
Setting			25.2mA/us~252mA/us	42mA/us~420mA/us	58.8mA/us~588mA/us	75.6mA/us~756mA/us
Resolution			9uA	15uA	21uA	27uA
Setting			2.52mA/us~25.2mA/us	4.2mA/us~42mA/us	5.88mA/us~58.8mA/us	7.56mA/us~75.6mA/us
Resolution			900nA	1.5uA	2.1uA	2.7uA
Setting			252nA/us~2.52mA/us	420uA/us~4.2mA/us	588uA/us~5.88mA/us	756uA/us~7.56mA/us
Resolution			90nA	150nA	210nA	270nA
Setting			25.2uA/us~252uA/us	42uA/us~420uA/us	58.8uA/us~588uA/us	75.6uA/us~756uA/us
Resolution			9nA	15nA	21nA	27nA
Setting			2.52uA/us~25.2uA/us	4.2uA/us~42uA/us	5.88uA/us~58.8uA/us	7.56uA/us~75.6uA/us
Slew Rate Accuracy of setting			±(10% of set + 25us)			
Current Operating range	Range	H	0~157.5A	0~262.5A	0~367.5A	0~472.5A
		M	0~15.75A	0~26.25A	0~36.75A	0~47.25A
		L	0~1.575A	0~2.625A	0~3.675A	0~4.725A
Current Setting range	Range	H	0A~165.378A	0A~275.630A	0A~385.882A	0A~496.134A
		M	0A~16.5378A	0A~27.5630A	0A~38.5882A	0A~49.6134A
		L	0A~1.65378A	0A~2.75630A	0A~3.85882A	0A~4.96134A
Current Resolution		H	6mA	10mA	14mA	18mA
		M	0.6mA	1mA	1.4mA	1.8mA
		L	0.06mA	0.1mA	0.14mA	0.18mA
Current Accuracy			±0.4%F.S.			
Operating range ⁻¹	Range	H	31.5S~540uS(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	3.15S~540uS(317.46mΩ ~18.5185kΩ)	5.25S~0.9mS(190.476mΩ ~11.1111kΩ)	7.35S~126uS(136.054mΩ ~7.93651kΩ)	9.45S~126uS(105.82mΩ ~6.17284kΩ)
		L	315mS~540uS(3.1746Ω ~185.185kΩ)	525mS~0.9mS(1.90476Ω ~111.111kΩ)	735mS~12.6uS(1.36054Ω ~79.3651kΩ)	945mS~162uS(1.0582Ω ~61.7284kΩ)

Setting range	Range	H	33.075S~0 S(30.23 mΩ ~OPEN)	55.125S~0S(18.14 mΩ ~OPEN)	77.175S~0 S(12.96 mΩ ~OPEN)	99.225S~0 S(10.08 mΩ ~OPEN)
		M	3.3075S~0 S(302.34 mΩ ~OPEN)	5.5125S~0S(181.41 mΩ ~OPEN)	7.7175S~0 S(129.58 mΩ ~OPEN)	9.9225S~0 S(100.78 mΩ ~OPEN)
		L	330.75mS~0 S(3.02343 Ω ~OPEN)	551.25mS~0S(1.81406 Ω ~OPEN)	771.75mS~0 S(1.29576 Ω ~OPEN)	992.25mS~0 S(1.00781 Ω ~OPEN)
Resolution		H	540uS	900uS	1.26mS	1.62mS
		M	54uS	90uS	126uS	162uS
		L	5.4uS	9uS	12.6uS	16.2uS
Accuracy of setting ^{*2}		H,M	±(0.5 % of set*3 + 0.5 % of f.s.*4) + Vin*5/(3.24/N) MΩ : Alone operation specifications			
		L	±(0.5 % of set*3 + 0.5 % of f.s.) + Vin*5/(3.24/N) MΩ : Alone operation specifications			
		N*6	2	3	4	5
*1 Siemens[S] = Input current[A] / Input voltage[V] = 1 / resistance[Ω]						
*2 Converted value at the input current. At the input current. It is not applied for the condition of the parrallel operation.						
*3 set = Vin / Rset						
*4 f.s. = Full scscale of High Range						
*5 Vin = Input terminal voltage of Electronic Load						
*6 Parallel connection number						

Should you have any questions on the PEL-3000H series announcement, please don' t hesitate to contact US.

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