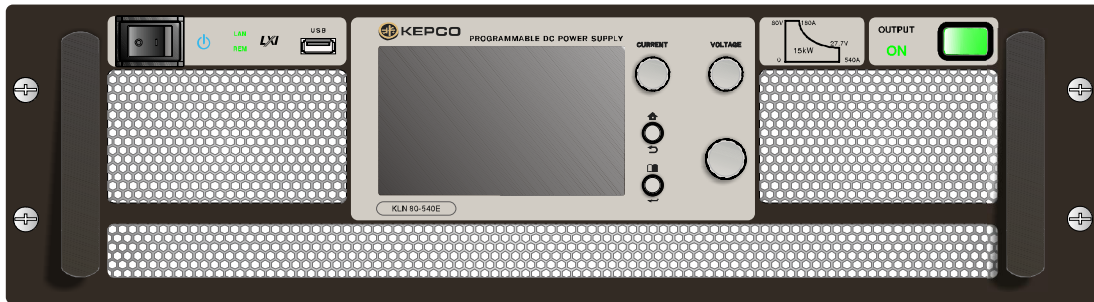


KLN Series Wide Range

Programmable DC Power Supply



Features

- **All Wide Range**; AC mains 180~460V, DC output 0~80V/540A to 0~1950V/27A.
- Each KLN can contain up to three power modules. Each power module runs on 3-phase Vac input, keeping the AC mains in balance, and complying with worldwide power distribution standards.
- 32 models give a range of power output from 5kW to 18kW.
- Built-in, patented synchronizing circuitry allows easy integration of 100 units to form an 1800kW power system.
- Active power factor correction, PF>0.99(480V input).
- Efficiency >95%+. (*2)

Electrical

- MHz switching frequency (15kW and 18kW models) with extremely low output ripple and noise. (*3)
- Multiple 32-bit ARM based embedded system gives a rapid boot of 10 seconds or less.
- Wide Bandgap power semiconductors such as the SiC MOSFET SBD give better performance, higher efficiency, and lower heat dissipation, increasing the range of acceptable ambient temperatures for use.
- Adjustable output voltage, current and power.
- Constant Voltage(CV), Constant Current(CC) and Constant Power(CP) , CV. CC. or CP working priority setting.
- Internal resistance adjustment function allows battery simulation.
- Provide True RMS current and True Watt readings.
- 18 bit DAC for Setting and 24 bit ADC for Measurement.
- Built-in Real Time Clock gives reliable time even when disconnected from a time server.
- It is possible to customize time synchronization to a time server.
- Remote sense functionality compensation voltage up to 5V.

Operational

- 5" touch screen with 3 definable background colors, 3 spin knobs with push-select and two push buttons give a clear and intuitive control.
- Patented multi-function HOME/RETURN key.
- Patented output ON/OFF button gives an extra layer of safety, allowing powered output only when both internal switches are triggered.
- Two kinds of output mode which can be changed following adjustment or after confirmation.
- Programmable over-voltage and over-current protection.
- Programmable output ramp-up and ramp-down protect the device under test.
- Up to 8000 sets of V/A/W data at 1ms intervals can be recorded and stored.
- Three sets of settings can be stored and recalled from the front panel.
- Free software gives control and sequence data setting.
- Data logging is timestamped.

Safety

- All models automatically discharge voltage to a safe range within 10 seconds of output being switched off.
- User definable power ON mode (LAST \ Output OFF or ON)
- Closed-case firmware upgrading and enhanced protection to prevent upgrade failures.
- Intelligent stepless speed controlled fans reduce acoustic noise while keeping system temperature low.
- Systems are shipped in CE approved, Filled Transport Packages approved, and Vibration Test approved shipping cases.

Interface

- Two LAN ports(LXI 1.4 approved) minimize wiring and reduce network complexity.
- Interface slot allows optional GPIB, RS422+485+USB, or Isolated Analog connections.
- Supports SCPI commands.
- Provides IVI-COM driver.
- Alarm signal output and Interlock mechanism prevent possible injury.
- Optional isolated analog programming port, 0~5V or 0~10V for setting and monitoring output V/A/W.
- Customized software gives an easy comparison between wide-range and traditional DC power supplies. (*5)

High Power/Current/Voltage Wide Range Output meet all Applications

- | | | | |
|--------------------------------|-----------------------|--------------------------|-------------------|
| ● Aerospace and Satellite Test | ● Battery Testing | ● Sputtering and Coating | ● Heat Processing |
| ● Semiconductor Equipments | ● Vehicle Electronics | ● Chemical Treatment | ● QC Testing |
| ● Solar Cell/Array Application | ● DC to DC Convertors | ● Water Purification | ● LED Testing |
| ● Contact/Connector Testing | ● DC to AC Invertors | ● Electronic Anti-rust | ● Lighting |
| ● Telecom and IT Industries | ● New Energy R&D | ● Factory Automation | ● MOCVD |
| ● Automated Test Equipment | | | |

note : *1: The ratio varies by model.

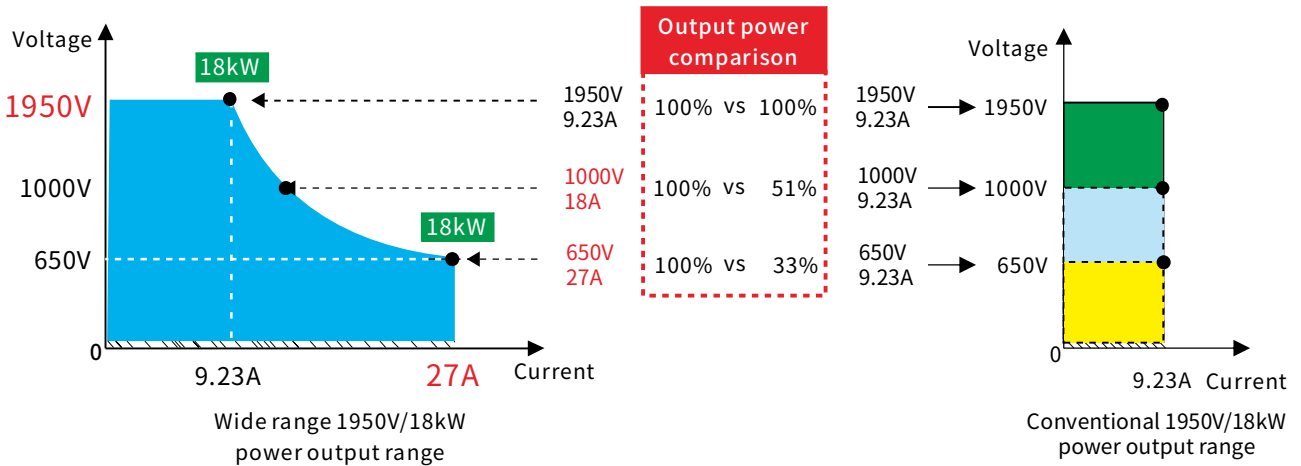
*2: The efficiency varies by model and input voltage.

*3: MHz switching frequency on selective models.

*4: The format of USB flash drive should be FAT16(2GB) or FAT32(32GB) USB2.0).

Output Characteristic

The KLN series provides various voltage and current combinations at full power. This makes the KLN useful in a broader range of applications, replacing multiple traditional DC power supplies.



Power rating

Output Power (32 models)	Models	Max. Voltage	Current @ Max. Voltage	Voltage @ Max. Current	Max. Current
		V1	A1	V2	A2
5kW (5 models)	KLN 80-180E	80 V	62.5 A	27.77 V	180 A
	KLN 250-60E	250 V	20 A	83.33 V	60 A
	KLN 350-42E	350 V	14.28 A	119.04 V	42 A
	KLN 500-30E	500 V	10 A	166.66 V	30 A
	KLN 650-23E	650 V	7.69 A	217.39 V	23 A
10kW (8 models)	KLN 80-360E	80 V	125 A	27.77 V	360 A
	KLN 160-180E	160 V	62.5 A	55.55 V	180 A
	KLN 250-120E	250 V	40 A	83.33 V	120 A
	KLN 350-84E	350 V	28.57 A	119.04 V	84 A
	KLN 500-60E	500 V	20 A	166.66 V	60 A
	KLN 650-46E	650 V	15.38 A	217.39 V	46 A
	KLN 1000-30E	1000 V	10 A	333.33 V	30 A
	KLN 1300-23E	1300 V	7.69 A	434.78 V	23 A
15kW (9 models)	KLN 80-540E	80 V	187.5 A	27.77 V	540 A
	KLN 250-180E	250 V	60 A	83.33 V	180 A
	KLN 350-126E	350 V	42.85 A	119.04 V	126 A
	KLN 500-90E	500 V	30 A	166.66 V	90 A
	KLN 650-69E	650 V	23.07 A	217.39 V	69 A
	KLN 750-60E	750 V	20 A	250 V	60 A
	KLN 1050-42E	1050 V	14.28 A	357.14 V	42 A
	KLN 1500-30E	1500 V	10 A	500 V	30 A
	KLN 1950-23E	1950 V	7.69 A	650 V	23 A
6kW (2 models)	KLN 500-36E	500 V	12 A	166.66 V	36 A
	KLN 650-27E	650 V	9.23 A	222.22 V	27 A
12kW (4 models)	KLN 500-72E	500 V	24 A	166.66 V	72 A
	KLN 650-54E	650 V	18.46 A	222.22 V	54 A
	KLN 1000-36E	1000 V	12 A	333.33 V	36 A
18kW (4 models)	KLN 1300-27E	1300 V	9.23 A	444.44 V	27 A
	KLN 500-108E	500 V	36 A	166.66 V	108 A
	KLN 650-81E	650 V	27.69 A	222.22 V	81 A
	KLN 1500-36E	1500 V	12 A	500 V	36 A
	KLN 1950-27E	1950 V	9.23 A	666.66 V	27 A

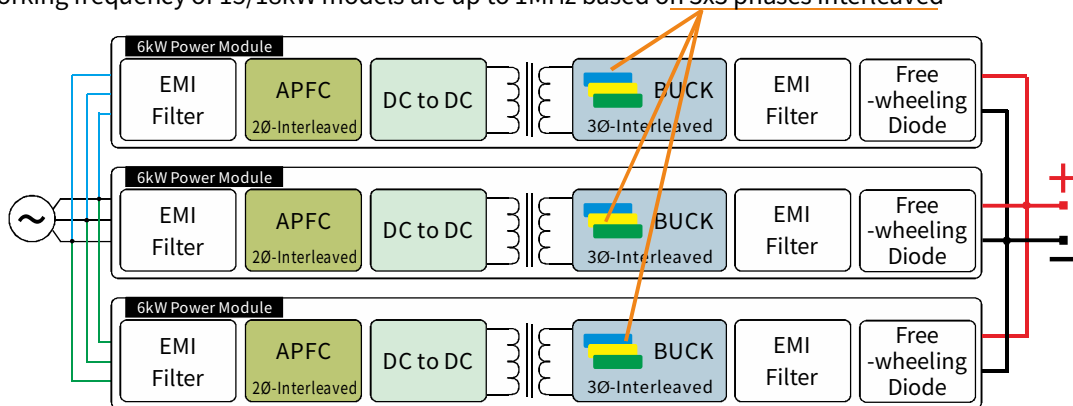
* Any output power combination from V1 x A1 to V2 x A2 is possible, but V1 x A2 is not allowed.

Block Diagram

Power Module

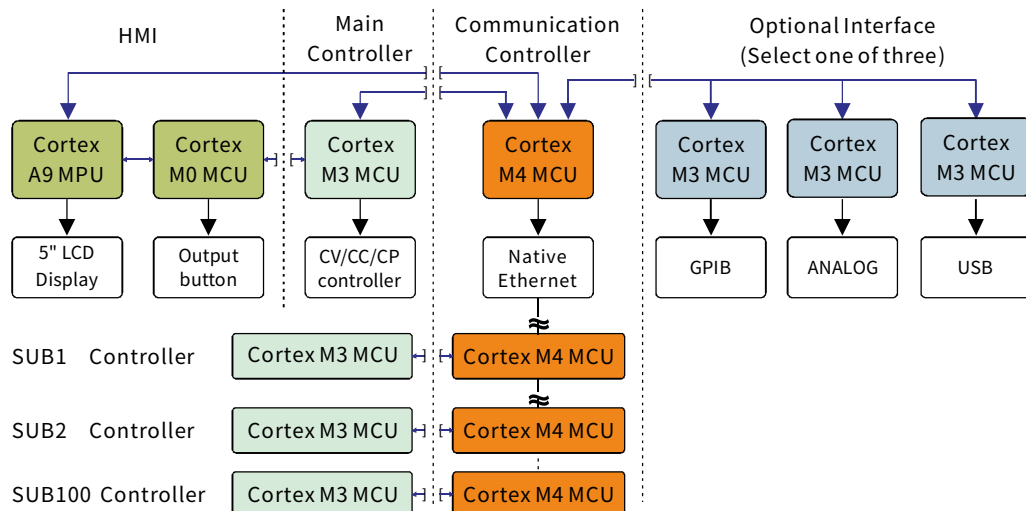
The power module of the KLN series uses a state-of-the-art SiC MOSFET/SBD and full 3-stage structure, with the following features: :

1. 3-phase line input keeps AC mains balanced and conforms with worldwide power distribution standards.
2. Forms 10-18kW models by internal series or parallel.
3. All power modules (up to 3) inside the unit are controlled by a single CV/CC circuit, eliminating chasing during transition.
4. Full 3 stage structure delivers the best efficiency with synergy efficiencies near 96%.
5. The 1st stage (APFC) has a two-phase interleaved design which gives high frequency, high density, high efficiency and low distortion.
6. The 2nd stage is an isolated, 99% high-efficiency DC to DC converter.
7. The 3rd stage is a buck circuit, consisting of 3 sets of interleaved SiC MOSFETs with a working frequency of up to 333 kHz.
8. The working frequency of 15/18kW models are up to 1MHz based on 3x3 phases interleaved



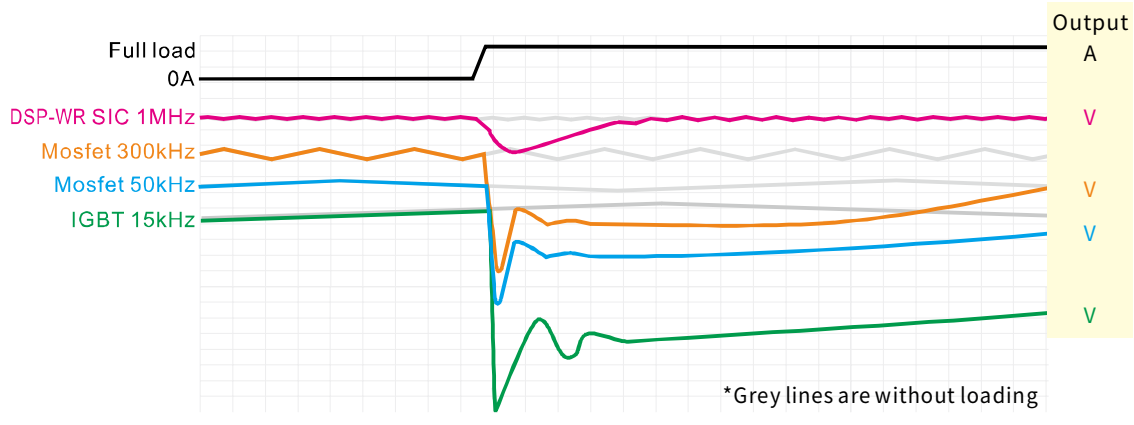
Control Module

1. The KLN series uses multiple 32-bit RAM MCUs and embedded RTOS. Each major control circuit has a dedicated embedded processor to ensure the highest performance, delivering the fastest response time in the industry.
2. Each control module signal and power circuit is completely isolated, delivering the best noise protection to ensure measurement accuracy and control stability.
3. The KLN series uses a Cortex M4 CPU to drive the built-in network capability for Main/SUBsidiary control. This design allows the KLN family to parallel more than 100 units to form high output power systems, without additional devices.



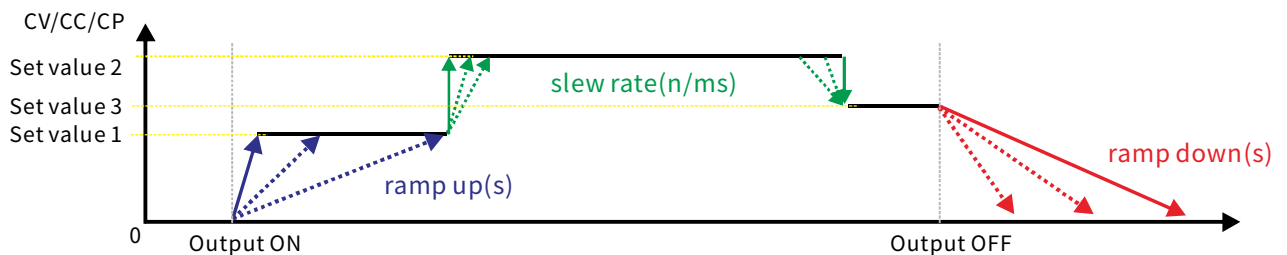
MHz Switching Frequency

The KLN multi-phase interleaved design boosts switching frequency to 1 MHz. The higher frequency allows the system to output with minimal ripple and respond to load variations faster than other systems. The KLN series is the first programmable DC power supply to reach MHz switching frequencies.



Adjustable Output On/Off Slope

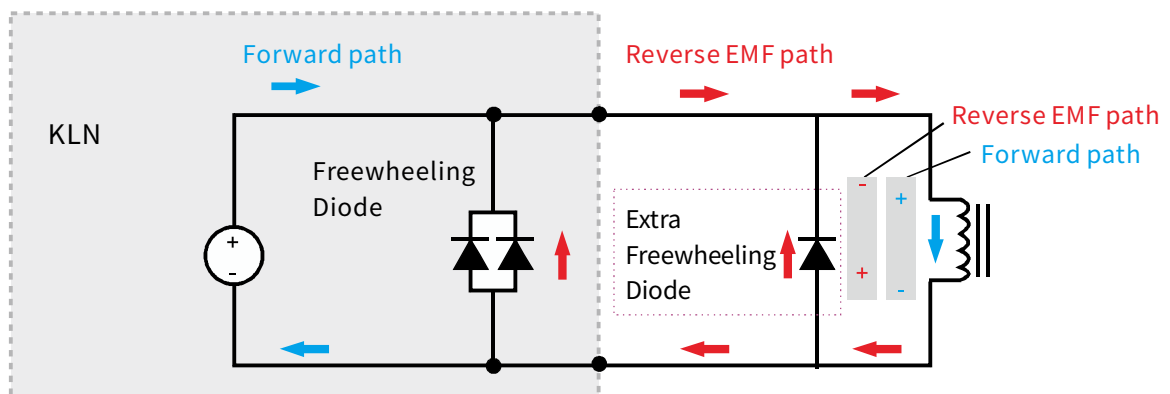
The output slope is based on the Slew Rate setup. If the Ramp Up/Down is more rapid than the Slew Rate, the KLN will default to Slew Rate settings. In the example below, the Ramp Up setting is higher than the Slew Rate, so the output voltage increases more gradually.



*1. Exact Ramp Down time may be affected by settings and load characteristics.

Output Protection

The KLN series is fully protected from Reverse EMF through thoughtful design, as shown below. The freewheeling diodes are rated 20% above any anticipated load.



Output Slewing Rates

The KLN series power supplies allow you to specify the slewing rates for Voltage, Current, and Power. The supported slewing rates are shown in the charts below.

1. Setting ranges for Voltage slewing rates :

Model	80V	160V	250V	350V	500V
5kW	0.008V/ms ~ 80V/ms	--	0.025V/ms ~ 250V/ms	0.035V/ms ~ 350V/ms	0.05V/ms ~ 500V/ms
6kW	--	--	--	--	0.05V/ms ~ 500V/ms
10kW	0.008V/ms ~ 80V/ms	0.016V/ms ~ 160V/ms	0.025V/ms ~ 250V/ms	0.035V/ms ~ 350V/ms	0.05V/ms ~ 500V/ms
12kW	--	--	--	--	0.05V/ms ~ 500V/ms
15kW	0.008V/ms ~ 80V/ms	--	0.025V/ms ~ 250V/ms	0.035V/ms ~ 350V/ms	0.05V/ms ~ 500V/ms
18kW	--	--	--	--	0.05V/ms ~ 500V/ms

Model	650V	750V	1000V	1050V	1300V
5kW	0.065V/ms ~ 650V/ms	--	--	--	--
6kW	0.065V/ms ~ 650V/ms	--	--	--	--
10kW	0.065V/ms ~ 650V/ms	--	0.1V/ms ~ 1000V/ms	--	0.13V/ms ~ 1300V/ms
12kW	0.065V/ms ~ 650V/ms	--	0.1V/ms ~ 1000V/ms	--	0.13V/ms ~ 1300V/ms
15kW	0.065V/ms ~ 650V/ms	0.075V/ms ~ 750V/ms	--	0.105V/ms ~ 1050V/ms	--
18kW	0.065V/ms ~ 650V/ms	--	--	--	--

Model	1500V	1950V
15kW	0.15V/ms ~ 1500V/ms	0.195V/ms ~ 1950V/ms
18kW	0.15V/ms ~ 1500V/ms	0.195V/ms ~ 1950V/ms

2. Setting ranges for Current slewing rates :

Model	80V	160V	250V	350V	500V
5kW	0.018A/ms ~ 180A/ms	--	0.006A/ms ~ 60A/ms	0.0042A/ms ~ 42A/ms	0.003A/ms ~ 30A/ms
6kW	--	--	--	--	0.0036A/ms ~ 36A/ms
10kW	0.036A/ms ~ 360A/ms	0.018A/ms ~ 180A/ms	0.012A/ms ~ 120A/ms	0.0084A/ms ~ 84A/ms	0.006A/ms ~ 60A/ms
12kW	--	--	--	--	0.0072A/ms ~ 72A/ms
15kW	0.054A/ms ~ 540A/ms	--	0.018A/ms ~ 180A/ms	0.0126A/ms ~ 126A/ms	0.009A/ms ~ 90A/ms
18kW	--	--	--	--	0.0108A/ms ~ 108A/ms

Model	650V	750V	1000V	1050V	1300V
5kW	0.0023A/ms ~ 23A/ms	--	--	--	--
6kW	0.0027A/ms ~ 27A/ms	--	--	--	--
10kW	0.0046A/ms ~ 46A/ms	--	0.003A/ms ~ 30A/ms	--	0.0023A/ms ~ 23A/ms
12kW	0.0054A/ms ~ 54A/ms	--	0.0036A/ms ~ 36A/ms	--	0.0027A/ms ~ 27A/ms
15kW	0.0069A/ms ~ 69A/ms	0.006A/ms ~ 60A/ms	--	0.0042A/ms ~ 42A/ms	--
18kW	0.0081A/ms ~ 81A/ms	--	--	--	--

Model	1500V	1950V
15kW	0.003A/ms ~ 30A/ms	0.0023A/ms ~ 23A/ms
18kW	0.0036A/ms ~ 36A/ms	0.0027A/ms ~ 27A/ms

3. Setting ranges for Power slewing rates :

Model	80V	160V	250V	350V	500V
5kW	0.5W/ms ~ 500W/ms	--	0.5W/ms ~ 500W/ms	0.5W/ms ~ 500W/ms	0.5W/ms ~ 500W/ms
6kW	--	--	--	--	0.6W/ms ~ 600W/ms
10kW	1W/ms ~ 1000W/ms	1W/ms ~ 1000W/ms	1W/ms ~ 1000W/ms	1W/ms ~ 1000W/ms	1W/ms ~ 1000W/ms
12kW	--	--	--	--	1.2W/ms ~ 1200W/ms
15kW	1.5W/ms ~ 1500W/ms	--	1.5W/ms ~ 1500W/ms	1.5W/ms ~ 1500W/ms	1.5W/ms ~ 1500W/ms
18kW	--	--	--	--	1.8W/ms ~ 1800W/ms

Model	650V	750V	1000V	1050V	1300V
5kW	0.5W/ms ~ 500W/ms	--	--	--	--
6kW	0.6W/ms ~ 600W/ms	--	--	--	--
10kW	1W/ms ~ 1000W/ms	--	1W/ms ~ 1000W/ms	--	1W/ms ~ 1000W/ms
12kW	1.2W/ms ~ 1200W/ms	--	1.2W/ms ~ 1200W/ms	--	1.2W/ms ~ 1200W/ms
15kW	1.5W/ms ~ 1500W/ms	1.5W/ms ~ 1500W/ms	--	1.5W/ms ~ 1500W/ms	--
18kW	1.8W/ms ~ 1800W/ms	--	--	--	--

Model	1500V	1950V
15kW	1.5W/ms ~ 1500W/ms	1.5W/ms ~ 1500W/ms
18kW	1.8W/ms ~ 1800W/ms	1.8W/ms ~ 1800W/ms

*1. Exact Slewing Rate may be affected by other settings and load characteristics.

*2. For an explanation of Slewing Rate, please refer to page 9 "Adjustable Output On/Off Slope."

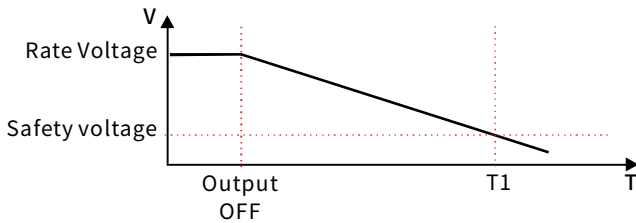
*3. For higher Slewing Rates, please contact Kepco.

Output Capacitance

model	80V	160V	250V	350V	500V	650V	750V	1000V	1050V	1300V	1500V	1950V
5kW	4230 μ F	--	1350 μ F	738 μ F	115 μ F	115 μ F	--	--	--	--	--	--
6kW	--	--	--	--	115 μ F	115 μ F	--	--	--	--	--	--
10kW	8460 μ F	2115 μ F	2700 μ F	1476 μ F	230 μ F	230 μ F	--	57.5 μ F	--	57.5 μ F	--	--
12kW	--	--	--	--	230 μ F	230 μ F	--	57.5 μ F	--	57.5 μ F	--	--
15kW	12690 μ F	--	4050 μ F	2214 μ F	345 μ F	345 μ F	450 μ F	--	246 μ F	--	38.3 μ F	38.3 μ F
18kW	--	--	--	--	345 μ F	345 μ F	--	--	--	--	38.3 μ F	38.3 μ F

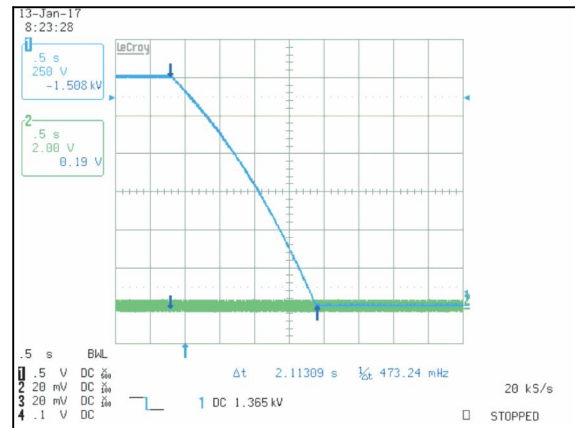
Auto-discharge

The KLN series automatically dissipates energy to about 60V or less within 10 seconds of Output OFF.



No load down time

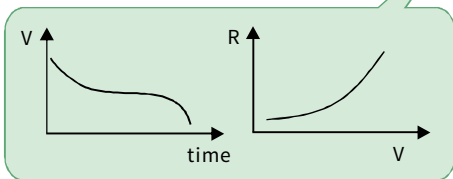
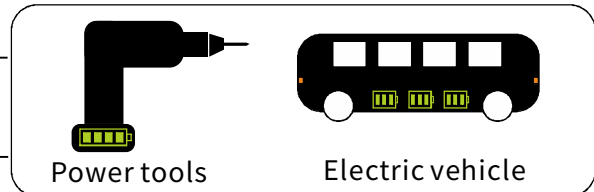
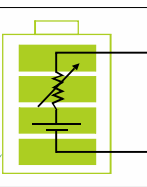
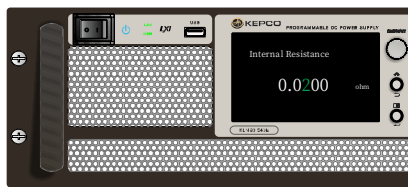
Model	T1	Model	T1	Model	T1
80V	5 sec	650V	6 sec	1500V	5 sec
160V	10 sec	750V	10 sec	1950V	6 sec
250V	10 sec	1000V	5 sec		
350V	10 sec	1050V	10 sec		
500V	5 sec	1300V	6 sec		



KLN1500-30E 2.11 seconds discharging time at no loading

Internal Resistance Simulation

The KLN series includes built-in resistance simulation allowing users to replicate battery behavior, accurate to 5 digits.



5kW model	Internal R range
KLN 80-180E	0~0.4444 Ω
KLN 250-60E	0~4.1667 Ω
KLN 350-42E	0~8.3333 Ω
KLN 500-30E	0~16.667 Ω
KLN 650-23E	0~28.261 Ω

6kW model	Internal R range
KLN 500-36E	0 ~ 13.888 Ω
KLN 650-27E	0 ~ 24.074 Ω

10kW model	Internal R range
KLN 80-360E	0 ~ 0.2222 Ω
KLN 160-180E	0 ~ 0.8888 Ω
KLN 250-120E	0 ~ 2.0833 Ω
KLN 350-84E	0 ~ 4.1667 Ω
KLN 500-60E	0 ~ 8.3333 Ω
KLN 650-46E	0 ~ 14.130 Ω
KLN 1000-30E	0 ~ 33.333 Ω
KLN 1300-23E	0 ~ 56.521 Ω

12kW model	Internal R range
KLN 500-72E	0 ~ 6.9444 Ω
KLN 650-54E	0 ~ 12.037 Ω
KLN 1000-36E	0 ~ 27.777 Ω
KLN 1300-27E	0 ~ 48.148 Ω

15kW model	Internal R range
KLN 80-540E	0 ~ 0.1481 Ω
KLN 250-180E	0 ~ 1.3889 Ω
KLN 350-126E	0 ~ 2.7778 Ω
KLN 500-90E	0 ~ 5.5556 Ω
KLN 650-69E	0 ~ 9.4203 Ω
KLN 750-60E	0 ~ 12.500 Ω
KLN 1050-42E	0 ~ 25.000 Ω
KLN 1500-30E	0 ~ 50.000 Ω
KLN 1950-23E	0 ~ 84.782 Ω

18kW model	Internal R range
KLN 500-108E	0 ~ 4.6296 Ω
KLN 650-81E	0 ~ 8.0246 Ω
KLN 1500-36E	0 ~ 41.666 Ω
KLN 1950-27E	0 ~ 72.222 Ω

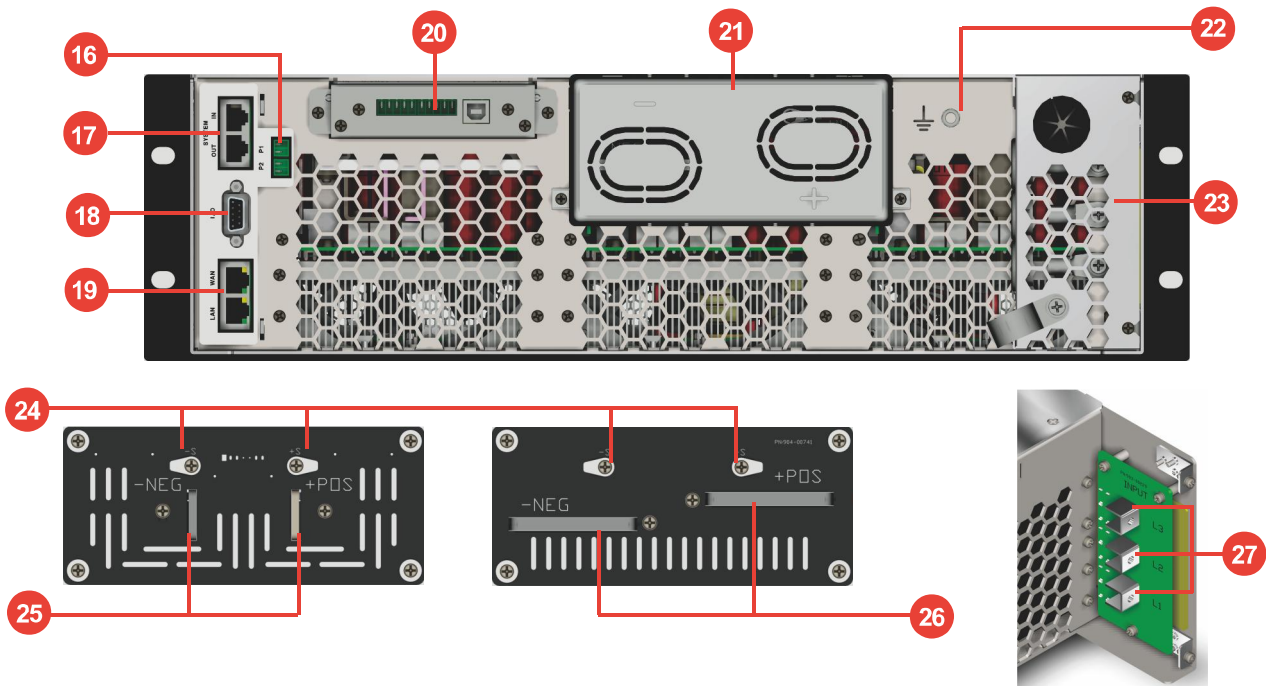
Front Panel

- ① Power switch
- ② Power indicator
- ③ LAN indicator
- ④ Remote control indicator
- ⑤ USB HOST
- ⑥ Operating and displaying area
- ⑦ Independent current setting knob with push button function
- ⑧ Independent voltage setting knob with push button function
- ⑨ EDIT/POWERADJUST and front panel lock multifunction knob
- ⑩ HOME/RETURN multifunction key
- ⑪ MENU/ENTER multifunction key
- ⑫ Power supply series
- ⑬ Output indicator
- ⑭ Output enable/disable key



Rear Panel

- ⑬ Current sharing
- ⑭ System IN/OUT
- ⑮ Digital I/O
- ⑯ LAN (LXI) connector
- ⑰ Slot for optional interfaces
- ⑱ Output terminals and cover
- ⑲ Output terminals
- ⑳ Output terminals (80V/10kW & 15kW)
- ㉑ Remote sense/compensation terminal
- ㉒ Output terminals
- ㉓ Output terminals (80V/10kW & 15kW)
- ㉔ AC input terminals
- ㉕ Ground terminal (earth terminal)
- ㉖ Input protective cover



MAIN / SUBsidiary Configuration

Several configurations of pre-assembled rack with Power Distribution Unit (PDU) are available.

- **Paralleling up to 100 units**

Up to 1,800kW

Up to 54,000A (80V model)

- **MAIN automatically detects all SUB units.**

- **Surplus SUB unit(s) can be off to save energy. (*1)**

- **Zero gap stacking, superior power density.**
180kW in 30U rack

- **Aggregated display**

MAIN unit controls and displays the actual values of entire system.

- **Ultra-fast synchronization**

Up to several Mbps of synchronization, extremely low ripple.

- **Smart PDU**

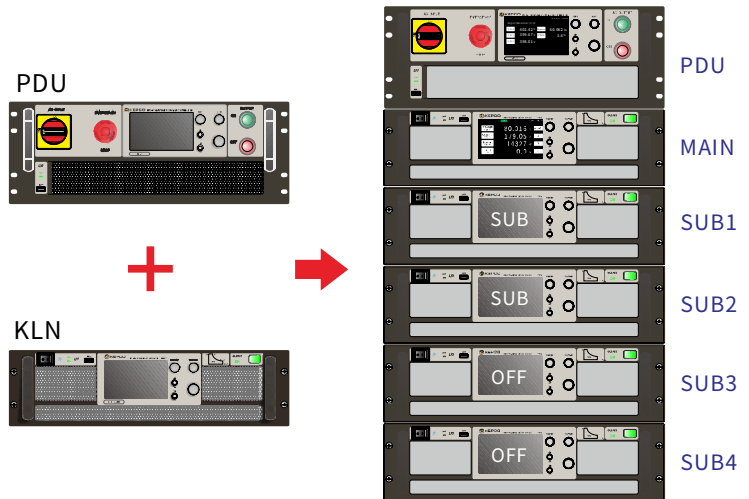
Full remote control.

Sequential power on/off of SUB units.

Monitoring power quality and power consumption.

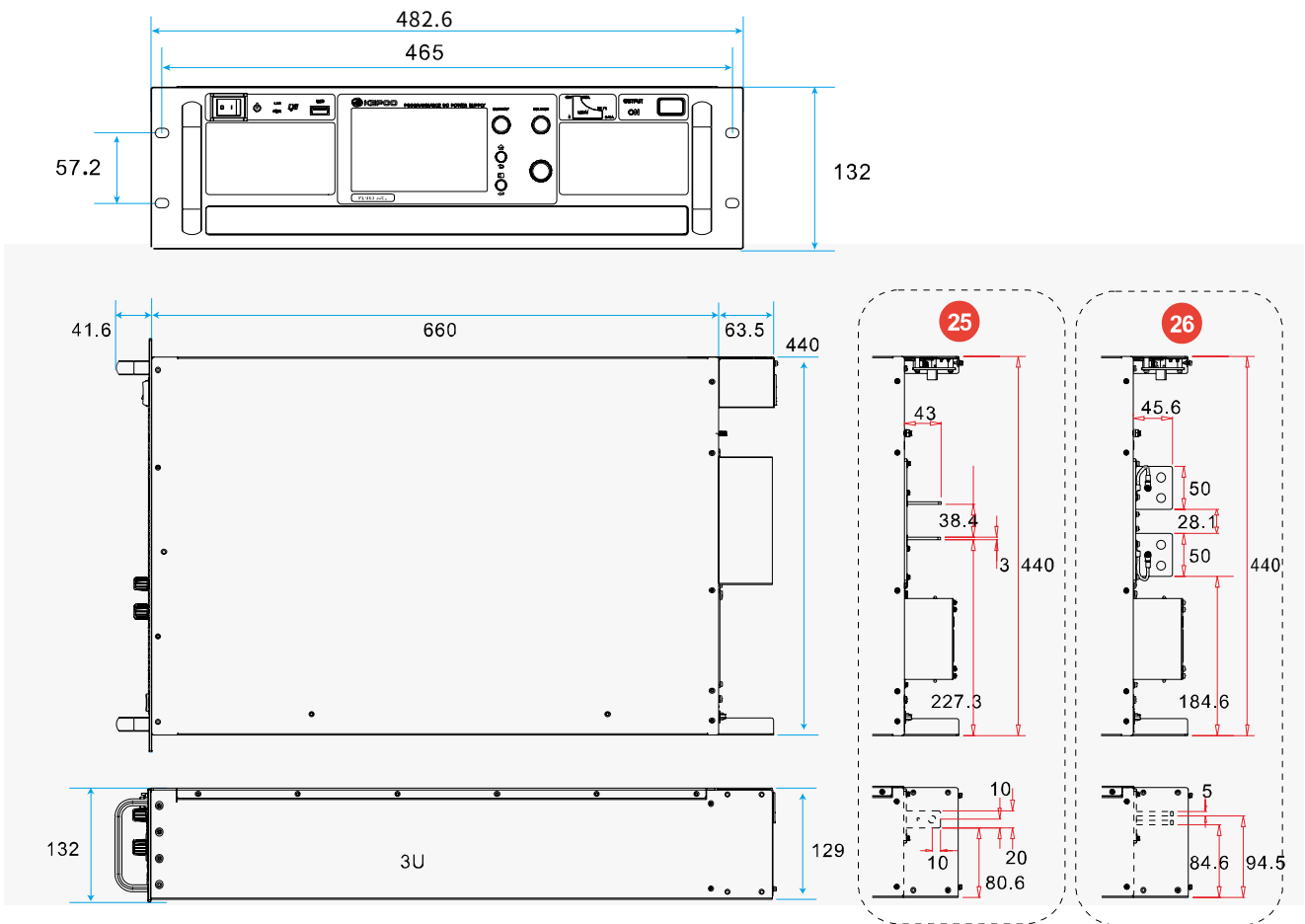
- **Expand the Power Capacity**

KLN and KLN-A(blank panel) series Programmable DC Power Supply allows 100 units paralleling



*1 : Switch Off from the last unit

Dimensions (mm)

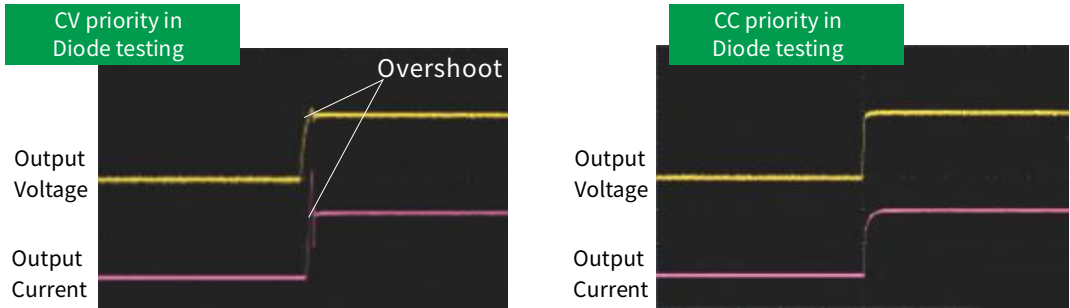


Application

Diode, Laser Diode, LED, Power Chip Testing

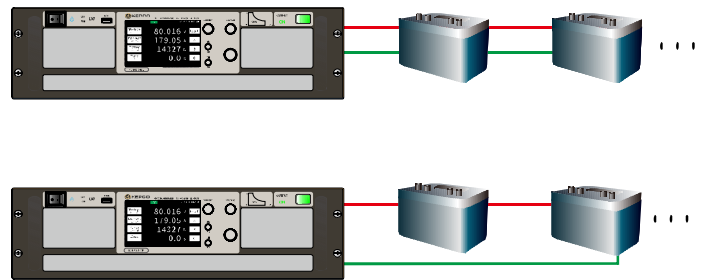
KLN series provides CV(Constant Voltage), CC(Constant Current) and CP(Constant Power) modes; users can select the mode suitable to their test requirements.

Below shows an application of CC mode avoiding any current/voltage overshoot during diode validation.



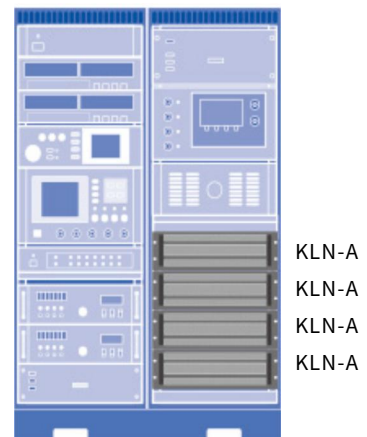
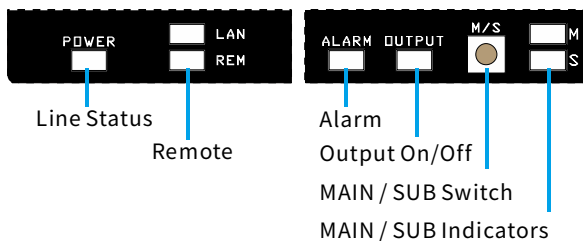
Lead Acid /Lithium Battery Testing

- KEPCO wide range DC Power Supply can adjust output range to fit various battery layouts. The KLN series reduces the cost of purchasing purpose-built power supplies.
- By using KLN series DC Power Supply, one unit can reach high voltage/low current and low voltage/high current, significantly reducing the cost and space requirements of test equipment.
- KLN series Wide Range DC Power Supply with sufficient current and voltage capacity to test batteries in parallel or series.



ATE Integration

- KLN-A series without front panel are suitable for ATE and SUBsidiary unit application.
- Full function design capable of acting as a MAIN unit.
- Equipped with indicators to show operating conditions for convenient visual checks.



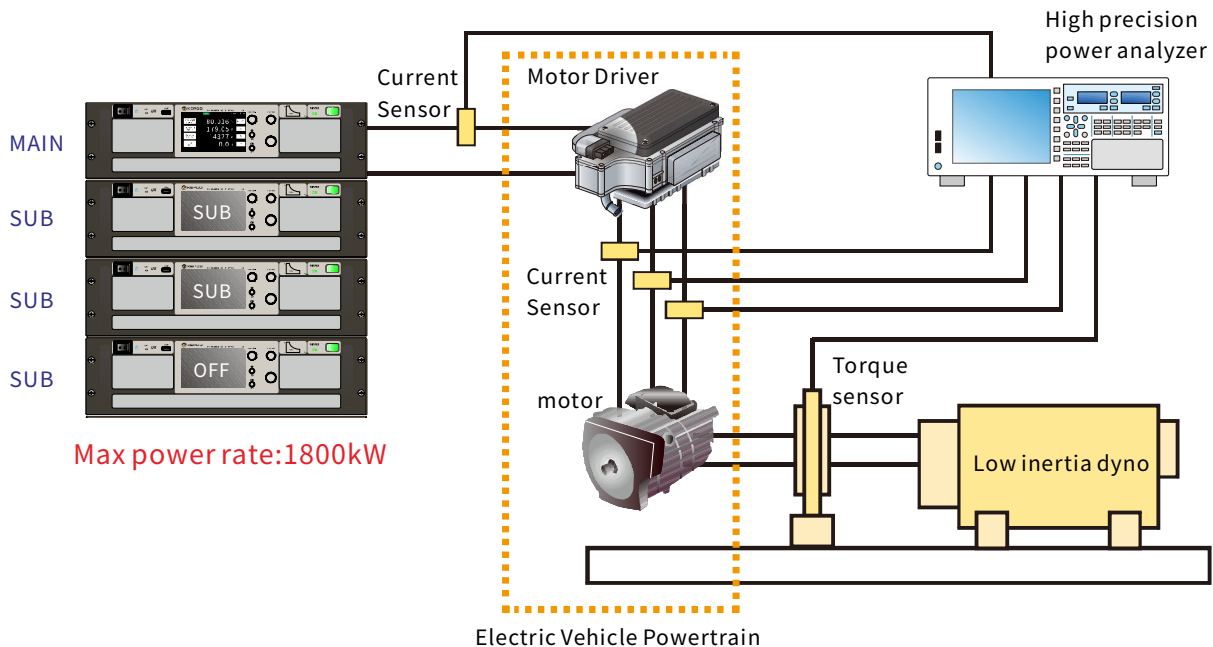
Application

Electric/Hybrid Vehicle and General Motor Testing

While electric vehicle design pursues better endurance and energy conversion efficiency, there is an increasing demand for highly flexible and reliable DC power supplies.

The KLN series DC power supply provides 5kW-1800kW wide-range voltage/current control.

They are capable of adjusting to all test scenarios.



GUI software

- This application software is compatible with KLN series Wide Range Programmable DC Power Supply.
- Synchronously control up to 16 units of KLN Series. (*1)
- Simulation panel control of output voltage, current, power and other parameters.
- Provide 16 sets Sequence Group containing 500 step of each Sequence, have loop and Random Sequence setting.



(*1) functions are opened only in full version, and can apply trial-use for standard version.

KLN Firmware Update

Update firmware easily with PC and KLN-OPT-FUA adaptor.

RISK FREE

Enhanced safety mechanism to prevent any firmware update failure.



5kW ~ 10kW Specifications

Rated Power	5kW	5kW	5kW	5kW	5kW	10kW
Model number	KLN 80-180E	KLN 250-60E	KLN 350-42E	KLN 500-30E	KLN 650-23E	KLN 80-360E
Rated Voltage	80V	250V	350V	500V	650V	80V
Rated Current	180A	60A	42A	30A	23A	360A
Constant Voltage						
Rated value	0~80V	0~250V	0~350V	0~500V	0~650V	0~80V
Settable range	0~84V	0~262.5V	0~367.5V	0~525V	0~682.5V	0~84V
Over voltage protection (OVP)	0%~110% of rated output voltage					
Voltage @ Max. Current	27.77V	83.33V	119.04V	166.66V	217.39V	27.77V
Programming resolution	5 digits					
Programming accuracy(*2)	±0.1% of rated voltage					
Meter resolution	5 digits					
Meter accuracy(*2)	± 0.1% of rated voltage					
Line regulation(*6)	±0.02% of rated voltage (with local sense)					
Load regulation(*7)	±0.05% of rated voltage (with local sense)					
Temperature coefficient for set values	100ppm/°C of rated output voltage, after a 30 minutes warm-up					
Ripple & noise(*3)(*4) Vpp (with local sense)(CV Mode) Vrms	<180mV <15mV	<270mV <36mV	<288mV <50mV	<315mV <63mV	<720mV <180mV	<288mV <23mV
Full load up	<30ms					
Full load down	<80ms					
No load down	<5s	<10s	<10s	<5s	<6s	<5s
Transient Response(*5)	<1.5ms					
Remote Compensation	6V	6V	9V	10V	16V	6V
Constant Current						
Rated value	0~180A	0~60A	0~42A	0~30A	0~23A	0~360A
Settable range(*10)	0~189A	0~63A	0~44.1A	0~31.5A	0~24.15A	0~378A
Over current protection (OCP)	0%~110% of rated output current					
Current @ Max. Voltage	62.5A	20A	14.28A	10A	7.69A	125A
Programming resolution	5 digits					
Programming accuracy(*2)	±0.2% of rated current					
Meter resolution	5 digits					
Meter accuracy(*2)	± 0.2% of rated current					
Line regulation(*6)	±0.05% of rated current					
Load regulation(*7)	±0.15% of rated current					
Temperature coefficient for set values	100ppm/°C of rated output voltage, after a 30 minutes warm-up					
Ripple & noise(*3)(*4) Arms (with local sense)(CC Mode)	72mA	20mA	16mA	15mA	15mA	144mA
Constant Power						
Rated value	0~5kW	0~5kW	0~5kW	0~5kW	0~5kW	0~10kW
Settable range(*9)	0~5100W	0~5100W	0~5100W	0~5100W	0~5100W	0~10200W
Over power protection (OPP)	0%~110% of rated output current					
Programming resolution	5 digits					
Programming accuracy	< 1% of rated power					
Meter resolution	5 digits					
Meter accuracy(*2)	± 0.5% of rated power					
Line regulation(*6)	< 0.05% of rated power					
Load regulation(*7)	< 0.75% of rated power					
Internal resistance						
Adjustment range	0~0.4444Ω	0~4.1667Ω	0~8.3333Ω	0~16.667Ω	0~28.261Ω	0~0.2222Ω
Programming resolution	0.0001Ω	0.0001Ω	0.0001Ω	0.001Ω	0.001Ω	0.0001Ω
Programming Accuracy(*2)	≤2.3% of max. resistance					
Input						
Nominal input rating	200~415V 50Hz/60Hz 3-phase 3 wires , Optional 480V 50/60Hz 3-phase 4 wires					
Input voltage range	180~460VAC , Optional 480VAC type:432~528VAC					
Input frequency range	47Hz~63Hz					
Current (Maximum)(Input 3P180V)	20A/phase	20A/phase	20A/phase	20A/phase	20A/phase	40A/phase
Inrush current(Input 3P 460V)	33A/phase	33A/phase	33A/phase	33A/phase	33A/phase	66A/phase
Input Power (Maximum)	6kVA	6kVA	6kVA	6kVA	6kVA	12kVA
Efficiency	86~95% varies by model(*1)					
Leakage current	< 3.5 mA					
Power Factor	0.99 typ.(480V input) / 0.95 typ.(200~415V input)					
Insulation						
Primary - Chassis	DC 2500V					
Primary - Secondary	DC 2500V					
Secondary - Chassis	DC750V	DC750V	DC750V	DC1000V	DC1500V	DC750V
Weights and dimensions						
Dimensions(WxHxD)	Enclosure : 440 x 129 x 660 mm , Total : 482 x 132 x 765.1 mm					
Weight (kg)	27.5	26	26	26	26	36.3

10kW Specifications

Rated Power	10kW	10kW	10kW	10kW	10kW	10kW
Model number	KLN 160-180E	KLN 250-120E	KLN 350-84E	KLN 500-60E	KLN 650-46E	KLN 1000-30E
Rated Voltage	160V	250V	350V	500V	650V	1000V
Rated Current	180A	120A	84A	60A	46A	30A
Constant Voltage						
Rated value	0~160V	0~250V	0~350V	0~500V	0~650V	0~1000V
Settable range	0~168V	0~262.5V	0~367.5V	0~525V	0~682.5V	0~1050V
Over voltage protection (OVP)	0%~110% of rated output voltage					
Voltage @ Max. Current	55.55V	83.33V	119.04V	166.66V	217.39V	333.33V
Programming resolution	5 digits					
Programming accuracy(*2)	±0.1% of rated voltage					
Meter resolution	5 digits					
Meter accuracy(*2)	± 0.1% of rated voltage					
Line regulation(*6)	± 0.02% of rated voltage (with local sense)					
Load regulation(*7)	± 0.05% of rated voltage (with local sense)					
Temperature coefficient for set values	100ppm/°C of rated output voltage, after a 30 minutes warm-up					
Ripple & noise(*3)(*4)	Vpp	<432mV	<270mV	<288mV	<315mV	<720mV
(with local sense)(CV Mode)	Vrms	<35mV	<36mV	<50mV	<63mV	<180mV
Full load up	<30ms					
Full load down	<80ms					
No load down	<5s	<10s	<10s	<5s	<6s	<10s
Transient Response(*5)	<1.5ms					
Remote Compensation	6V	6V	9V	10V	16V	22V
Constant Current						
Rated value	0~180A	0~120A	0~84A	0~60A	0~46A	0~30A
Settable range(*10)	0~189A	0~126A	0~88.2A	0~63A	0~48.3A	0~31.5A
Over current protection (OCP)	0%~110% of rated output current					
Current @ Max. Voltage	62.5A	40A	28.57A	20A	15.38A	10A
Programming resolution	5 digits					
Programming accuracy(*2)	±0.2% of rated current					
Meter resolution	5 digits					
Meter accuracy(*2)	± 0.2% of rated current					
Line regulation(*6)	± 0.05% of rated current					
Load regulation(*7)	± 0.15% of rated current					
Temperature coefficient for set values	100ppm/°C of rated output voltage, after a 30 minutes warm-up					
Ripple & noise(*3)(*4)	Arms	72mA	40mA	32mA	29mA	29mA
(with local sense)(CC Mode)						20mA
Constant Power						
Rated value	0~10kW	0~10kW	0~10kW	0~10kW	0~10kW	0~10kW
Settable range(*9)	0~10200W	0~10200W	0~10200W	0~10200W	0~10200W	0~10200W
Over power protection (OPP)	0%~110% of rated output current					
Programming resolution	5 digits					
Programming accuracy	< 1% of rated power					
Meter resolution	5 digits					
Meter accuracy(*2)	± 0.5% of rated power					
Line regulation(*6)	< 0.05% of rated power					
Load regulation(*7)	< 0.75% of rated power					
Internal resistance						
Adjustment range	0~0.8888Ω	0~2.0833Ω	0~4.1667Ω	0~8.3333Ω	0~14.130Ω	0~33.333Ω
Programming resolution	0.0001Ω	0.0001Ω	0.0001Ω	0.0001Ω	0.001Ω	0.001Ω
Programming Accuracy(*2)	≤2.3% of max. resistance					
Input						
Nominal input rating	200~415V 50Hz/60Hz 3-phase 3 wires , Optional 480V 50/60Hz 3-phase 4 wires					
Input voltage range	180~460VAC , Optional 480VAC type:432~528VAC					
Input frequency range	47Hz~63Hz					
Current (Maximum)(Input 3P 180V)	40A/phase	40A/phase	40A/phase	40A/phase	40A/phase	40A/phase
Inrush current(Input 3P 460V)	66A/phase	66A/phase	66A/phase	66A/phase	66A/phase	66A/phase
Input Power (Maximum)	12kVA	12kVA	12kVA	12kVA	12kVA	12kVA
Efficiency	86~95% varies by model(*1)					
Leakage current	< 3.5 mA					
Power Factor	0.99 typ.(480V input) / 0.95 typ.(200-415V input)					
Insulation						
Primary - Chassis	DC 2500V					
Primary - Secondary	DC 2500V					
Secondary - Chassis	DC750V	DC750V	DC750V	DC1000V	DC1500V	DC1500V
Weights and dimensions						
Dimensions(WxHxD)	Enclosure : 440 x 129 x 660 mm , Total : 482 x 132 x 765.1 mm					
Weight (kg)	36.3	34.8	34.8	34.8	34.8	34.8

10kW ~ 15kW Specifications

Rated Power	10kW	15kW	15kW	15kW	15kW	15kW
Model number	KLN 1300-23E	KLN 80-540E	KLN 250-180E	KLN 350-126E	KLN 500-90E	KLN 650-69E
Rated Voltage	1300V	80V	250V	350V	500V	650V
Rated Current	23A	540A	180A	126A	90A	69A
Constant Voltage						
Rated value	0~1300V	0~80V	0~250V	0~350V	0~500V	0~650V
Settable range	0~1365V	0~84V	0~262.5V	0~367.5V	0~525V	0~682.5V
Over voltage protection (OVP)	0%~110% of rated output voltage					
Voltage @ Max. Current	434.78V	27.77V	83.33V	119.04V	166.66V	217.39V
Programming resolution	5 digits					
Programming accuracy(*2)	±0.1% of rated voltage					
Meter resolution	5 digits					
Meter accuracy(*2)	± 0.1% of rated voltage					
Line regulation(*6)	±0.02% of rated voltage (with local sense)					
Load regulation(*7)	±0.05% of rated voltage (with local sense)					
Temperature coefficient for set values	100ppm/°C of rated output voltage, after a 30 minutes warm-up					
Ripple & noise(*3)(*4)	Vpp	<1800mV	<288mV	<270mV	<288mV	<315mV
(with local sense)(CV Mode)	Vrms	<395mV	<23mV	<36mV	<50mV	<63mV
Full load up	<30ms					
Full load down	<80ms					
No load down	<6s	<5s	<10s	<10s	<5s	<6s
Transient Response(*5)	<1.5ms					
Remote Compensation	28V	6V	6V	9V	10V	16V
Constant Current						
Rated value	0~23A	0~540A	0~180A	0~126A	0~90A	0~69A
Settable range(*10)	0~24.15A	0~567A	0~189A	0~132.3A	0~94.5A	0~72.45A
Over current protection (OCP)	0%~110% of rated output current					
Current @ Max. Voltage	7.69A	187.5A	60A	42.84A	30A	23.07A
Programming resolution	5 digits					
Programming accuracy(*2)	±0.2% of rated current					
Meter resolution	5 digits					
Meter accuracy(*2)	± 0.2% of rated current					
Line regulation(*6)	±0.05% of rated current					
Load regulation(*7)	±0.15% of rated current					
Temperature coefficient for set values	100ppm/°C of rated output voltage, after a 30 minutes warm-up					
Ripple & noise(*3)(*4)	Arms	20mA	216mA	60mA	44mA	44mA
(with local sense)(CC Mode)						
Constant Power						
Rated value	0~10kW	0~15kW	0~15kW	0~15kW	0~15kW	0~15kW
Settable range(*9)	0~10200W	0~15300W	0~15300W	0~15300W	0~15300W	0~15300W
Over power protection (OPP)	0%~110% of rated output current					
Programming resolution	5 digits					
Programming accuracy	< 1% of rated power					
Meter resolution	5 digits					
Meter accuracy(*2)	± 0.5% of rated power					
Line regulation(*6)	< 0.05% of rated power					
Load regulation(*7)	< 0.75% of rated power					
Internal resistance						
Adjustment range	056.521Ω	0~0.1481Ω	0~1.3889Ω	0~2.7778Ω	0~5.5556Ω	0~9.4203Ω
Programming resolution	0.001Ω	0.0001Ω	0.0001Ω	0.0001Ω	0.0001Ω	0.0001Ω
Programming Accuracy(*2)	≤2.3% of max. resistance					
Input						
Nominal input rating	200~415V 50Hz/60Hz 3-phase 3 wires , Optional 480V 50/60Hz 3-phase 4 wires					
Input voltage range	180~460VAC , Optional 480VAC type:432~528VAC					
Input frequency range	47Hz~63Hz					
Current (Maximum)(Input 3P 180V)	40A/phase	60A/phase	60A/phase	60A/phase	60A/phase	60A/phase
Inrush current(Input 3P 460V)	66A/phase	99A/phase	99A/phase	99A/phase	99A/phase	99A/phase
Input Power (Maximum)	12kVA	18kVA	18kVA	18kVA	18kVA	18kVA
Efficiency	86~95% varies by model(*1)					
Leakage current	< 3.5 mA					
Power Factor	0.99 typ.(480V input) / 0.95 typ.(200-415V input)					
Insulation						
Primary - Chassis	DC 2500V					
Primary - Secondary	DC 2500V					
Secondary - Chassis	DC2000V	DC750V	DC750V	DC750V	DC1000V	DC1500V
Weights and dimensions						
Dimensions(WxHxD)	Enclosure : 440 x 129 x 660 mm , Total : 482 x 132 x 765.1 mm					
Weight (kg)	34.8	45.1	43.6	43.6	43.6	43.6

15kW Specifications

Rated Power	15kW	15kW	15kW	15kW		
Model number	KLN 750-60E	KLN 1050-42E	KLN 1500-30E	KLN 1950-23E		
Rated Voltage	750V	1050V	1500V	1950V		
Rated Current	60A	42A	30A	23A		
Constant Voltage						
Rated value	0~750V	0~1050V	0~1500V	0~1950V		
Settable range	0~787.5V	0~1102.5V	0~1575V	0~2047.5V		
Over voltage protection (OVP)	0%~110% of rated output voltage					
Voltage @ Max. Current	250V	357.14V	500V	650V		
Programming resolution	5 digits					
Programming accuracy(*2)	±0.1% of rated voltage					
Meter resolution	5 digits					
Meter accuracy(*2)	± 0.1% of rated voltage					
Line regulation(*6)	±0.02% of rated voltage (with local sense)					
Load regulation(*7)	±0.05% of rated voltage (with local sense)					
Temperature coefficient for set values	100ppm/°C of rated output voltage, after a 30 minutes warm-up					
Ripple & noise(*3)(*4)	Vpp	<830mV	<1440mV	<2160mV	<2160mV	
(with local sense)(CV Mode)	Vrms	<196mV	<315mV	<360mV	<510mV	
Full load up	<30ms					
Full load down	<80ms					
No load down	<10s	<10s	<6s	<6s		
Transient Response(*5)	<1.5ms					
Remote Compensation	19V	23V	30V	32V		
Constant Current						
Rated value	0~60A	0~42A	0~30A	0~23A		
Settable range(*10)	0~63A	0~44.1A	0~31.5A	0~24.15A		
Over current protection (OCP)	0%~110% of rated output current					
Current @ Max. Voltage	20A	14.29A	10A	7.69A		
Programming resolution	5 digits					
Programming accuracy(*2)	±0.2% of rated current					
Meter resolution	5 digits					
Meter accuracy(*2)	± 0.2% of rated current					
Line regulation(*6)	±0.05% of rated current					
Load regulation(*7)	±0.15% of rated current					
Temperature coefficient for set values	100ppm/°C of rated output voltage, after a 30 minutes warm-up					
Ripple & noise(*3)(*4)	Arms	40mA	32mA	24mA	44mA	
(with local sense)(CC Mode)						
Constant Power						
Rated value	0~15kW	0~15kW	0~15kW	0~15kW		
Settable range(*9)	0~15300W	0~15300W	0~15300W	0~15300W		
Over power protection (OPP)	0%~110% of rated output current					
Programming resolution	5 digits					
Programming accuracy	< 1% of rated power					
Meter resolution	5 digits					
Meter accuracy(*2)	± 0.5% of rated power					
Line regulation(*6)	< 0.05% of rated power					
Load regulation(*7)	< 0.75% of rated power					
Internal resistance						
Adjustment range	0~12.500Ω	0~25.000Ω	0~50.000Ω	0~84.782Ω		
Programming resolution	0.001Ω	0.001Ω	0.001Ω	0.001Ω		
Programming Accuracy(*2)	≤2.3% of max. resistance					
Input						
Nominal input rating	200~415V 50Hz/60Hz 3-phase 3 wires , Optional 480V 50/60Hz 3-phase 4 wires					
Input voltage range	180~460VAC , Optional 480VAC type:432~528VAC					
Input frequency range	47Hz~63Hz					
Current (Maximum)(Input 3P 180V)	60A/phase	60A/phase	60A/phase	60A/phase		
Inrush current(Input 3P 460V)	99A/phase	99A/phase	99A/phase	99A/phase		
Input Power (Maximum)	18kVA	18kVA	18kVA	18kVA		
Efficiency	86~95% varies by model(*1)					
Leakage current	< 3.5 mA					
Power Factor	0.99 typ.(480V input) / 0.95 typ.(200-415V input)					
Insulation						
Primary - Chassis	DC 2500V					
Primary - Secondary	DC 2500V					
Secondary - Chassis	DC1500V	DC1500V	DC1500V	DC3000V		
Weights and dimensions						
Dimensions(WxHxD)	Enclosure : 440 x 129 x 660 mm , Total : 482 x 132 x 765.1 mm					
Weight (kg)	43.6	43.6	43.6	43.6		

6kW ~ 12kW Specifications

Rated Power	6kW	6kW	12kW	12kW	12kW	12kW
Model number	KLN 500-36E	KLN 650-27E	KLN 500-72E	KLN 650-54E	KLN 1000-36E	KLN 1300-27E
Rated Voltage	500V	650V	500V	650V	1000V	1300V
Rated Current	36A	27A	72A	54A	36A	27A
Constant Voltage						
Rated value	0~500V	0~650V	0~500V	0~650V	0~1000V	0~1300V
Settable range	0~525V	0~682.5V	0~525V	0~682.5V	0~1050V	0~1365V
Over voltage protection (OVP)	0%~110% of rated output voltage					
Voltage @ Max. Current	166.66V	222.22V	166.66V	222.22V	333.33V	444.44V
Programming resolution	5 digits					
Programming accuracy(*2)	±0.1% of rated voltage					
Meter resolution	5 digits					
Meter accuracy(*2)	± 0.1% of rated voltage					
Line regulation(*6)	±0.02% of rated voltage (with local sense)					
Load regulation(*7)	±0.05% of rated voltage (with local sense)					
Temperature coefficient for set values	100ppm/°C of rated output voltage, after a 30 minutes warm-up					
Ripple & noise(*3)(*4)	Vpp	<375mV	<864mV	<375mV	<864mV	<1725mV
(with local sense)(CV Mode)	Vrms	<75mV	<216mV	<75mV	<216mV	<376mV
Full load up	<30ms					
Full load down	<80ms					
No load down	<5s	<6s	<5s	<6s	<5s	<6s
Transient Response(*5)	<1.5ms					
Remote Compensation	10V	16V	10V	16V	22V	28V
Constant Current						
Rated value	0~36A	0~27A	0~72A	0~54A	0~36A	0~27A
Settable range(*10)	0~37.8A	0~28.35A	0~75.6A	0~56.7A	0~37.8A	0~28.35A
Over current protection (OCP)	0%~110% of rated output current					
Current @ Max. Voltage	12A	9.23A	24A	18.46A	12A	9.23A
Programming resolution	5 digits					
Programming accuracy(*2)	±0.2% of rated current					
Meter resolution	5 digits					
Meter accuracy(*2)	± 0.2% of rated current					
Line regulation(*6)	±0.05% of rated current					
Load regulation(*7)	±0.15% of rated current					
Temperature coefficient for set values	100ppm/°C of rated output voltage, after a 30 minutes warm-up					
Ripple & noise(*3)(*4)	Arms	18mA	18mA	35mA	35mA	24mA
(with local sense)(CC Mode)						
Constant Power						
Rated value	0~6kW	0~6kW	0~12kW	0~12kW	0~12kW	0~12kW
Settable range(*9)	0~6120W	0~6120W	0~12240W	0~12240W	0~12240W	0~12240W
Over power protection (OPP)	0%~110% of rated output current					
Programming resolution	5 digits					
Programming accuracy	< 1% of rated power					
Meter resolution	5 digits					
Meter accuracy(*2)	± 0.5% of rated power					
Line regulation(*6)	< 0.05% of rated power					
Load regulation(*7)	< 0.75% of rated power					
Internal resistance						
Adjustment range	0~13.888Ω	0~24.074Ω	0~6.9444Ω	0~12.037Ω	0~27.777Ω	0~48.148Ω
Programming resolution	0.001Ω	0.001Ω	0.0001Ω	0.001Ω	0.001Ω	0.001Ω
Programming Accuracy(*2)	≤2.3% of max. resistance					
Input						
Nominal input rating	380~415V 50Hz/60Hz 3-phase 3 wires					
Input voltage range	340~460VAC					
Input frequency range	47Hz~63Hz					
Current (Maximum)(Input 3P 340V)	13A/phase	13A/phase	26A/phase	26A/phase	26A/phase	26A/phase
Inrush current(Input 3P 460V)	33A/phase	33A/phase	66A/phase	66A/phase	66A/phase	66A/phase
Input Power (Maximum)	7.2kVA	7.2kVA	14.4kVA	14.4kVA	14.4kVA	14.4kVA
Efficiency	86~95% varies by model(*1)					
Leakage current	< 3.5 mA					
Power Factor	0.95 typ.(380~415V input)					
Insulation						
Primary - Chassis	DC 2500V					
Primary - Secondary	DC 2500V					
Secondary - Chassis	DC1000V	DC1500V	DC1500V	DC1500V	DC1500V	DC2000V
Weights and dimensions						
Dimensions(WxHxD)	Enclosure : 440 x 129 x 660 mm , Total : 482 x 132 x 765.1 mm					
Weight (kg)	26	26	34.8	34.8	34.8	34.8

18kW Specifications

Rated Power	18kW	18kW	18kW	18kW		
Model number	KLN 500-108E	KLN 650-81E	KLN 1500-36E	KLN 1950-27E		
Rated Voltage	500V	650V	1500V	1950V		
Rated Current	108A	81A	36A	27A		
Constant Voltage						
Rated value	0~500V	0~650V	0~1500V	0~1950V		
Settable range	0~525V	0~682.5V	0~1575V	0~2047.5V		
Over voltage protection (OVP)	0%~110% of rated output voltage					
Voltage @ Max. Current	166.66V	222.22V	500V	666.66V		
Programming resolution	5 digits					
Programming accuracy(*2)	± 0.1% of rated voltage					
Meter resolution	5 digits					
Meter accuracy(*2)	± 0.1% of rated voltage					
Line regulation(*6)	± 0.02% of rated voltage (with local sense)					
Load regulation(*7)	± 0.05% of rated voltage (with local sense)					
Temperature coefficient for set values	100ppm/°C of rated output voltage, after a 30 minutes warm-up					
Ripple & noise(*3)(*4)	Vpp	<375mV	<864mV	<2590mV	<3360mV	
(with local sense)(CV Mode)	Vrms	<75mV	<216mV	<430mV	<645mV	
Full load up	<30ms					
Full load down	<80ms					
No load down	<5s	<6s	<6s	<6s		
Transient Response(*5)	<1.5ms					
Remote Compensation	10V	16V	30V	32V		
Constant Current						
Rated value	0~108A	0~81A	0~36A	0~27A		
Settable range(*10)	0~113.4A	0~85.05A	0~37.8A	0~28.35A		
Over current protection (OCP)	0%~110% of rated output current					
Current @ Max. Voltage	36A	27.69A	12A	9.23A		
Programming resolution	5 digits					
Programming accuracy(*2)	± 0.2% of rated current					
Meter resolution	5 digits					
Meter accuracy(*2)	± 0.2% of rated current					
Line regulation(*6)	± 0.05% of rated current					
Load regulation(*7)	± 0.15% of rated current					
Temperature coefficient for set values	100ppm/°C of rated output voltage, after a 30 minutes warm-up					
Ripple & noise(*3)(*4)	Arms	54mA	50mA	42mA	42mA	
(with local sense)(CC Mode)						
Constant Power						
Rated value	0~18kW	0~18kW	0~18kW	0~18kW		
Settable range(*9)	0~18360W	0~18360W	0~18360W	0~18360W		
Over power protection (OPP)	0%~110% of rated output current					
Programming resolution	5 digits					
Programming accuracy	< 1% of rated power					
Meter resolution	5 digits					
Meter accuracy(*2)	± 0.5% of rated power					
Line regulation(*6)	< 0.05% of rated power					
Load regulation(*7)	< 0.75% of rated power					
Internal resistance						
Adjustment range	0~4.6296Ω	0~8.0246Ω	0~41.666Ω	0~72.222Ω		
Programming resolution	0.0001Ω	0.0001Ω	0.001Ω	0.001Ω		
Programming Accuracy(*2)	≤2.3% of max. resistance					
Input						
Nominal input rating	380~415V 50Hz/60Hz 3-phase 3 wires					
Input voltage range	340~460VAC					
Input frequency range	47Hz~63Hz					
Current (Maximum)(Input 3P 340V)	40A/phase	40A/phase	40A/phase	40A/phase		
Inrush current(Input 3P 460V)	99A/phase	99A/phase	99A/phase	99A/phase		
Input Power (Maximum)	21.6kVA	21.6kVA	21.6kVA	21.6kVA		
Efficiency	86~95% varies by model(*1)					
Leakage current	< 3.5 mA					
Power Factor	0.95 typ.(380~415V input)					
Insulation						
Primary - Chassis	DC 2500V					
Primary - Secondary	DC 2500V					
Secondary - Chassis	DC1000V	DC1500V	DC2000V	DC3000V		
Weights and dimensions						
Dimensions(WxHxD)	Enclosure : 440 x 129 x 660 mm , Total : 482 x 132 x 765.1 mm					
Weight (kg)	43.6	43.6	43.6	43.6		

General Specifications

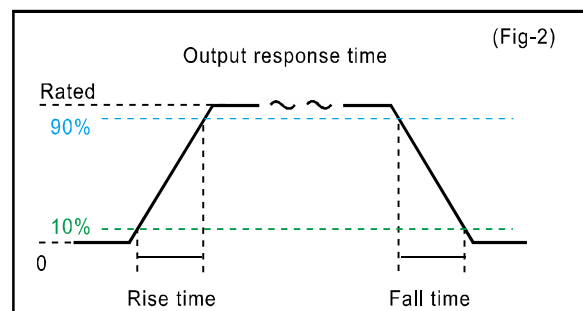
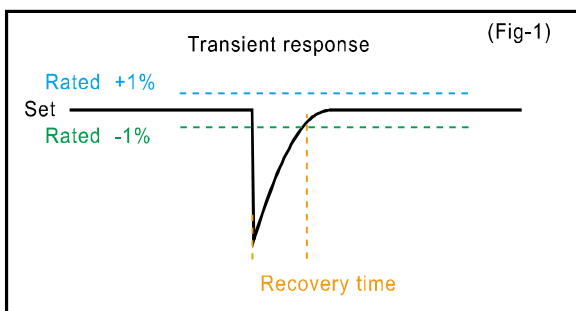
Environment	
Operating environment	Indoor use
Operating temperature / humidity	0°C ~ 50°C , 30%rh ~ 80%rh (no condensation)
Storage temperature / humidity	-20°C ~ 70°C , 10%RH ~ 80%RH (no condensation)
Altitude	Up to 2000m
Cooling method	Forced air cooling using the speed controlled fan
Ground polarity	Capable of Negative ground or Positive ground
Memory & Sequence	
Number of memory	3 sets (operating in front panel)
Maximum step number	500 steps per each Sequence
Maximum Sequence number	16
Step time settable range	0.00 sec ~ 999999.99 sec
Standard Interface	
LAN interface	LXI 1.4
Digital I/O	Input : Interlock , Output ON/OFF , SHUT OFF Output : Alarm signal , Output voltage downward signal
Optional GPIB Interface	
Compliant	SCPI - 1990, IEEE 488.2 compliant interface;
Optional RS422/RS485 Interface	
Baud Rate	Support 4800 , 9600 , 19200 , 38400 , 57600 , 115200 bps
Optional USB Interface(USB type B connector)	
Compliant	Full Compliant with USB V2.0 specification
Optional Analog Interface	
Status output (dry contact)	CV State, CC State , CP State(*9) , CR State(*9) , ON/OFF State
V control range & accuracy(*2)	0% ~ 100% of rated output voltage in the range of 0V ~ 5V or 0V ~ 10V ; $\pm 0.2\%$
A control range & accuracy(*2)	0% ~ 100% of rated output current in the range of 0V ~ 5V or 0V ~ 10V ; $\pm 0.2\%$
P control range & accuracy(*2,*9)	0% ~ 100% of rated output power in the range of 0V ~ 5V or 0V ~ 10V ; $\pm 0.2\%$
Monitoring output & accuracy(*2)	0~5V or 0~10V output for monitoring V/A/W ; $\pm 2\%$
Reference output	0~5VDC or 0~10VDC (max=5mA)

Notes:

- *1) The output voltage and current ranges can be set to 105% of the rated value, but the total output will be less. The extra capacity is used to compensate for external wiring loss and cannot be used as a regular value.
- *2) Measured at room temperature of $23 \pm 5^\circ\text{C}$.
- *3) rms value of ripple & noise was measured at meter bandwidth 300kHz
- *4) Peak value of ripple & noise was measured at meter bandwidth 20MHz.
- *5) The time for the output voltage to reach $\pm 1\%$ of the setting value at 10% - 90% of rated voltage, and 10% and above of rated power, with a resistance load. (Fig. 1)
- *6) Input voltage variation between 180~264VAC or 342~460VAC with a fixed loading 1~100%.
- *7) CV Mode: Constant line voltage; output current variation between 10% - 90% of the rated value.
 CC Mode: Constant line voltage; output voltage variation between 10% - 90% of the rated value.
 CP Mode: Constant line voltage; output voltage*current variation between 10% - 90% of the rated value.

General Remarks:

- a) All data were measured at the output terminal with local sensing, at 2% - 100% of rated voltage, 1% - 100% of rated current, after 30 minutes warm-up, in a room at 50°C and 80% RH.
- b) "Rise Time" means the time from 10% to 90% of rated voltage; "Fall Time" is the time to drop from 90% to 10% of rated voltage.
- c) The performance will be affected the character of the external wiring for multi-unit paralleling.
- d) LXI interface with minimum 3ms response time. The actual response time will be affected by your network's connection quality and LAN speed.
- e) The information in this document is subject to change without notice and should not be construed as a commitment by Kepco. Kepco assumes no responsibility for any errors that may appear in this document. In no event shall Kepco be liable for incidental or consequential damages arising from use of this document or the software or hardware described in this document.



PDU10 / PDU6 Programmable Power Distribution Unit

Innovative, patented design and functions. Equipped with digital controller, protection, remote measurement, and multiple connections in parallel, it sequentially controls and secures AC mains supply to the DC power supplies, and provides useful CO²e and efficiency readings.

To remain eco-friendly, the PDU series maintains Kepco's stainless steel chassis with very little paint and no plating. The PDU series state-of-the-art functions allow you to manage very high power easily and environmentally.



World First Innovation

- PDU10/PDU6, 4U height, connect with 10/6 units 18kW Kepco DC power supply.
- MAIN / SUBSidiary function, control millions of watts of DC power via a single LAN cable.
- A 5" 800x480 WVGA touchscreen supplemented with physical controls, forms an intuitive control interface.
- A built-in AC mains monitoring system provides ten or more useful reporting parameters such as V, A, Freq, VA, Watt, VAR, kWh, CO2e and Efficiency.
- Permanent and resettable Time accumulators.
- CE approved.
- LXI 1.5 approved

Electrical

- 3Ø180~460VAC, 47~63Hz Universal Input.
- Embedded system with multiple 32 bit ARM based MCU, fast boot time of 10 seconds or less.
- Built-in timer allows the setting of output running time.
- Built-in RTC maintains reliable time without a time server.
- Closed-case firmware upgrading and enhanced protection to prevent upgrade failures.
- Full remote control via a single LAN cable.
- Definable Power On to a select-able number of SUB units with the surplus SUB units off to save energy.
- Easy to replace individual output terminal.

○ Safety

- SEMATECH std. EMO button- physically off all managed DC power supplies at once.
- Distinct AC output On/Off button, sequence On/Off DC power supplies.
- Lockable power switch to avoid accidental operation.
- Interlock function.

○ Interface

- Built-in 2 LAN(LXI) ports, saves the cost of an extra switch hub.
- Fast LAN response time of 3ms.
- SCPI compatible
- Alarm signal output and interlock mechanism prevent potential injury.
- Supports USB(*1) plug and play to easily read and store data.

PDU2 Power Distribution Unit

Economic Design for sequential on or off of 2 SUBsidiary units.



○ World First Innovation

- PDU2, 1U height, control 2 units 18kW Kepco DC power supply.
- MAX power rate at 36KW
- CE approved

○ Electrical

- 3Ø180~460VAC, 47~63Hz universal Input
- Sequential power ON/OFF.
- Easy to replace output terminal.

○ Safety

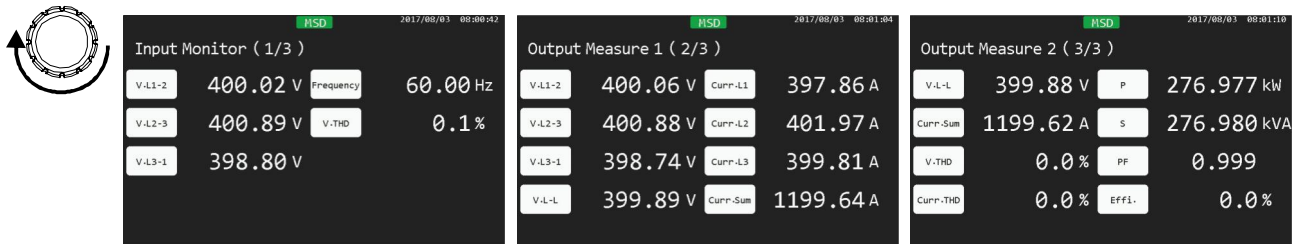
- SEMATECH std. EMO button, physically off all managed DC power supply at once.
- Distinct AC Output On/Off button to On/Off DC power supply in sequence..

*1. The format of USB flash drive should be FAT16(2GB) or FAT32(32GB) USB2.0

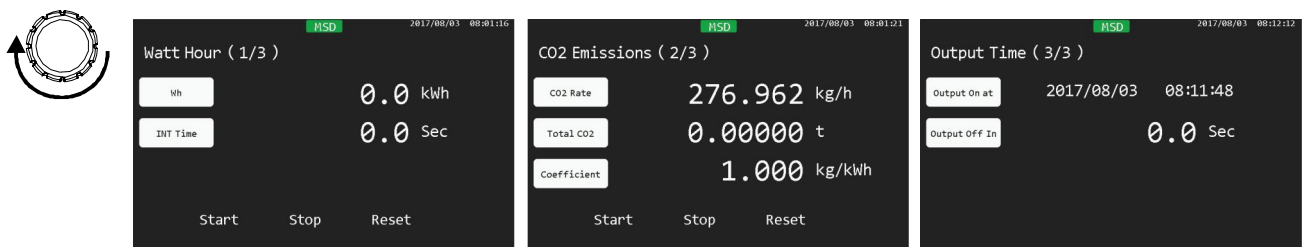
Functions and Displays of PDU10/PDU6

PDU10/PDU6 provide various readings in different pages.

Turn MEAS knob to switch between pages



Dedicated TIME knob for all time related parameter adjustments



Models Function List

	PDU10	PDU6	PDU2
Channels	10	6	2
Parallel Units	10	10	
Remote Monitoring	V	V	
Sequence On/Off	V	V	
Number of On/Off Setting	V	V	
LXI1.5	V	V	
Web Server	V	V	
NTP Sync.	V	V	
4 Input Readings	V	V	
9 Output Readings	V	V	
5 Protections	V	V	
Off Time Setting	V	V	
Interlock	3	3	1
No. of Ext. EMO Input	2	2	
Tower Light Output	V	V	
Buzzer Output	V	V	
Thermo Switch Input	V	V	
EMO Button	V	V	V
5" 800x480 Touchscreen	V	V	
Stanless Steel Case	V	V	V

4 Input Readings

1. Voltage(L1,L2,L3)
2. Frequency
3. Voltage THD
4. Phase Loss

9 Output Readings

1. Current(L1,L2,L3)
2. Effective Power
3. Reactive Power
4. Power Factor
5. Voltage THD
6. Current THD
7. KWh
8. CO2 Emmission
9. Efficiency

5 Protections

1. Line Voltage High
2. Line Voltage Low
3. Output Current High
4. Output Over Loading
5. Magent Contact Fail

Web Server Function

The PDU10/PDU6 provides a web GUI allowing users to control the DC power system via ethernet.

Instrument Welcome Page	
Device Model	PDU10
Manufacturer	IDRC
Serial Number	000000
Description	PDU10_000000
LXI Extended Features	LXI HISLIP
LXI Version	1.4 LXI Device Specification 2011
Hostname	PDU10_000000.local
MAC Address	70:46:42:8C:65:F1
TCP/IP Address	192.168.42.203
Firmware Revision	0.36.00
Instrument Address String	TCPIPO::192.168.42.203::5025::SOCKET TCPIPO::192.168.42.203::HISLIP0::INSTR
Device Indicator	Inactive <input type="button" value="Toggle"/>

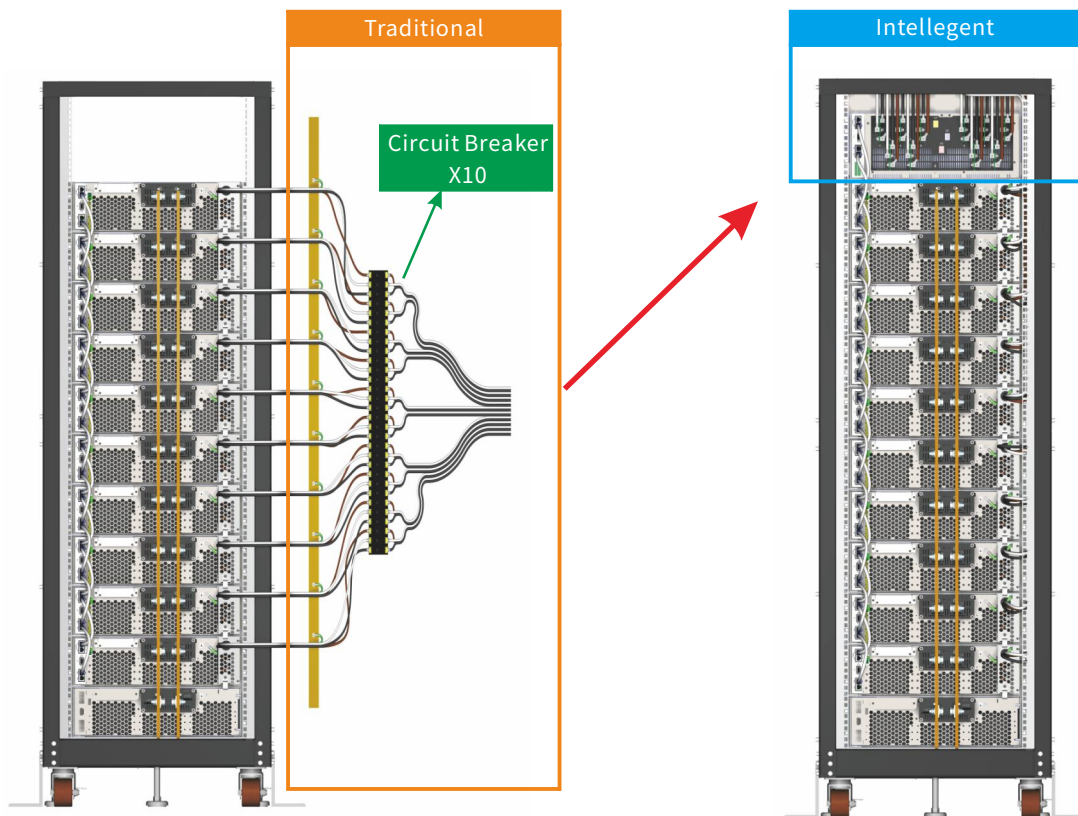
<Web server information>

Output	OFF	
Integrate	OFF	
Freq:	60.00	Hz
U ₁₂ :	400.19	V
U ₂₃ :	401.01	V
U ₃₁ :	398.83	V
THD _U :	0.1	%
I ₁ :	397.95	A
I ₂ :	402.18	A
I ₃ :	399.80	A
THD _I :	0.1	%
P:	277.134	kW
S:	277.137	kVA
PF:	1.000	
Effi:	0.0	%
WH:	0.0	kWh
Int. time:	0	Sec
CO ₂ Rate:	277.133	kg/h
Total CO ₂ :	0.00000	t
Off in:		

<Parameters>

PDU Application Example

Our innovative, patented Power Distribution Unit design consolidates control and management of two hundred thousand VA AC mains in a 4U chassis. This significantly simplifies the control and wiring for a 180 kW DC Power System.



PDU Series Specifications

Model number	PDU10	PDU6	PDU2
Control unit	1~10	1~6	1~2
Input & Output Specification			
Input Voltage range	180~460VAC , Optional 480VAC type:432~528VAC		
Nominal voltage	200/208/220/380/400/415VAC		
Phase/Wires	3-phase / 3 wires		
Frequency range	45Hz ~ 65Hz		
Max Current(at 180V 3-phase)	600A	360A	120A
Max Power	180kVA	108kVA	36kVA
System settings			
Nominal voltage	Selectable 200/208/220/380/400/415VAC		-
Frequency	Selectable 50Hz/60Hz		-
Power OFF timer	DDD/HH/MM		-
Number of Interlock I/O	1~3		-
CO ₂ emission coefficient	0.000kg/kWh ~ 9.999 kg/kWh		-
Sequential Control settings			
Power ON sequence	The power ON order is from the last SUB unit to the MAIN unit.		
Power OFF sequence	The power OFF order is from the MAIN unit to the last SUB unit.		
ON/OFF control	Manual/Timer/Remote		-
Input measurement			
Voltage (L1, L2, L3)	Range	600V / 300V	-
	Resolution	0.01V	-
	Accuracy	± 0.2%	-
Frequency	Resolution	0.001Hz	-
	Accuracy	± 0.2%	-
Output measurement			
Current (L1, L2, L3)	Range	600A / 300A / 60A	600A / 300A / 60A
	Resolution	0.01A	-
	Accuracy	± 0.8%	-
Active Power (P)	Resolution	0.001kW	-
	Accuracy	± 1.5%	-
Apparent Power (S)	Resolution	0.001kVA	-
	Accuracy	± 1.5%	-
Power Factor	Resolution	0.001	-
	Accuracy	± 1%	-
Kilo-Watt-Hour	Resolution	0.1 kWh	-
	Accuracy	± 1.5%	-
CO ₂ emission	Real time	0000.000 ~ 9999.999kg	-
	Accumulate	0000.00000t ~ 9999.99999t	-
Efficiency (DC power supply output/input)	Resolution	0.1%	-
	Accuracy	± 1.5%	-
Voltage	Resolution	0.1%	-
Total Harmonic Distortion	Accuracy	± 1%	-
Current	Resolution	0.1	-
Total Harmonic Distortion	Accuracy	± 1%	-
Safety and Protection			
Emergency Stop	EMS button on the front panel		-
OVP	+10% of Nominal input		-
UVP	-10% of Nominal input		-
OCP	+10% of Max. input current		-
OLP	Adjustable from 18kVA to 180kVA	Adjustable from 18kVA to 108kVA	-
Frequency	±3Hz at 50Hz/60Hz		-
Phase loss	Alarm and stop operation when lose any phase.		
Status Indication on the LCD display			
REMOTE	REMOTE will show on the LCD display when the PDU is connected to PC		-
KEY LOCK	KEY LOCK will show on the LCD display when the keys are locked		-
Error	ERR will show on the LCD display when any error occurs		-
Digital interface - LAN			
Standard	LXI		
Line ending character	Reception : LF , END ; Transmission : LF+END		
External Control I/O			
EMS	1. Multiple rack cabinet EMS can be connected in series. 2. Extendable EMS switch.		
Interlock	Equipped with three interlock connectors (in series).		

PDU Series Specifications

Model number	PDU10	PDU6	PDU2	
Control units	1~10	1~6	1~2	
General specification				
Auxiliary Power Supply	Input voltage	180~460VAC ,Optional 480VAC for 15kW model		
	Frequency	45Hz ~ 65Hz		
	Power consumption	≤55W	≤46W	≤35W
	Standby power	≤30W	≤30W	≤10W
Environmental Condition	Operating environment	Indoor use		
	Operating temperature	0°C ~ 50°C		
	Operating humidity	30%rh ~ 80%rh (no condensation), 80% RH at 30°C , . Decrease linearly to 50% RH at 40°C		
	Storage temperature	-20°C ~ 70°C		
	Storage humidity	10%rh ~ 80%rh (no condensation)		
	Altitude	Up to 2000m		
Withstanding voltage	Cooling method	Forced air cooling		
	Primary - Chassis	DC2500V		
	Primary - Secondary	DC2500V		
Secondary - Chassis	DC2500V			
Physical specification				
Display panel	TFT LCD Touchscreen 127mm(5" - 800x480)		-	
Dimensions (W x H x D)	440 x 176 x 849.6 mm		-	
Weight	40kg	35kg	12kg	
Accessories				
LAN cable	2m		-	
RS485 cable	1pc (AWG24-2m)		-	

*1. All parameters are measured after 30 minutes warm-up. Ambient temperature at 23±5°C, Humidity Under 80% RH, AC Voltage : 415V±5%, Frequency : 50/60Hz±5%.

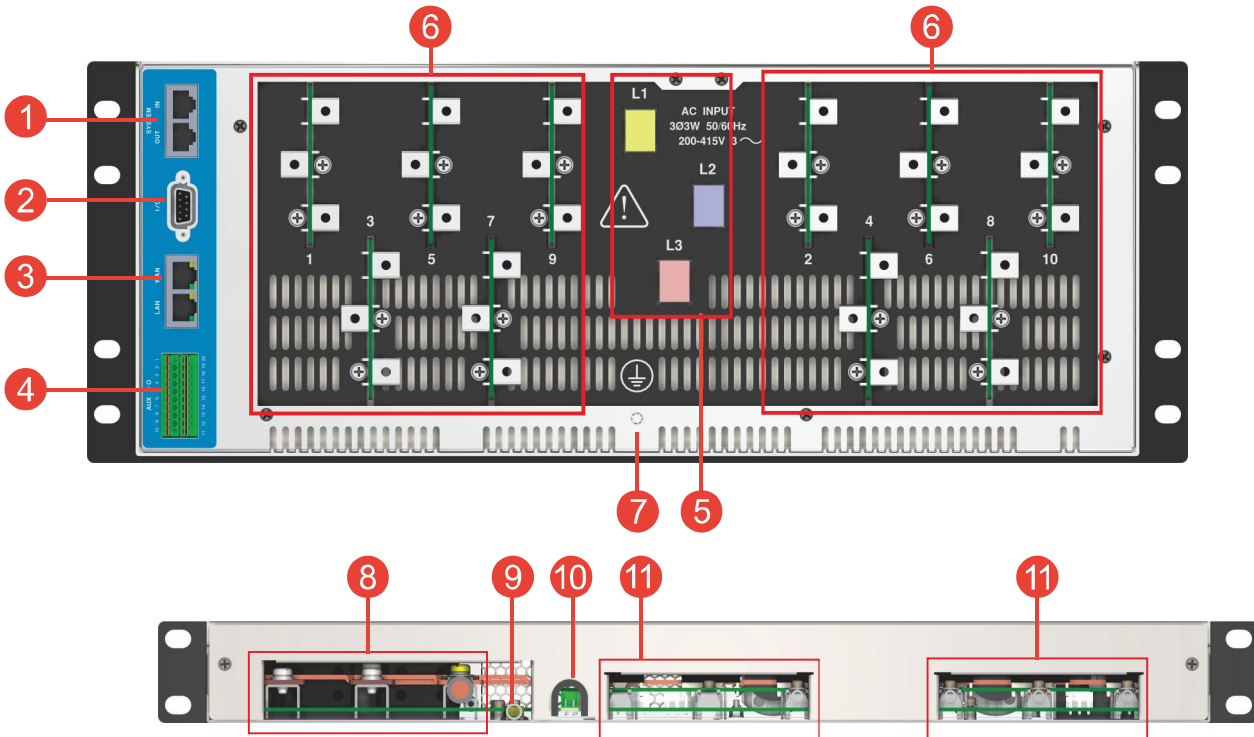
Rear Panel

PDU10/PDU6

- ① MAIN / SUB Port
- ② Digital I/O
- ③ LAN (LXI) connector
- ④ I/O Port
- ⑤ Line In
- ⑥ Line Out
- ⑦ Ground Terminal

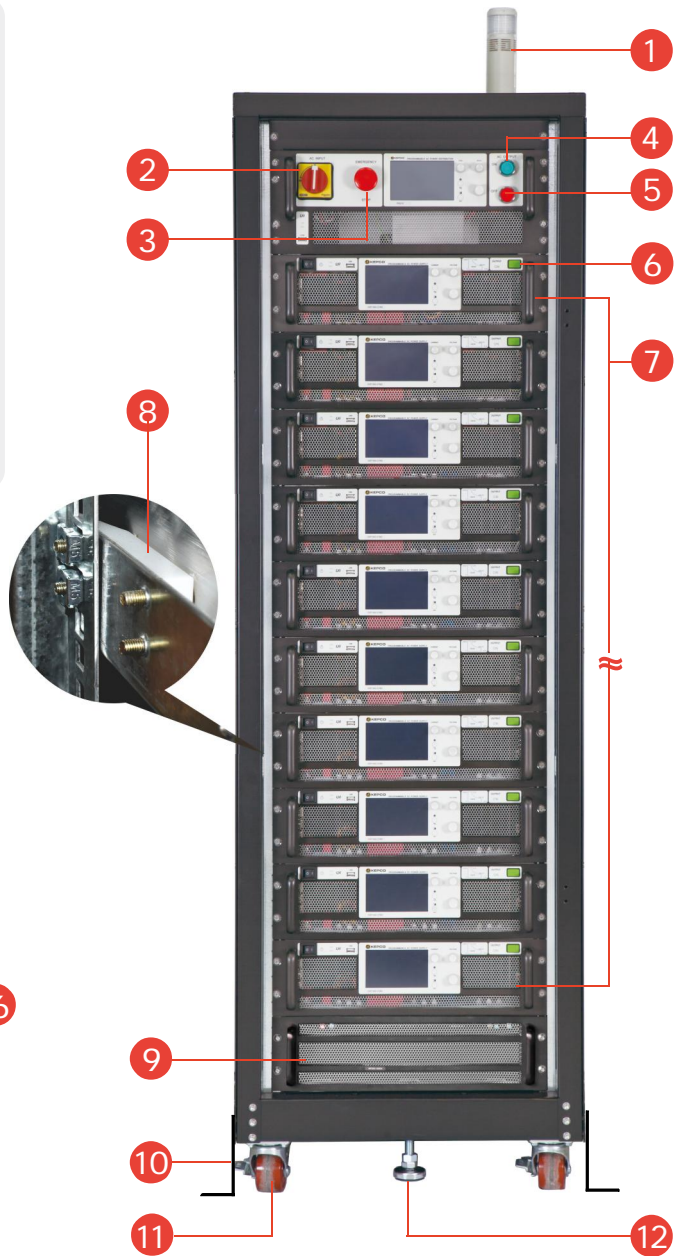
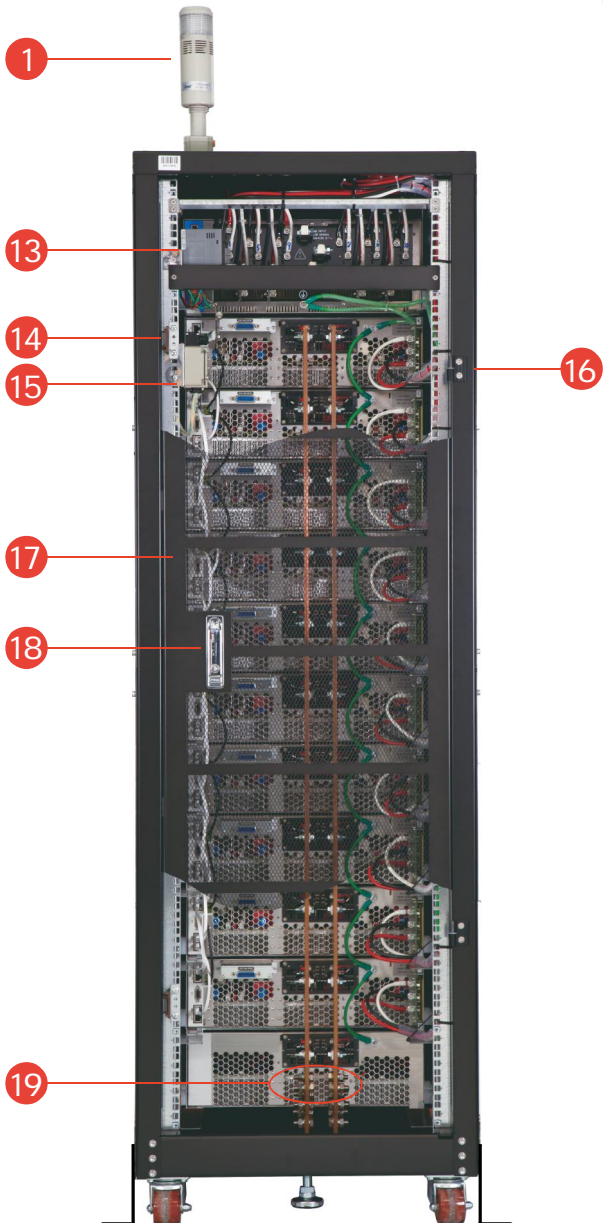
PDU2

- ⑧ Line In
- ⑨ Ground Terminal
- ⑩ I/O Port
- ⑪ Line Out



Glance of DC-RACK

- 1 Tower Light
- 2 AC Mains Switch
- 3 EMO Button
- 4 Subs Sequence On Button
- 5 Subs Sequence Off Button
- 6 DC Output On/Off Key
- 7 KLN DC Power Supplies
- 8 Rack Mounting Clipper
- 9 Options
 - KLN-OPT-FD Freewheeling Diode
 - KLN-OPT-CB Capacitor Bank
 - KLN-OPT-DC Discharging Device
 - KLN-OPT-RP Reverse Protection

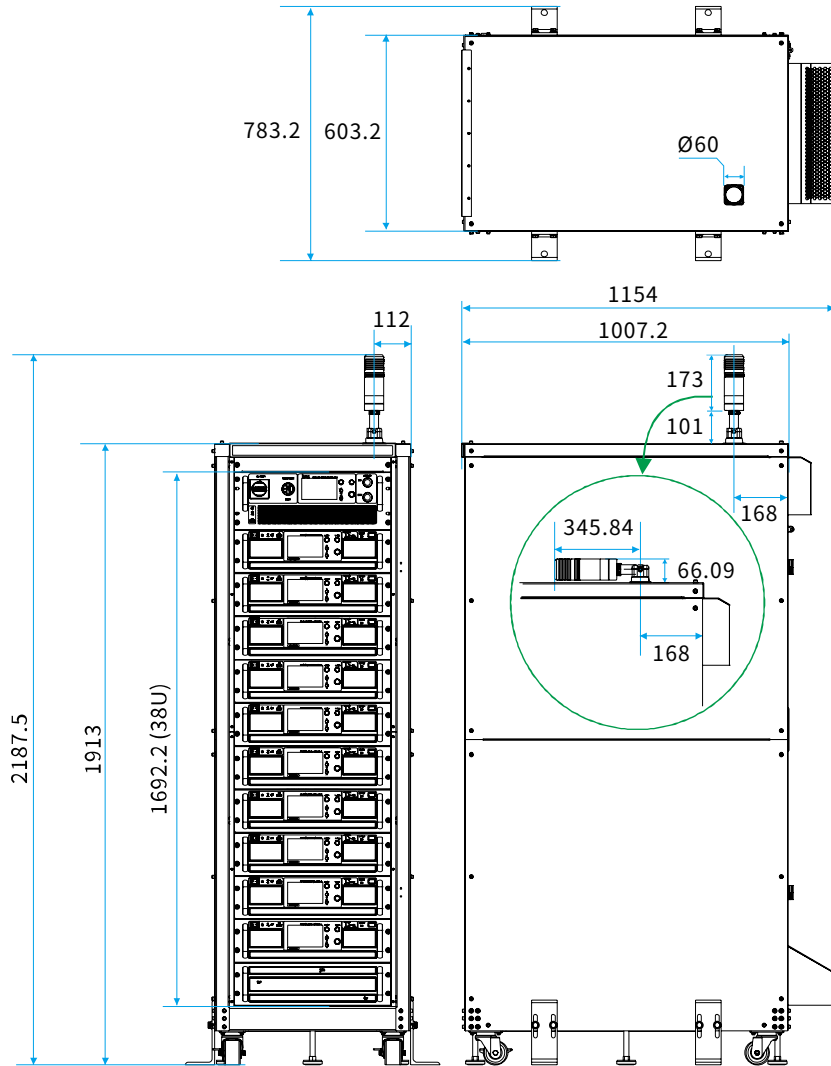


- 10 Anti-tilt Shaft
- 11 Heavy Loading Tire(wheel)
- 12 Leveling Bolt
- 13 4 Ports Hub
- 14 Magnet Lock
- 15 Door Interlock
- 16 Door Bolt
- 17 Rear Door
- 18 Handle
- 19 Output Copper Bar

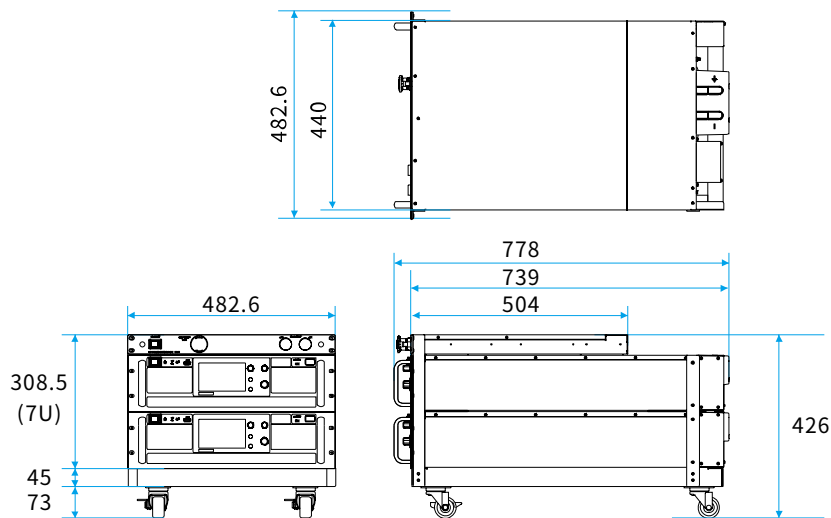
DC-RACK Dimensions(mm)

DC-RACK10

For reference only. May vary slightly on order.



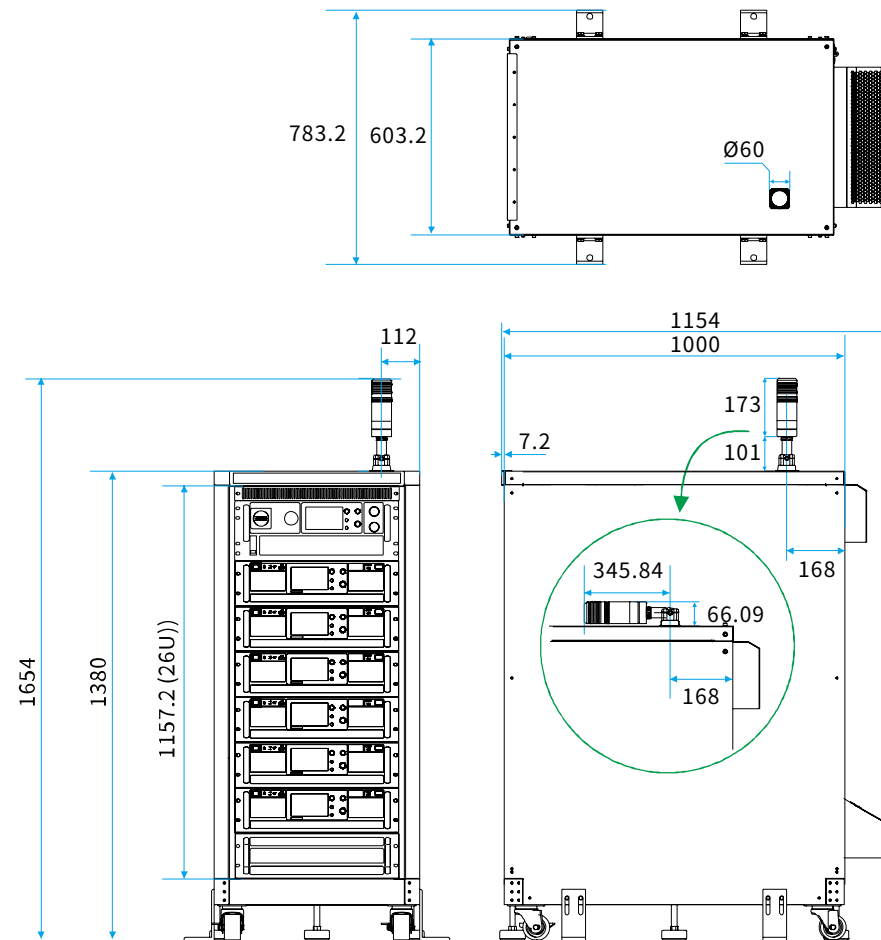
DC-RACK2



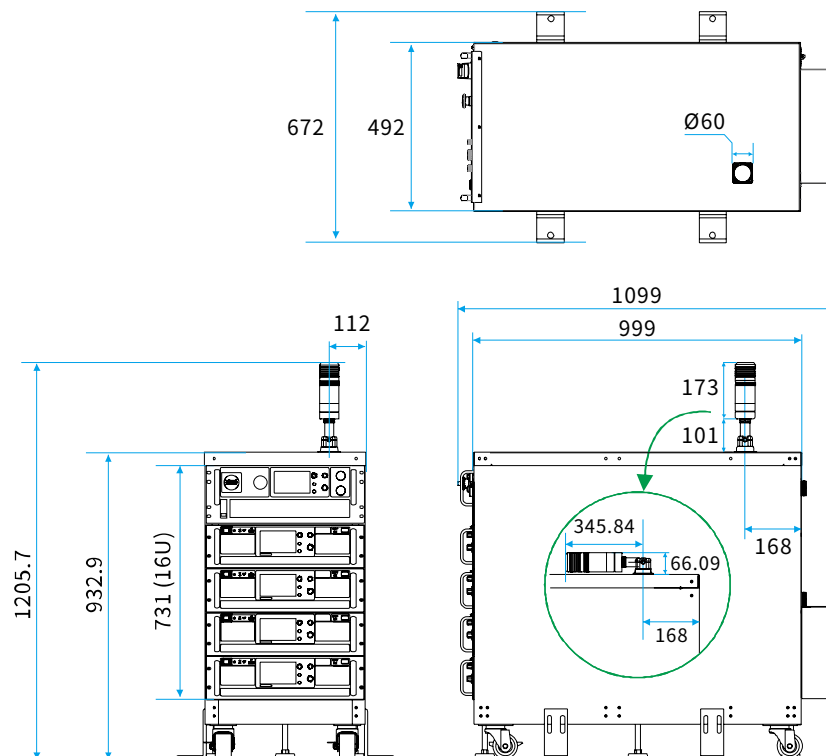
DC-RACK Dimensions(mm)

DC-RACK6

For reference only. May vary slightly on order.



DC-RACK4



Options

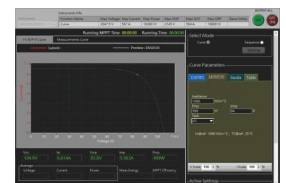
Function	Description
KLN-OPT-FUA	Firmware update adapter
KLN-OPT-422U	RS-422+RS485+USB interface
KLN-OPT-ANA	Isolated Analog Interface
KLN-OPT-488	IEEE-488 (GPIB) interface
KLN-OPT-CAB	Parallel cable kit
KLN-OPT-2EC	2m Ethernet Cable
KLN-OPT-ICE	AC Input Cover Assembly +Nylon Cable Gland
KLN-OPT-ICN	AC Input board Assembly
KLN-OPT-OPC	Output protection cover
KLN-OPT-TOOL	Install tool kit (*1)
KLN-OPT-AC480	AC 3Ø4W 480V input (input range AC 432V ~ 528V)
KLN-OPT-DC550	DC 500V input (input range DC400V ~ DC600V)
KLN-OPT-DC	Discharge Circuit(*2)
KLN-OPT-CB	Capacitor Bank(*2)
KLN-OPT-FD	Freewheeling diode(*2)
KLN-OPT-RP	Reverse Protection(*2)
KLN-OPT-PBB	Parallel bus bar(80V 10kW/15kW model only)

*1. External interface device are supplied by third party, please contact Kepco before order.

*2. Various voltage/current/power/time specifications, please contact Kepco before order.

Options KLN-S Solar Array Simulator

- Imitate the output characteristics of various solar arrays using the built-in solar array simulation function.
- Two input modes (Curve & Table) allow creation of smooth and realistic solar array waveforms.
- Versatile working modes: I-V curve; constant voltage; constant current; and constant power.
- Graphic control software meets EN50530 and Sandia requirements.
- Simulations of I-V curves can accommodate changes in temperature and irradiance.
- Static & Dynamic MPPT efficiency test (accumulated energy method) with log files.
- Real-time Maximum Power Point Tracing via remote interface.
- Multitasking allows up to 16 controllable Solar Array simulations.



I/V curve- EN 50530



MPPT

Output Power (11 models)	Models	Max. Voltage	Current @ Max. Voltage	Voltage @ Max. Current	Max. Current
		V1	A1	V2	A2
10kW (3 models)	KLN 650-46S	650 V	15.38 A	217.39 V	46 A
	KLN 1000-30S	1000 V	10 A	333.33 V	30 A
	KLN 1300-23S	1300 V	7.69 A	434.78 V	23 A
12kW (2 models)	KLN 1000-36S	1000 V	12 A	333.33 V	36 A
	KLN 1300-27S	1300 V	9.23 A	444.44 V	27 A
15kW (4 models)	KLN 650-69S	650 V	23.07 A	217.39 V	69 A
	KLN 1050-42S	1050 V	14.28 A	357.14 V	42 A
	KLN 1500-30S	1500 V	10 A	500 V	30 A
	KLN 1950-23S	1950 V	7.69 A	650 V	23 A
18kW (2 models)	KLN 1500-36S	1500 V	12 A	500 V	36 A
	KLN 1950-27S	1950 V	9.23 A	666.66 V	27 A

* Any output power combination from V1 x A1 to V2 x A2 is possible, but V1 x A2 is not allowed.