KIKUSUI

P X B S E R I E S



Bidirectional High-Capacity DC Power Supply

PXB Series

High power density: 20 kW in 3U size
A single unit handles both power and regeneration
Rated output voltage 50 V/ 100 V/ 250 V/ 500 V/ 1000 V/ 1500 V
Select input voltage from 200 Vac (3-phase) or 400 Vac (3-phase)
Continuous operation at rated power at ambient temperature of 50°C (Excluding some models)
Up to 25 units (500 kW) can be operated in parallel
Equipped with touch panel display
LAN, USB, RS232C, external analog control (isolated type) standard
Regenerative function (on-site)
External control I/O is standard for both NPN and PNP type PLCs

https://global.kikusui.co.jp/

For the Progressive "X" electric applications

A better power supply testing environment, for an increasingly electric and electronic world. Our goal was to create a bidirectional power supply that can flexibly respond to various "X" requirements related to advanced technology!

The PXB series of bidirectional high-capacity DC power supplies condenses a 20 kW large-capacity output into a 3U-size chassis. Not only handling high voltages of 1500 V, but also capable of both power and regeneration in both directions in a single unit. We provide a new power supply test environment for electrical and electronic equipment that is becoming increasingly high-powered. In addition, a variety of analog, digital, and communication interfaces are provided for optimal operation at any stage of research, development, and manufacturing! A new generation of bidirectional DC power supplies that support the progression of advanced technologies.

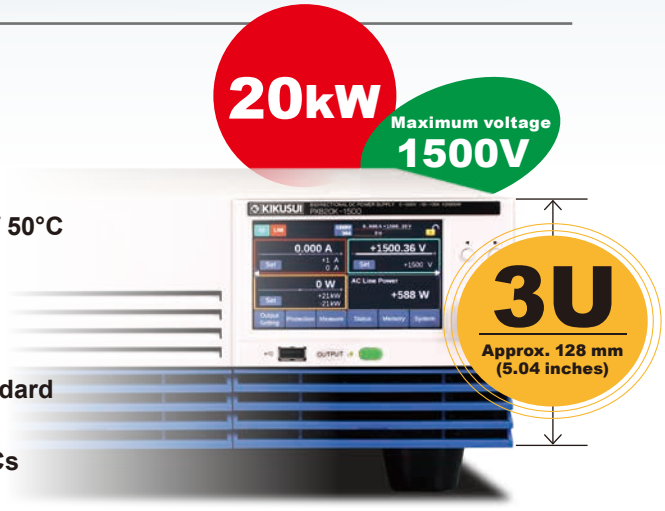


Bidirectional High-Capacity DC Power Supply

PXB Series

Features

- High power density: 20 kW in 3U size
- A single unit handles both power and regeneration
- Rated output voltage 50 V/ 100 V/ 250 V/ 500 V/ 1000 V/ 1500 V
- Select a model with an input voltage from 200 Vac (3-phase) or 400 Vac (3-phase)
- Continuous operation at rated power at ambient temperature of 50°C (Excluding some models)
- Up to 25 units (500 kW) can be operated in parallel
  *Please contact us if you wish to operate more than 10 units in parallel.
- Equipped with touch panel display
- LAN, USB, RS232C, external analog control (isolated type) standard
- Regenerative function (on-site)
- External control I/O is standard for both NPN and PNP type PLCs



Lineup / Main Specifications

Model	Output			Ripple noise	Power fluctuation		Load variation	
	CV	CC *	Rated power	CV (rms)	CV	CC	CV	CC
PXB10K-50	0 V to 50 V	-400 A to +400 A	10 kW	37 mV	±10 mV	±800 mA	±40 mV	±800 mA
PXB20K-50	0 V to 50 V	-800 A to +800 A	20 kW	30 mV	±10 mV	±1600 mA	±40 mV	±1600 mA
PXB20K-100	0 V to 100 V	-400 A to +400 A		75 mV	±20 mV	±800 mA	±50 mV	±800 mA
PXB20K-250	0 V to 250 V	-200 A to +200 A		125 mV	±50 mV	±400 mA	±125 mV	±400 mA
PXB20K-500	0 V to 500 V	-120 A to +120 A		250 mV	±100 mV	±240 mA	±250 mV	±240 mA
PXB20K-1000	0 V to 1000 V	-60 A to +60 A		500 mV	±200 mV	±120 mA	±500 mV	±120 mA
PXB20K-1500	0 V to 1500 V	-30 A to +30 A		750 mV	±300 mV	±60 mA	±750 mV	±60 mA

Model	Rise time / Fall time				Input current	Weight
	CV		CC		AC 200 V (3-phase 3-wire) / 400 V (3-phase 3-wire) * Select type at purchase. Switching not possible.	
	Rise time	Fall time	Rise time (Short-circuit) (TYP)	Fall time (Short-circuit) (TYP)		Approx.
PXB10K-50	10 ms		5 ms		40 A / 20 A	28 kg (61.73 lbs)
PXB20K-50					80 A / 40 A	41 kg (90.39 lbs)
PXB20K-100						40 kg (88.18 lbs)
PXB20K-250						39 kg (85.98 lbs)
PXB20K-500						38 kg (83.78 lbs)
PXB20K-1000						37 kg (81.57 lbs)
PXB20K-1500						37 kg (81.57 lbs)

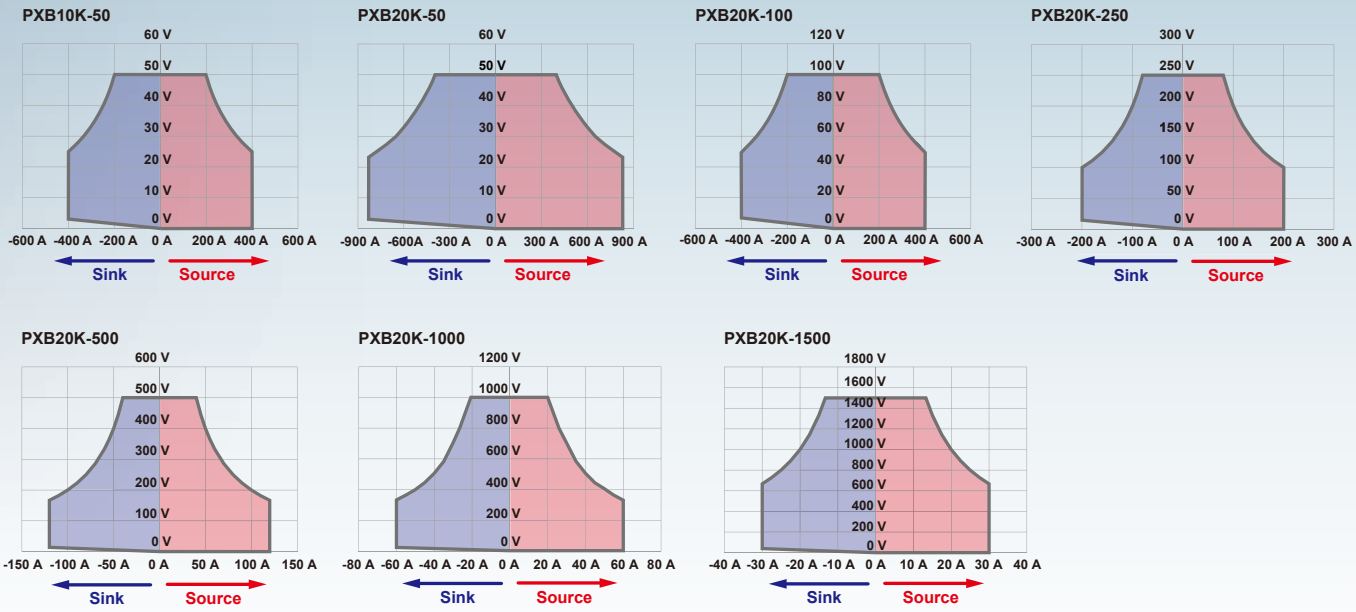
*The minimum voltage at which the maximum Sink is possible is 6 % of the rated voltage for the PXB20K-50 and PXB20K-250, 7% of the rated voltage for the PXB20K-100, and 2 % of the rated voltage for other models.

● Output power range

2 to 3 times mains-powered operation

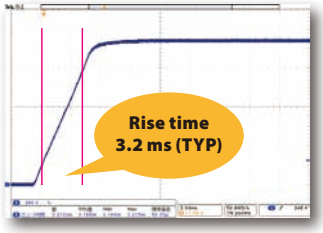
Mains-powered power supply with a wide range of operating ranges and combinations of voltage and current settings. If the voltage of the connected DUT is lower than the voltage setting of the PXB series, current flows from the PXB series to the DUT. If the voltage of the connected DUT is higher than the voltage setting of the PXB series, current flows from the DUT to the PXB series.

Conceptual diagram of operating area

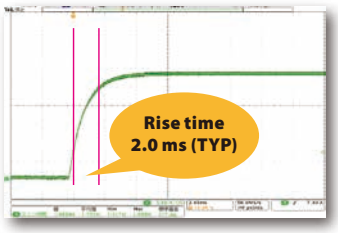


● Achieves high-speed rise and fall times

Achieves a rise/fall time of 10 ms, which is several tens of times faster than conventional switching power supplies. Enabling high-speed power fluctuation testing that cannot be handled by ordinary DC power supplies.



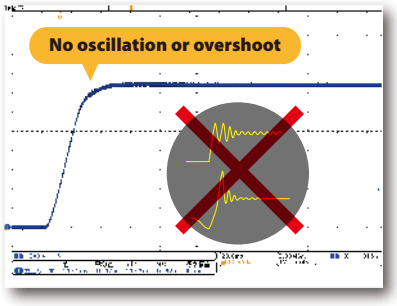
CV operation: at no load



CC operation: at short circuit

● Highly stable operation with high resistance to capacitive loads

Designed for highly stable operation, without oscillation or overshoot even when a load with a large capacitive component is connected. Slew rate and response can be varied to match the characteristics of the connected load, suppressing oscillation and overshoot.



Output voltage waveform with 400 µF capacitor connected

● Applications

Inverter and motor evaluation test



Inverter　　Motor

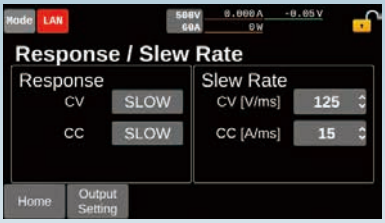
Aging tests for bidirectional DC/DC converters



DC/DC converter

● Optimized for different purposes and applications, with selectable response speeds

Required response speed of power supply equipment varies depending on test conditions and load specifications. The PXB series can change the response speed of the power supply as desired to suit the application.



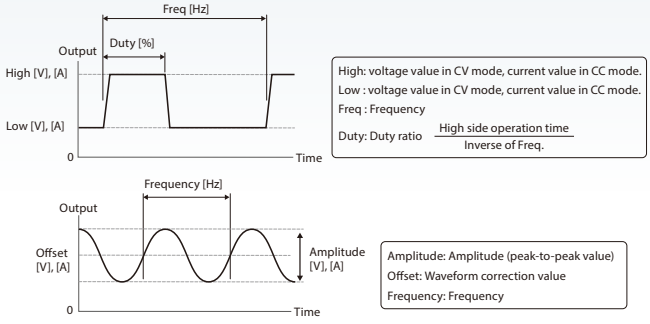
Response	**FAST/SLOW**
Slew rate	**Selectable in 5 steps** * Refer to P6 specifications for details.

● Priority operation mode

Mode of operation can be set, as constant voltage (CV), constant current (CC), or constant power (CP), when output is turned on. Overshoot can be prevented by setting CC mode priority when batteries, power supplies, etc. are connected.

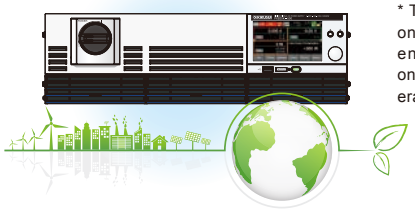
● Pulse function / Sign function

"Pulse" operation can be set, which repeatedly executes a binary setting, or "sine" operation, changing the current in a sinusoidal manner.



● Regenerative function (on-premises) contributes to carbon neutrality.

When power is regenerated to the main unit from an inverter or battery, the load power is converted to reusable power and regenerated to the AC LINE. This can contribute to reducing the amount of heat exhaust and saving energy. *Regenerative efficiency of over 90% (at rated load).

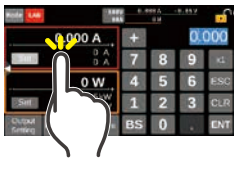


* The PXB series is designed for on-site regeneration. Use in an environment where the power on-site is greater than the regenerative power.

● Equipped with touch panel display

By pressing or swiping a finger on the display, on-screen items can be selected, or numerical values set.
The display is pressure-sensitive and can be operated even with gloves.

Press / Long press

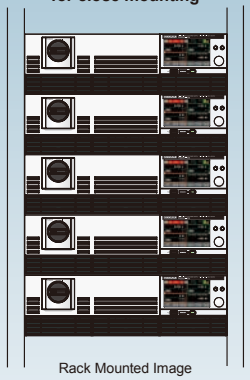


Swipe



● Up to 25 units can be operated in parallel, achieving 500 kW*

Intake and exhaust on the front and back only, allowing for close mounting

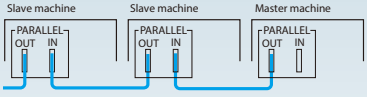


Rack Mounted Image

Including master machine, up to 25 units (500 kW) can be operated in parallel. Connection is with one-control parallel operation, and the panel of the master machine can control and display the entire system. With the automatic recognition function, the need for complicated settings is eliminated, allowing the construction of high-capacity systems.

* Parallel operation is possible between models with different input rated voltages.
Please contact us if you wish to operate more than 10 units in parallel.

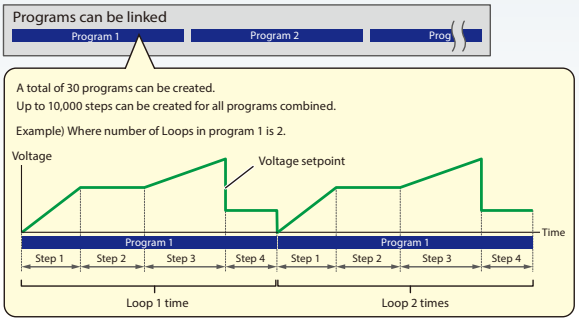
Connection conceptual diagram



Parallel operation connection cable
PC01-PXB

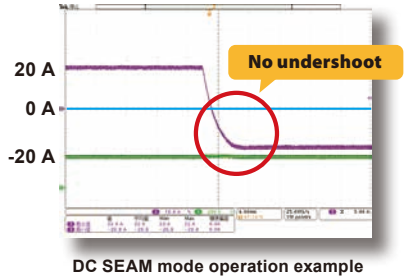
● Sequence function

Preset operations can be run continuously. Total of 30 programs, and up to 10,000 steps can be created for all programs. Programs stored in the unit's memory, and data can be exported to a USB memory stick from the front panel.



● SEAM mode

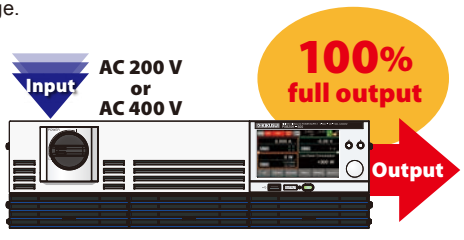
Equipped with SEAM mode allowing current to flow in both directions without changing voltage values. Suitable for charging and discharging storage batteries. Can suppress current overshoots and undershoots which may often occur during operation mode switching after charge/discharge.



DC SEAM mode operation example

● Selectable power input

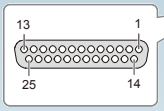
Full output at rated power regardless of input voltage. Choose from 3-phase 3-wire 200 V or 400 V models. No output limitation for either input voltage.



● External control function

The EXT CONT connector on the rear panel can be used to control the PXB series with external devices. The general-purpose digital input and output terminals can be assigned any function, facilitating system construction in combination with other measurement devices. Digital I/O standard for both NPN and PNP type PLCs. Analog I/O is isolated from output terminals as standard, allowing safe analog control from PLC.

EXT CONT connector pin number



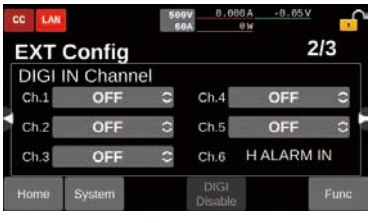
Rear panel



Terminal No.	Method	I/O	Name	Description
1	Digital	O	OUT Ch.1	General-purpose output terminal
2	Digital	O	OUT Ch.2	General-purpose output terminal
3	Digital	O	OUT Ch.3	General-purpose output terminal
4	–	–	DO COM	Digital output common
5	–	–	DI COM	Digital input common
6	Digital	I	IN Ch.1	General-purpose input terminal
7	Digital	I	IN Ch.2	General-purpose input terminal
8	Digital	I	IN Ch.3	General-purpose input terminal
9	–	O	+12 V OUT	12 V reference voltage available for digital input
10	–	–	–	Not used
11	–	–	A COM	Analog signal common
12	Analog	O	VMON	Voltage monitor
13	Analog	O	IMON	Current monitor
14	Digital	O	OUT Ch.4	General-purpose output terminal
15	Digital	O	OUT Ch.5	General-purpose output terminal
16	Digital	O	OUT Ch.6	General-purpose output terminal
17	–	–	DO COM	Digital output common
18	–	–	DI COM	Digital input common
19	Digital	I	IN Ch.4	General-purpose input terminal
20	Digital	I	IN Ch.5	General-purpose input terminal
21	Digital	I	H ALARM IN	HIGH alarm EXT HIGH occurrence
22	–	–	12 V COM	12 V reference voltage common
23	–	–	A COM	Analog signal common
24	Analog	I	EXT CV	Voltage control in the constant voltage mode
25	Analog	I	EXT CC/CP	Current control in the constant current / power modes

Method	Function
Analog input	Setting of voltage and current values
Analog output	Monitoring of voltage and current values
General-purpose isolated digital input (Ch.1 to ch.5) *Photocoupler isolated input (Supports both current sink and source)	• Output ON/OFF from DC OUTPUT terminal • LOW alarm generation / deactivation • Start / Stop totalizer measurement • Reset totalized value • Measurement trigger input • Preset memory recall
Digital input (Ch.6)	HIGH alarm generation (Fixed)
General-purpose isolated digital output (Ch.1 to ch.6) *Semiconductor relay output	• Monitor output status of DC OUTPUT terminal • Power-on monitor • Alarm monitoring • Operating mode monitoring • Preset memory monitoring

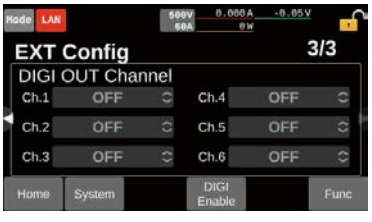
General-purpose isolated digital input terminals are available from Ch.1 to Ch.5. Any setting value from the items listed on the right can be selected.



- ➤ OFF
- ➤ OUTPUT ON
- ➤ OUTPUT OFF
- ➤ OUTPUT CTRL
- ➤ L ALARM IN
- ➤ ALARM CLR
- ➤ SEQ RUN
- ➤ SEQ PAUSE
- ➤ INTEG CTRL
- ➤ INTEG RESET
- ➤ ACQUIRE TRIG
- ➤ SEQ TRIG IN
- ➤ MEM1 RECALL
- ➤ MEM2 RECALL

* Ch.6 is fixed at "H Alarm IN".

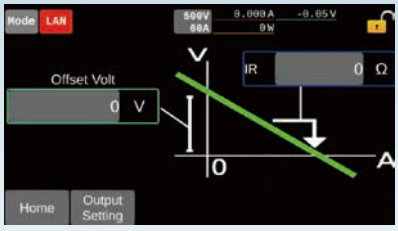
General-purpose isolated digital output terminals are available from Ch.1 to Ch.6. Any setting value from the items listed on the right can be selected.



- ➤ OFF
- ➤ OUTPUT ON
- ➤ POWER ON
- ➤ H ALARM OUT
- ➤ L ALARM OUT
- ➤ CC STATUS
- ➤ CV STATUS
- ➤ SEQ TRIG OUT
- ➤ SEQ STATUS
- ➤ EXT DIN BUSY
- ➤ MEM1 ACT TIME
- ➤ MEM2 ACT TIME
- ➤ RELAY DRIVE

● Variable internal resistance function

Function can change the output voltage value in constant voltage operation, according to the output current value based on the set resistance value. Simple simulation of Internal resistance of rechargeable batteries and wire harnesses etc.



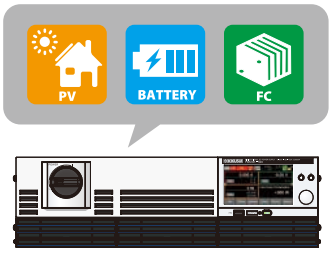
Range of settings	PXB10K-50	0 mΩ to 126 mΩ
	PXB20K-50	0 mΩ to 63 mΩ
	PXB20K-100	0 mΩ to 315 mΩ
	PXB20K-250	0 mΩ to 1575 mΩ
	PXB20K-500	0 mΩ to 5250 mΩ
	PXB20K-1000	0 mΩ to 21000 mΩ
	PXB20K-1500	0 mΩ to 63000 mΩ

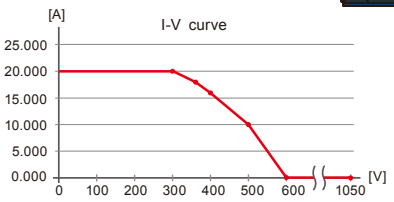
● I-V characteristic function

By registering multiple arbitrary points on the I-V characteristics, arbitrary I-V characteristics can be set for each CC and CV operation mode. Arbitrary points can be registered from 3 to 100, making it possible to simulate the I-V characteristics of rechargeable batteries and other devices.

PXB20K-1000 CC mode setting example

Score	Voltage [V]	Current [A]
1	0	20.000
2	300	20.000
3	360	18.000
4	400	16.000
5	500	10.000
6	600	0.000
7	1050	0.000





● Reliable and solid performance even under high temperatures



Solid performance under operating temperatures of 0°C to 50°C. Exhibits full performance even in environments with severe ambient temperatures, such as when installed in equipment. (Excluding some models.)

Caution: PXB10K-50, PXB20K-50, PXB20K-100 and PXB20K-250 operates in the temperature range of 0°C to +40°C.

● Safety Protection Function

- OVP (Over voltage protection)
- OPP (Over power protection)
- UVP (Under voltage protection)
- OCP (Over current protection)
- WDOG (Communication error protection)
- EXT LOW (External input alarm detection)

Specifications

Unless specified otherwise, the specifications are for the following settings and conditions.
• The product is warmed up for at least 30 minutes.
The used terminology is as follows:
• TYP: These are typical values that are representative of situations where the product operates in an environment with an ambient temperature of 23°C (73.4°F). These values do not guarantee the performance of this product. • setting: Indicates a setting. • reading: Indicates a readout value. • rating: Indicates a rated value. • Open: Indicates equivalence to the state in which the DC OUTPUT terminals are opened. • +, −: + sign indicates source, − sign indicates sink. • Vout: Indicates an output voltage.

Output rating

Item	PXB10K-50	PXB20K-50	PXB20K-100	PXB20K-250	PXB20K-500	PXB20K-1000	PXB20K-1500
Rated power	±10000 W	±20000 W	±20000 W	±20000 W	±20000 W	±20000 W	±20000 W
Rated voltage (source) *1	0 V to 50 V	0 V to 50 V	0 V to 100 V	0 V to 250 V	0 V to 500 V	0 V to 1000 V	0 V to 1500 V
Operating voltage (sink) *2	3 V to 50 V	3 V to 50 V	7 V to 100 V	15 V to 250 V	10 V to 500 V	20 V to 1000 V	30 V to 1500 V
Rated current *1	±400 A	±800 A	±400 A	±200 A	±120 A	±60 A	±30 A

*1. Limited by the maximum output power.
*2. Operating voltage at which the rated sink current can be applied.

Output voltage

Item			PXB10K-50	PXB20K-50	PXB20K-100	PXB20K-250	PXB20K-500	PXB20K-1000	PXB20K-1500
Maximum settable voltage			52.5 V	52.5 V	105 V	262.5V	525 V	1050 V	1575 V
Setting accuracy			±(0.2 % of setting + 0.1 % of rating)						
Setting resolution			0.005 V	0.005 V	0.01 V	0.02 V	0.05 V	0.1 V	0.1 V
Power fluctuation *1			±10 mV	±10 mV	±20 mV	±50 mV	±100 mV	±200 mV	±300 mV
Load variation *2			±40 mV	±40 mV	±50 mV	±125 mV	±250 mV	±500 mV	±750 mV
Remote sensing (Maximum compensation voltage (reciprocating))			10 % of rating						
Internal resistance setting upper limit			126 mΩ	63 mΩ	315 mΩ	1575 mΩ	5250 mΩ	21000 mΩ	63000 mΩ
Internal resistance setting resolution			1 mΩ	1 mΩ	1 mΩ	1 mΩ	1 mΩ	2 mΩ	5 mΩ
Response switching			FAST, SLOW						
Slew rate switching (TYP)			12.5 V/ms or more *3	12.5 V/ms or more *3	25 V/ms or more *3	62.5 V/ms or more *3	125 V/ms or more *3	250 V/ms or more *3	375 V/ms or more *3
			12.5 V/ms	12.5 V/ms	25 V/ms	62.5 V/ms	125 V/ms	250 V/ms	375 V/ms
			1.25 V/ms	1.25 V/ms	2.5 V/ms	6.25 V/ms	12.5 V/ms	25 V/ms	37.5 V/ms
			0.125 V/ms	0.125 V/ms	0.25 V/ms	0.625 V/ms	1.25 V/ms	2.5 V/ms	3.75 V/ms
			0.0125 V/ms	0.0125 V/ms	0.025 V/ms	0.0625 V/ms	0.125 V/ms	0.25 V/ms	0.375 V/ms
Source only *4	Transient response *5		8 ms or less	8 ms or less	8 ms or less	8 ms or less	8 ms or less	10 ms or less	10 ms or less
	Ripple noise *6	p-p *7	250 mV	250 mV	300 mV	375 mV	1000 mV	1500 mV	2500 mV
		rms *8	37 mV	30 mV	75 mV	125 mV	250 mV	500 mV	750 mV
	Rise time *9	Full load *10	10 ms						
		No load	10 ms						
	Fall time *11	Full load *10	10 ms						
		No load	10 ms						

*1. 180 Vac to 252 Vac for 200 Vac input, 342 Vac to 504 Vac for 400 Vac input. At the constant load.
*2. The amount of change that occurs when the load is changed from no load to full load (rated output power/rated output voltage) with rated output voltage. The value is measured at the sensing point.
*3. MAX will appear on the display.
*4. In the case that the CV mode response setting is set to FAST.
*5. The amount of time required for the output voltage to return to a value within "rated output voltage ±(0.1 % + 10 mV)." The load current fluctuation is 50 % to 100 % of the maximum current with the set output voltage.
*6. At the rated output current. Values measured using JEITA RC-9131C probe and 100:1 probe.
*7. Measurement frequency band: 10 Hz to 20 MHz
*8. Measurement frequency band: 10 Hz to 1 MHz
*9. 10 % to 90 % of the rated output voltage.
*10. For a pure resistance.
*11. 90 % to 10 % of the rated output voltage.

Output current

Item	PXB10K-50	PXB20K-50	PXB20K-100	PXB20K-250	PXB20K-500	PXB20K-1000	PXB20K-1500
Settable maximum source current *1	+420 A	+840 A	+420 A	+210 A	+126 A	+63 A	+31.5 A
Settable maximum sink current *1	-420 A	-840 A	−420 A	-210 A	-126 A	-63 A	-31.5 A
Seamless setting current range *1	-420 A to +420 A	-840 A to +840 A	-420 A to +420 A	-210 A to +210 A	-126 A to +126 A	-63 A to +63 A	-31.5 A to +31.5 A
Setting accuracy	±(0.75 % of rating)						
Setting resolution	0.05 A	0.1 A	0.05 A	0.02 A	0.01 A	0.005 A	0.002 A
Power fluctuation	±800 mA	±1600 mA	±800 mA	±400 mA	±240 mA	±120 mA	±60 mA
Load variation	±800 mA	±1600 mA	±800 mA	±400 mA	±240 mA	±120 mA	±60 mA
Rise time (Short-circuit) (TYP) *2	5 ms						
Fall time (Short-circuit) (TYP) *3	5 ms						
Charge/discharge switching time (TYP)	10 ms						
Response switching	FAST, SLOW						
Slew rate switching (TYP) *1	100 A/ms or more *4	200 A/ms or more *4	100 A/ms or more *4	50 A/ms or more *4	30 A/ms or more *4	15 A/ms or more *4	7.5 A/ms or more *4
	100 A/ms	200 A/ms	100 A/ms	50 A/ms	30 A/ms	15 A/ms	7.5 A/ms
	10 A/ms	20 A/ms	10 A/ms	5 A/ms	3 A/ms	1.5 A/ms	0.75 A/ms
	1 A/ms	2 A/ms	1.0 A/ms	0.5 A/ms	0.3 A/ms	0.15 A/ms	0.075 A/ms
	0.1 A/ms	0.2 A/ms	0.10 A/ms	0.05 A/ms	0.03 A/ms	0.015 A/ms	0.0075 A/ms

*1. During parallel operation, this will be the value multiplied by the number of units in the configuration.
*2. In the case that the CC mode response setting is set to FAST: Applied in response to changes from 10 % to 90 % of rated output current.
*3. In the case that the CC mode response setting is set to FAST: Applied in response to changes from 90 % to 10 % of rated output current.
*4. MAX will appear on the display.

Output power

Item	PXB10K-50	PXB20K-50	PXB20K-100	PXB20K-250	PXB20K-500	PXB20K-1000	PXB20K-1500
Settable maximum source power *1	+10500 W	+21000 W					
Settable maximum sink power *1	-10500 W	-21000 W					
Seamless setting power range *1	-10500 W to +10500 W	-21000 W to +21000 W					
Setting accuracy *2	±(0.5 % of power rating + 0.5 % of current rating × Vout)						
Setting resolution	1 W	2 W					

*1. During parallel operation, this will be the value multiplied by the number of units in the configuration.
*2. Equal to or higher than 5 % of the rated power is guaranteed. Less than 5 % of the rated power is guaranteed as a TYP value.

Specifications

200 V three-phase three-wire input

Specifications for models having an input voltage rating of 200 Vac.

Item	10 kW models	20 kW models
Nominal input rating	200 Vac to 240 Vac, 50 Hz to 60 Hz	
Input voltage range	180 Vac to 252 Vac	
Input frequency range	47 Hz to 63 Hz	
Input current (MAX) *1	40 A (180 V)	80 A (180 V)
Input power (MAX) *1	12 kVA	24 kVA
Inrush current (TYP) *2	90 A	
Power factor (TYP) *1	0.96	
Output hold time	10 ms or more	

*1. At the rated output power for the rated output current.
*2. Maximum peak current value when the POWER switch is turned on. (Excluding the surge current to the input filter capacitor.)

400 V three-phase three-wire input

Specifications for models having an input voltage rating of 400Vac.

Item	10 kW models	20 kW models
Nominal input rating	380 Vac to 480 Vac, 50 Hz to 60 Hz	
Input voltage range	342 Vac to 504 Vac	
Input frequency range	47 Hz to 63 Hz	
Input current (MAX) *1	20 A (342 V)	40 A (342 V)
Input power (MAX) *1	12 kVA	24 kVA
Inrush current (TYP) *2	70 A	
Power factor (TYP) *1	0.96	
Output hold time	10 ms or more	

*1. At the rated output power for the rated output current.
*2. Maximum peak current value when the POWER switch is turned on. (Excluding the surge current to the input filter capacitor.)

Display

Item		PXB10K-50	PXB20K-50	PXB20K-100	PXB20K-250	PXB20K-500	PXB20K-1000	PXB20K-1500
Voltmeter	Maximum display	±60.000 V	±60.000 V	±120.000 V	±300.000 V	±600.00 V	±1200.00 V	±1800.00 V
	Display accuracy	±(0.1 % of reading + 0.2 % of rating)						
Ammeter	Maximum display	±560.00 A	±1120.000 A	±560.00 A	±280.00 A	±168.000 A	±84.000 A	±42.000 A
	Display accuracy	±(0.75 % of rating)						
Wattmeter	Maximum display *1	±12.000 kW	±24.000 kW					
	Display accuracy	Display the integrated value of voltmeter and ammeter						
Operation display	Output ON / OFF	The OUTPUT LED on the front panel lights in green						
	Operation mode	Indicate the followings on the upper left part of the display CV: Green CV icon, CC: Red CC icon, CP: Orange CP icon						
	Remote (LAN)	Indicate the followings on the upper left part of the display Not connected: Red LAN icon, Preparing for connection: Orange LAN icon, Connected: Green LAN icon						
	Alarm	Indicate the details of activated protection function on the display						
	SCPI error	Indicate the error occurring at present on the display						
	POWER off	Indicate residual charge warning and an instruction to turn off the display, then reboot						
	Key lock	Indicate the key lock status on the upper right part of the display						
	Sensing	When sensing is enabled, indicate the sensing icon on the upper right part of the display						
	During parallel operation	Displaying the slave state on the slave unit						
	External control	When digital input/output is enabled, indicate the EXT icon on the upper right part of the display						

*1. The unit will be W if it is less than 10 kW.

Protection function LOW alarm

An alarm not requiring a reboot to be cleared.

Item		PXB10K-50	PXB20K-50	PXB20K-100	PXB20K-250	PXB20K-500	PXB20K-1000	PXB20K-1500
OVP (overvoltage protection)	Protection operation	Output off, indicate “OVP” on the display. SLV OVP is displayed on the slave unit.						
	Setting range	5 V to 55 V	5 V to 55 V	10 V to 110 V	25 V to 275 V	50 V to 550 V	100 V to 1100 V	150 V to 1650 V
	Setting accuracy	±(0.1 % of setting + 0.2 % of rating)						
	Setting resolution	0.005 V	0.005 V	0.01 V	0.02 V	0.05 V	0.1 V	0.1 V
OCP (overcurrent protection)	Protection operation	Output off, indicate “OCP” on the display. SLV OCP is displayed on the slave unit.						
	Setting range (Source) *1	40 A to 440 A	80 A to 880 A	40 A to 440 A	20 A to 220 A	12 A to 132 A	6 A to 66 A	3 A to 33 A
	Setting range (Sink) *1	-40 A to -440 A	-80 A to -880 A	−40 A to −440 A	-20 A to -220 A	−12 A to −132 A	-6 A to -66 A	−3 A to −33 A
	Setting accuracy	±(0.75 % of rating)						
	Setting resolution	0.05 A	0.1 A	0.05 A	0.02 A	0.01 A	0.005 A	0.002 A
OPP (overpower protection)	Protection operation	Output off, indicate “OPP” on the display. SLV OPP is displayed on the slave unit.						
	Setting range (Source) *1	1 kW to 12 kW	2 kW to 24 kW					
	Setting range (Sink) *1	-1 kW to -12 kW	-2 kW to -24 kW					
	Setting accuracy	±(1.0 % of power rating + 1.0 % of current rating × Vout)						
	Setting resolution	1 W	2 W					
UVP (undervoltage protection)	Protection operation	Output off, indicate “UVP” on the display. SLV UVP is displayed on the slave unit.						
	Setting range	0 V to 50 V	0 V to 50 V	0 V to 100 V	0 V to 250 V	0 V to 500 V	0 V to 1000 V	0 V to 1500 V
	Selectable	Enable/Disable						
	Setting accuracy	±(0.1 % of setting + 0.2 % of rating)						
	Setting resolution	0.005 V	0.005 V	0.01 V	0.02 V	0.05 V	0.1 V	0.1 V
Watchdog Alarm (Communication error protection)	Protection operation	Output off, indicate “WDOG” on the display						
	Setting range	1 s to 3600 s						
	Selectable	Enable/Disable						
External Alarm LOW Level (external input alarm detection)	Protection operation	Output off, indicate “EXT LOW” on the display						

*1. During parallel operation, this will be the value multiplied by the number of units in the configuration.

Protection function HIGH alarm

An alarm requiring a reboot to be cleared.

Item		Common to all models
Reverse Alarm (Reverse-connection detection protection)	Protection operation	Output off, indicate “REVE” on the display
OHP (Overheat protection)	Protection operation	Output off, indicate “OHP” on the display. SLV OHP is displayed on the slave unit.
Line OVP (Grid overvoltage protection)	Protection operation	Output off, indicate “LOVP” on the display. SLV LOVP is displayed on the slave unit.
	Setting range	Input voltage rating 200 Vac model: 200 V to 258 V Input voltage rating 400 Vac model: 380 V to 516 V
Line UVP (Grid undervoltage protection)	Protection operation	Output off, indicate “LUVP” on the display. SLV LUVP is displayed on the slave unit.
	Setting range	Input voltage rating 200 Vac model: 175 V or less. Input voltage rating 400 Vac model: 333 V or less.
Line Frequency Error (Grid abnormal frequency protection)	Protection operation	Output off, indicate “FREQ” on the display. SLV FREQ is displayed on the slave unit.
	Detection value	42 Hz/68 Hz
External Alarm HIGH Level (External input alarm detection)	Protection operation	Output off, indicate “EXT HIGH” on the display
SENS Alarm (incorrect sensing connection detection)	Protection operation	Output off, indicate “SENS” on the display
	Setting range	Enable/Disable
Parallel Communication Error (Parallel operation communication error detected)	Protection operation	Output off, indicate “PARA COM” on the display
Para Other Slave Alarm (Parallel operation slave error occurred)	Protection operation	Output off, indicate “SLV OTHR” on the display
Incorrect Slave Alarm (Not applicable device connected)	Protection operation	Output off, indicate “SLV INC” on the display
Too many connections (Too many parallel connections)	Protection operation	Output off, indicate “TOO MANY” on the display
Hardware ERR *1 (Hardware error)	Protection operation	Output off, indicate “ERRH” on the display. SLV ERRH is displayed on the slave unit.
Software ERR *2 (Software error)	Protection operation	Output off, indicate “ERRS” on the display. SLV ERRS is displayed on the slave unit.

*1. It occurs when an abnormality related to the hardware is detected and the internal unit comes to an emergency stop.
*2. It occurs when an abnormality related to the software is detected and the internal unit comes to an emergency stop.

External analog I/O

Item			Common to all models
Input	Input points		2 points
	Voltage (CV) control	Setting range	0 % to 100 % of the rated output voltage
		Input voltage range	0 V to +5 V or 0 V to +10 V (Selectable)
		Accuracy	±(1 % of rating)
	Current (CC) control Power (CP) control *1	Setting range	−100 % to +100 % of the rated current and rated power
		Input voltage range	−5 V to +5 V or −10 V to +10 V (Selectable)
		Accuracy	±(1 % of rating)
Output	Output points		2 points
	Voltage monitor (VMON)	Monitor range	0 % to +100 % of the rated output voltage
		Output voltage range	0 V to +5 V or 0 V to +10 V (Selectable)
		Accuracy	1 % of rating
	Current monitor (IMON)	Monitor range	−100 % to +100 % of the rated output voltage
		Output voltage range	−5 V to +5 V or −10 V to +10 V (Selectable)
		Accuracy	±(1 % of rating)

*1. Select either current control or power control.

External digital input

Item		Common to all models
Fixed input points		1 point (Polarity switchable)
Selected input points		5 points (Polarity switchable)
Input form		Photocoupler isolated input (Applicable to both current sink / source output)
Fixed function	ALARM IN	HIGH alarm occurrence
Selecting function	OFF	Do not use terminals
	OUTPUT ON	Turn on the output
	OUTPUT OFF	Turn off the output
	OUTPUT CTRL	Turn on of off the output
	L ALARM IN	LOW alarm occurrence
	ALARM CLR	LOW alarm clearance
	SEQ RUN	Sequence start/end
	SEQ PAUSE	Sequence pause/resume
	INTEG CTRL	Starting/stopping integration measurement
	INTEG RESET	Resetting integration measurement data
	ACQUIRE TRIG	Input the measurement trigger
	SEQ TRIG IN	Input the trigger for sequence
	MEM1 RECALL	Recall preset memory 1
	MEM2 RECALL	Recall preset memory 2
External circuit power supply range		12 V to 24 Vdc (±10 %)

Specifications

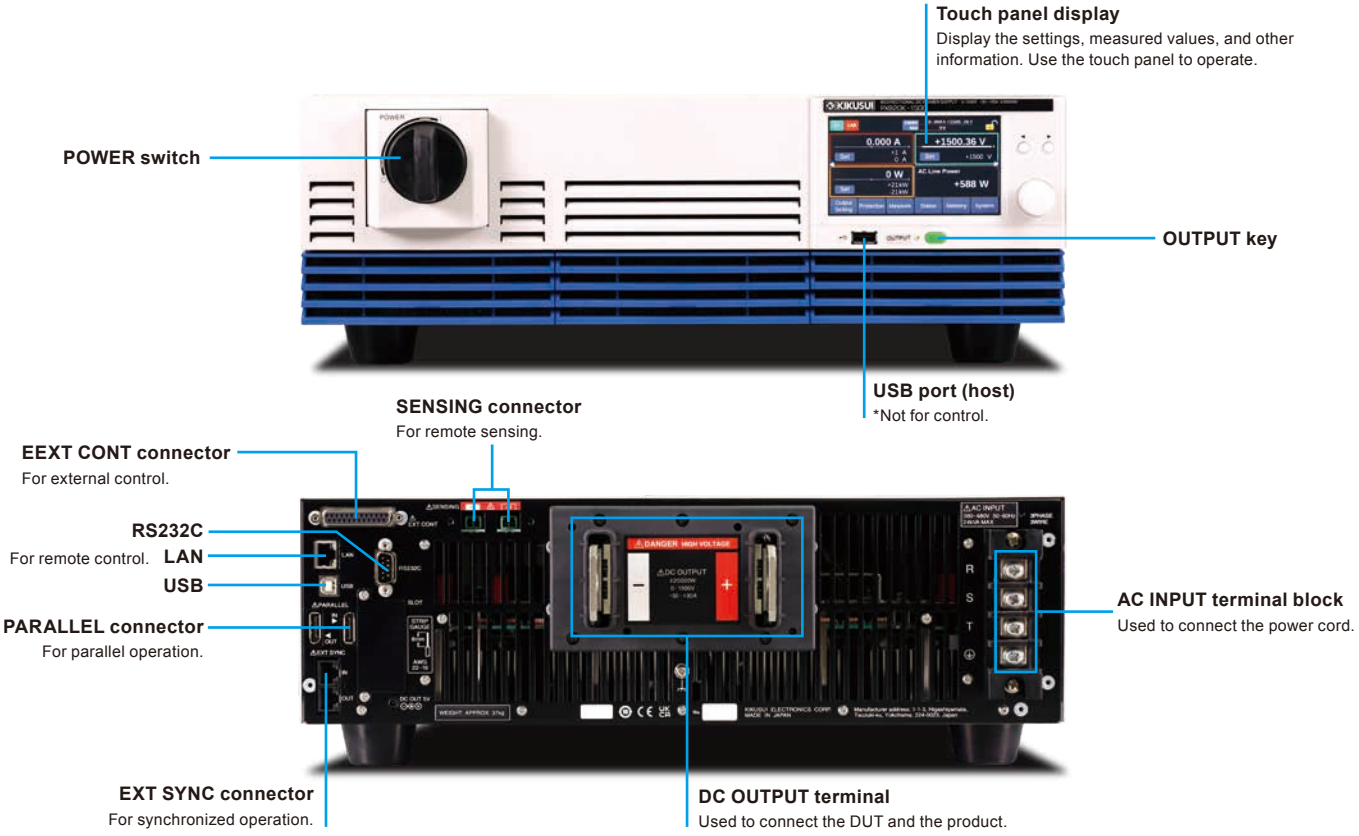
External digital output

Item		Common to all models
Output points		6 points (Polarity switchable)
Output form		Semiconductor relay output
Selecting function	OFF	Do not use terminals
	OUTPUT ON	Outputting the signal while the output is ON
	POWER ON	Signal is output when power supply is on and output is possible
	H ALARM OUT	Output a signal when a HIGH alarm occurs
	L ALARM OUT	Output a signal when a LOW alarm occurs
	CC STATUS	Output a signal when operating in the CC mode
	CV STATUS	Output a signal when operating in the CV mode
	SEQ TRIG OUT	Output the trigger for sequence
	SEQ STATUS	Signal is output while the sequence is running
	EXT DIN BUSY	Output a signal when the digital input is in BUSY status
	MEM1 ACT TIME	Signal is output when the setting is completed for preset memory 1
	MEM2 ACT TIME	Signal is output when the setting is completed for preset memory 2
	RELAY DRIVE	Output a signal after approx. 100 ms in step with on/off of the DC OUTPUT terminal output. You can set this parameter to only Ch.6.

Communication interface

Item		Common to all models
Common specifications	Software protocol	IEEE std. 488.2-1992
	Command language	Complies with SCPI Specification 1999.0
RS232C	Hardware	D-SUB 9-pin connector Baud rate: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps Data length: 8 bits, Stop bits: 1 bit, Parity bit: None Flow control: No, CTS-RTS
	Program message terminator	LF during reception, LF during transmission
USB (device)	Hardware	Standard type B socket Complies with the USB 2.0 specifications; data rate: 480 Mbps (high speed)
	Program message terminator	LF or EOM during reception, LF + EOM during transmission
	Device class	Complies with the USBTMC-USB488 device class specifications
USB (host)	Hardware	Standard type A socket Complies with the USB 2.0 specifications; data rate: 480 Mbps (high speed)
LAN	Hardware	IEEE 802.3 100BASE-TX or 10BASE-T Ethernet
	Communication protocol	SCPI-RAW, SCPI-Telnet, HiSLIP, VXI-11
	Program message terminator	SCPI-RAW: LF during reception, LF during transmission HiSLIP: LF or END during reception, LF + END during transmission.
	Compliant standards	LXI Version 1.5 Specifications 2016

Panel explanation



Others

Item			Common to all models
Synchronization function (clock synchronization)	Overview		SYNC icon is displayed on the display when synchronization is established with the internal clock after connecting with other PXB series using the EXT SYNC connector.
	Sequence synchronization		Synchronization of the program start and step start.
	Measurement synchronization		Synchronization of the measurement start
	Output synchronization		Synchronization of output ON/OFF
Sequence function	Operation mode		CV, CC, and CP modes
	Maximum number of programs		30
	Maximum number of steps		10000
	Step execution time		1 ms to 3600000 s
	Loop count		1 to 100000, or infinite
Sine function	Operation mode		CV/CC mode
	Frequency setting range *1		1 Hz to 1000 Hz
	Frequency precision setting	1 Hz to 10 Hz	0.2 Hz
		12 Hz to 100 Hz	2 Hz
		120 Hz to 1000 Hz	20 Hz
	CV	Maximum setting	Setting range up to 105 % of rated voltage
		Maximum offset setting	Setting range up to 105 % of rated voltage
	CC	Maximum setting	Setting range up to 210 % of rated current
		Maximum offset setting	Setting range up to ±105 % of rated current
Pulse function	Operation mode		CV/CC mode
	Frequency setting range *1		1 Hz to 1000 Hz
	Frequency precision setting	1 Hz to 10 Hz	0.01 Hz
		12 Hz to 100 Hz	0.1 Hz
		120 Hz to 1000 Hz	1 Hz
	CV	High level rated current	Setting range up to 105 % of rated voltage
		Low level rated current	Setting range up to 105 % of rated voltage
	CC	High level rated current	Setting range up to 105 % of rated current
		Low level rated current	Setting range up to 105 % of rated current
	Duty cycle		2.5 % to 97.5 %
Measurement trigger	Measurement start condition (trigger source)		Conditions for starting measurement can be selected (when inputting from display, when inputting commands by remote control, when inputting signals by external control, and when operating in synchronization)
	Number of measurements		1 to 65536
	Measurement delay time	Setting range	0 s to 100 s
		Setting resolution	0.1 ms
	Measurement interval	Setting range	0.1 ms to 3600 s
		Setting resolution	0.1 ms
	Measurement time	Setting range	0.1 ms to 1 s
		Setting resolution	0.1 ms
I-V characteristic function	Operation mode		CV/CC mode
	Number of setup items		3 to 100 items (interpolated between points with straight lines)
Preset value Memory	Number of memory entries		20
	Saved setting		Values in CV, CC, and CP modes, protection function values, and IR values
Setup Memory	Number of memory entries		21
	Saved setting		On/off of the output from the DC OUTPUT terminal Output voltage value/Output current value/Output power value Output current for seamless operation (DC SEAM) Output mode Response Slew Rate Priority operation mode (Priority when output is ON) Impedance Setting When the Output is Off (Impedance when output is OFF) Value of the pulse function (Duty, Frequency, High, Low) Value of the sine function (Amplitude, Frequency, Offset) Number of I-V characteristics (Count) Internal resistance value (IR) Over voltage protection (OVP) Under voltage protection (UVP, UVP Enable) Over current protection (OCP(+), OCP(-), Delay) Over power protection (OPP(+), OPP(-)) Line overvoltage protection (Line OVP) Measurement trigger settings (Source, Count, Delay, Enable, Timer) Integration settings (Gate, Reset)
Key Lock	Level 1		Output on/off and preset memory recall are available
	Level 2		Output on/off are available
	Level 3		Output off is available
Number of units in parallel operation			Up to 25 units *2

*1. Due to the PXB series output gain characteristics, the output is diminished when setting frequency to 100 Hz or more.
*2. Please contact us if you wish to operate more than 10 units in parallel.

Specifications

General Specifications

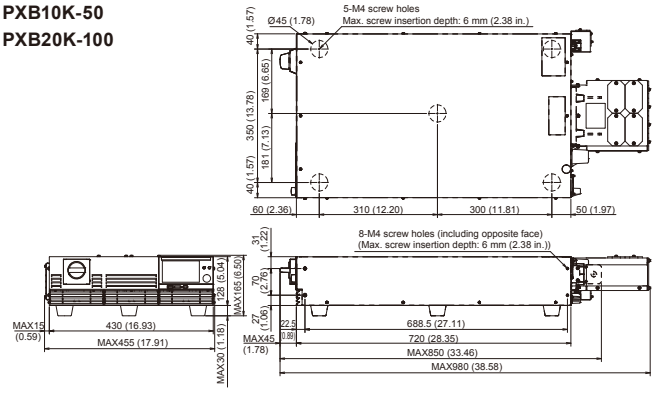
Item		PXB10K-50	PXB20K-50	PXB20K-100	PXB20K-250	PXB20K-500	PXB20K-1000	PXB20K-1500
Weight		Approx. 28 kg (61.73 lbs)	Approx. 41 kg (90.39 lbs)	Approx. 40 kg (88.18 lbs)	Approx. 39 kg (85.98 lbs)	Approx. 38 kg (83.78 lbs)	Approx. 37 kg (81.57 lbs)	Approx. 37 kg (81.57 lbs)
Dimensions		430 (16.93)W×128 (5.04)H×720 (28.35)Dmm (inches) For details, refer to the dimensional drawing.						
Environmental conditions	Operating environment	Indoor use, Overvoltage category II						
	Operating temperature	0 °C to +40 °C (32 °F to +104 °F)				0 °C to +50 °C (32 °F to +122 °F)		
	Operating humidity	20 % rh to 85% rh (no condensation)						
	Storage temperature	−25°C to +60°C (−13 °F to +140 °F)						
	Storage humidity	90 % rh or less (no condensation)						
	Altitude	Up to 2000m						
Cooling system		Forced air cooling using fan						
Accessories		Input terminal cover, External control connector kit (1 set), Chassis connection wire, OUTPUT terminal cover, DC OUTPUT terminal screws (1 pair), EXT SYNC connector cover, SENSING connector cover, SENSING connector (2 pc.), Synchronized operation signal cable kit, Safety Information (1 copy), China RoHS sheet (1 sheet), Getting Started Guide (1 copy), Heavy object warning label (1 pc.)						
Withstand voltage	Between input and GND	2200 Vac for 1 minute						
	Between input and output							
	Between output and GND	500 Vdc for 1 minute	500 Vdc for 1 minute	500 Vdc for 1 minute	1000 Vdc for 1 minute	1800 Vdc for 1 minute	1800 Vdc for 1 minute	3000 Vdc for 1 minute
Insulation resistance	Between input and GND	30 MΩ, 500 Vdc						
	Between input and output	30 MΩ, 500 Vdc	30 MΩ, 500 Vdc	30 MΩ, 500 Vdc	30 MΩ, 600 Vdc	30 MΩ, 1000 Vdc		
Isolation voltage		±250 V	±250 V	±250 V	±600 V	±1000 V	±1000 V	+2000 V/−1000 V
Electromagnetic compatibility (EMC) *1 *2		Complies with the requirements of the following directive and standards. EMC Directive 2014/30/EU EN 61326-1 (Class A *3)						
Safety *1		Complies with the requirements of the following directive and standards. Low Voltage Directive 2014/35/EU *2 EN 61010-1 (Class I *4, Overvoltage category II, Pollution Degree 2 *5) UL 61010-1 *6, CAN/CSA -C 22.2 NO.61010-1 *6						

*1. Does not apply to specially ordered or modified products.
*2. Only for models with CE mark/UKCA mark on their body.
*3. This is a Class A instrument. This product is intended for use in an industrial environment. This product may cause interference if used in residential areas. Such use must be avoided unless the user takes special measures to reduce electromagnetic emissions to prevent interference to the reception of radio and television broadcasts.
*4. This is a Class I instrument. Be sure to ground this product's protective conductor terminal. The safety of this product is guaranteed only when the product is properly grounded.
*5. Pollution is addition of foreign matter (solid, liquid or gaseous) that may produce a reduction of dielectric strength or surface resistivity. Pollution Degree 2 assumes that only non-conductive pollution will occur except for an occasional temporary conductivity caused by condensation.
*6. Only on models that have cTUVus marking on the panel.

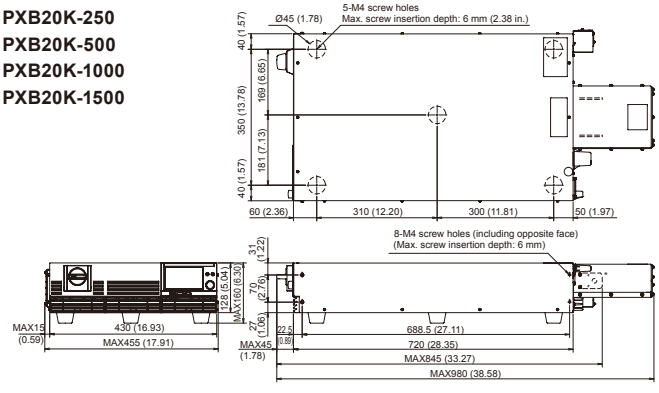
Outline drawing are common to all models. *Maximum dimensions include protrusions and accessory covers.

Unit: mm (inches)

PXB10K-50
PXB20K-100

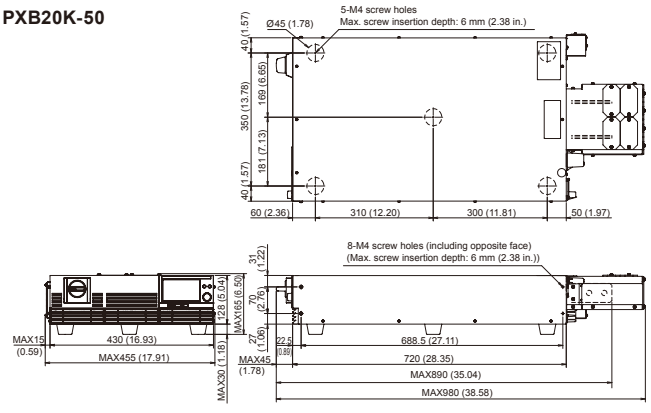


PXB20K-250
PXB20K-500
PXB20K-1000
PXB20K-1500



* The number of holes in bus bars varies depending on the model.

PXB20K-50



Ordering information

● Example of 100 kW system configuration (1500 V)

Product name	Model name	Volume
Bidirectional high-capacity DC power supply	PXB20K-1500	5
Parallel operation cable	PC01-PXB	4
Rack Mount Bracket	KRB3-TOS	5

● Example of 200 kW system configuration (1500 V)

Product name	Model name	Volume
Bidirectional high-capacity DC power supply	PXB20K-1500	10
Parallel operation cable	PC01-PXB	9
Rack Mount Bracket	KRB3-TOS	10

* Rack for mounting PXB main unit, power cables for 3-phase input, and load cables available separately.
* We can rack up the system and provide as a customer-specific solution. (Sold separately)

Options

● Parallel operation signal cable kit
PC01-PXB

● Rack mount bracket
KRB3-TOS (EIA inch rack standard)
KRB150-TOS (JIS millimeter rack standard)

● Load cable

Model name	Length	Maximum allowable current	Terminal size	Applicable models
DC200-4P3M-M12M12	3 m	800 A	M12/M12	PXB20K-50
DC150-4P3M-M12M12		500 A	M12/M12	PXB10K-50, PXB20K-100
DC80-2P3M-M10M10		200 A	M10/M10	PXB20K-250, PXB20K-500
HV22-2P3M-M12M8		80 A	M12/M8	PXB20K-1000, PXB20K-1500

● Three-phase input power cord

Model name	Length	Nominal cross-sectional area	Terminal size	Applicable models
AC22-4P3M-M6C-4S	3 m	22 mm^2	M6	All models

KIKUSUI ELECTRONICS CORPORATION
1-1-3, Higashiyamata, Tsuzuki-ku, Yokohama, Kanagawa, 224-0023, Japan
Phone:(+81)45-593-0200, Facsimile:(+81)45-593-7591, https://global.kikusui.co.jp/

KIKUSUI AMERICA, INC. https://kikusuiamerica.com/
3625 Del Amo Blvd., Suite 160 Torrance, CA90503
Phone: +1(310)214-0000, Facsimile: +1(310)214-0014, E-mail: kikusui@kikusuiamerica.com

KIKUSUI TRADING(SHANGHAI)Co., Ltd. http://www.kikusui.cn
Room 305, Shenggao Building, No.137, Xianxia Road, Shanghai City, China
Phone: +86-(0)21-5887-9067, Facsimile: +86-(0)21-5887-9069, E-mail: sales@kikusui.cn

KIKUSUI ELECTRONICS EUROPE GmbH https://kikusui-europe.com
Grossenbaumer Weg 8, 40472 Duesseldorf, Germany
Phone: +49(211)54257600, E-mail: support@kikusui-europe.com

KIKUSUI ELECTRONICS INDIA PRIVATE LIMITED
17th Cross Rd, CHBS Layout, MC Layout, Vijayanagar, Bengaluru, Karnataka 560040, India
Phone: +91 98800 66713

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