KIKUSUI

P X Z S E R I E S

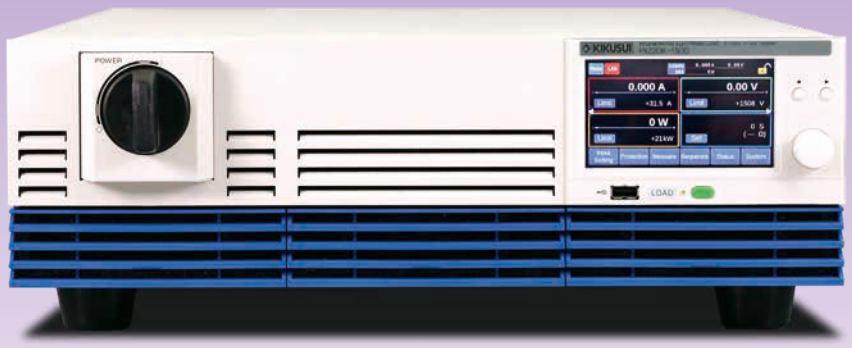
High-Capacity Regenerative Electronic Load

PXZ Series

Rated power of 20 kW in 3U
Maximum operating voltage of 1500 V
Operating modes: CC, CR, CV, CP
Up to 25 units (500 kW) can be operated in parallel
Equipped with a touch panel display
Pre-charge function
I-V characteristic function
Sequence function
LAN, USB, RS232C, external analog control (isolated type) as standard *GPIB optional
Regenerative efficiency of over 90% (on-site regeneration)

This high-capacity regenerative electronic load series contributes to carbon neutrality! Its highly efficient power regeneration reduces energy loss.

The PXZ series of highly efficient, reliable, high-capacity regenerative electronic loads has a rated power of 20 kW in 3U. In addition to the constant-current, constant-resistance, constant-voltage, and constant-power operating modes, this series has an I-V characteristic function that allows the user to set arbitrary I-V characteristics for each CC and CV operating mode. The series is also equipped with various functions, such as sequence, pre-charge, synchronous operation, pulse, sine, and VMCB functions. LAN, USB, and RS232C communication functions are included as standard, allowing easy integration into various evaluation systems. The PXZ series is highly scalable, and its capacity can be increased up to 500 kW when operating in parallel (up to 25 units).



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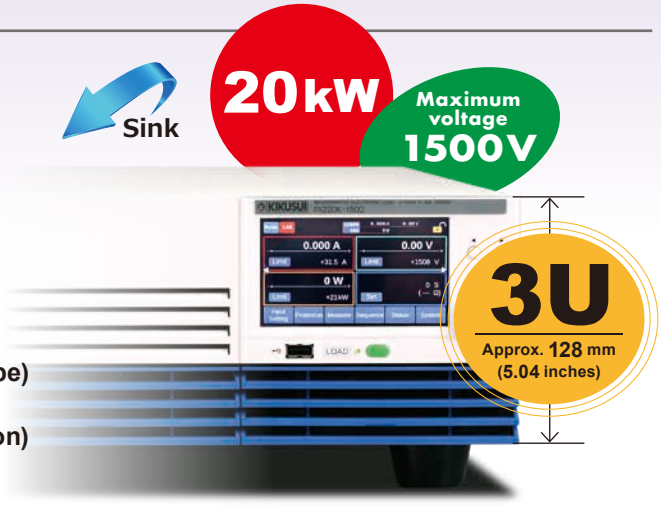
PXZ Series

Features

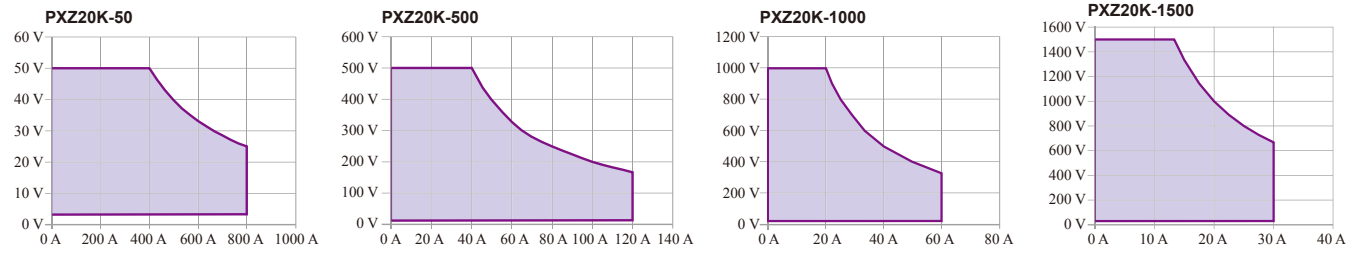
- **Rated power of 20 kW in 3U**
- **Maximum operating voltage of 1500 V**
- **Operating modes: CC, CR, CV, CP**
- **Up to 25 units (500 kW) can be operated in parallel**
  *Please contact us if you wish to operate more than 10 units in parallel.
- **Equipped with a touch panel display**
- **Pre-charge function**
- **I-V characteristic function**
- **Sequence function**
- **LAN, USB, RS232C, external analog control (isolated type) as standard *GPIB optional**
- **Regenerative efficiency of over 90% (on-site regeneration)**



Lineup / Main Specifications

Specifications Model	DC Input rating power	DC Input operating voltage	DC Input rating current	Input current AC (200 V 3-phase) / (400 V 3-phase) A	weight Approx. kg(lbs)
PXZ20K-50	20 kW	3 V to 50 V	800 A	80/40	41(90.39)
PXZ20K-500		10 V to 500 V	120 A	80/40	38(83.78)
PXZ20K-1000		20 V to 1000 V	60 A	80/40	37(81.57)
PXZ20K-1500		30 V to 1500 V	30 A	80/40	37(81.57)

● Wide Operating Range With an Expansion Ratio of 2.25 to 3 Times



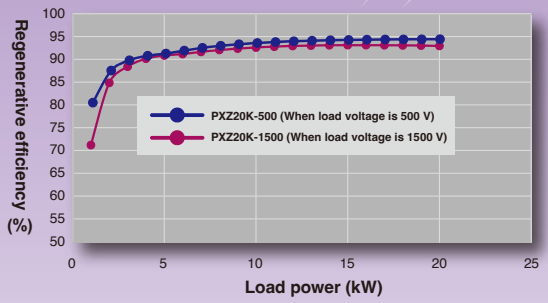
Conceptual diagram of operating area

● Regenerative Efficiency of Over 90 % (At Rated Input)

Thanks to high-performance switching technology, the PXZ series regenerates power with an efficiency of 90 % or higher (maximum regenerative efficiency of approximately 95 %) and load power of 6 kW or more. Since the regenerated power can be reused, carbon dioxide emission is significantly reduced.

Please note that this product is designed for on-site regeneration.
(This is not a grid-connected device that returns the power to the grid.)

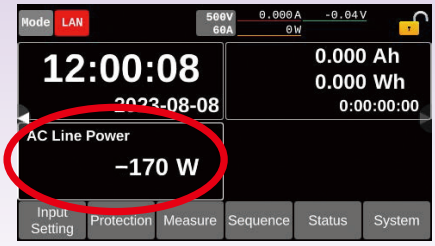
Regeneration efficiency graph



● The Value of Regenerative Power Is Visible at a Glance!

A large LCD display shows regenerative power value in real time.
Energy-saving benefits are visible at a glance.

*The displayed power value is for reference only and may differ by up to ±500 W.



● Operating Modes

The PXZ series has four operating modes. In addition, the I-V characteristic function can be set in the CC and CV modes.

CC		The set current value is maintained even if the voltage changes.
	DC	Normal input mode. Current is controlled by the current set value.
	PULSE	Controlled by pulse function.
	SINE	Controlled by sine function.
	I-V	Controlled by arbitrary I-V characteristics.
	EXT	The current set value is controlled by an external voltage. The external voltage input to EXT CONT is treated as an absolute value and applied to the current set value.
CR		A current proportional to the change in voltage is applied using the set conductance value as a proportionality constant.
	OFF	Not controlled by conductance set value.
	DC	Normal input mode. Current and voltage are controlled by the conductance set value.
	PULSE	Controlled by pulse function.
	EXT	The conductance set value is controlled by an external voltage.
CV		The set voltage value is maintained even if the current changes.
	DC	Normal input mode. The voltage is controlled by the voltage set value.
	PULSE	Controlled by pulse function.
	SINE	Controlled by sine function.
	I-V	Controlled by arbitrary I-V characteristics.
	EXT	The voltage is controlled by external voltage.
CP		The set power is maintained even if the voltage and/or current change.
	DC	Normal input mode. Power is controlled by the power set value.
	EXT	The power set value is controlled by an external voltage.

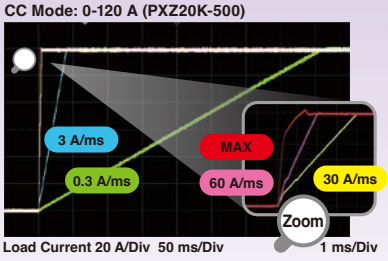
● Priority Operation Mode

Immediately after turning on the load, the preferred operating mode can be set from CC, CR, and CP. When the input from the DUT reaches the set value, the operating mode switches automatically according to the DUT status. If the voltage of the connected DUT is higher than the voltage setpoint of the PXZ series, current flows from the DUT to the PXZ series. Select CC if a battery or power supply is connected as the DUT.

● Five-Step Slew Rate Switching

In CV and CC modes, the speed at which the current or voltage changes can be set. This allows the user to set the optimum test conditions for DUT applications.

CC Mode: 0-120 A (PXZ20K-500)



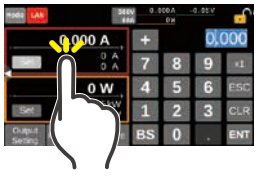
*Slew rate works in the following cases:
- When the current or voltage value changes after changing the setting value.
- When the current or voltage value is changed using external control.
- When the current or voltage value is changed by turning the load on.
- When the load is turned off.

Model	Operating modes	Slew rate
PXZ20K-50	CV [V/ms]	0.0125 / 0.125 / 1.25 / 12.5 / MAX
	CC [A/ms]	2 / 20 / 200 / 400 / MAX
PXZ20K-500	CV [V/ms]	0.125 / 1.25 / 12.5 / 125 / MAX
	CC [A/ms]	0.3 / 3 / 30 / 60 / MAX
PXZ20K-1000	CV [V/ms]	0.25 / 2.5 / 25 / 250 / MAX
	CC [A/ms]	0.150 / 1.50 / 15.0 / 30 / MAX
PXZ20K-1500	CV [V/ms]	0.375 / 3.75 / 37.5 / 375 / MAX
	CC [A/ms]	0.075 / 0.75 / 7.5 / 15 / MAX

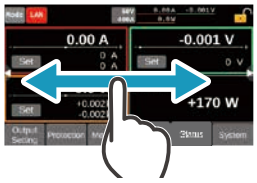
● Equipped With a Touch Panel Display

By pressing or swiping the display with a finger, the user can select an item on the screen or set a numerical value. The display is pressure-sensitive and can be operated even with gloves on.

Press / Long press



Swipe



Contributing to Carbon Neutrality

The calculations were made assuming the maximum load power is 20 kW, and the device operates continuously for one month.

▼ Comparison of PXZ20K-1500 and PLZ20005WH2 (without regenerative function)

Model	Load power	Internal loss	CO2 emissions
PXZ20K-1500	20 kW	2 kW	631 kg
PLZ20005WH2	20 kW	20 kW	6,307 kg

The PXZ series can effectively regenerate the load power without dissipating it as heat. CO2 emissions can be reduced by approximately 5.67 tons per month (CO2 emission factor*: calculated with 0.438 kg [per kWh]). Furthermore, because the heat dissipation of the main unit is very low, the air conditioning costs can be significantly reduced.
*The CO2 emission factor is based on the national average for electric utility companies (FY2022 results) published by the Ministry of the Environment Government of Japan.

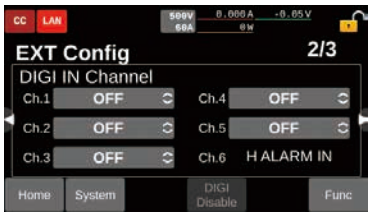
● External Control Function

The EXT CONT connector on the rear panel can be used to control the PXZ 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 is standard for both NPN and PNP-type PLCs. Analog I/O is isolated from output terminals as standard, allowing safe analog control from PLC.

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	Voltage and current value settings
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)	• Load on/off • LOW alarm on/off • Start/stop integration measurement • Reset integrated value • Input the measurement trigger • Recall settings from preset memory
Digital input (Ch.6)	Generating HIGH alarm (fixed)
General-purpose isolated digital output (Ch.1 to ch.6) *Semiconductor relay output	• Monitor the load on/off status • Monitor the power on • Monitor the alarm • Monitor the operation mode • Monitor the preset memory

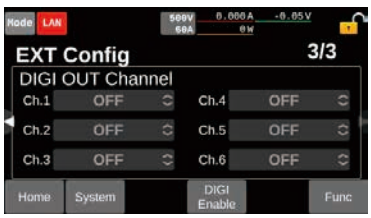
General-purpose isolated digital input terminals are available for Ch.1 to Ch.5. Any setting value from the items listed on the right can be selected.



- ▶OFF
- ▶LOAD ON
- ▶LOAD OFF
- ▶LOAD 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”.

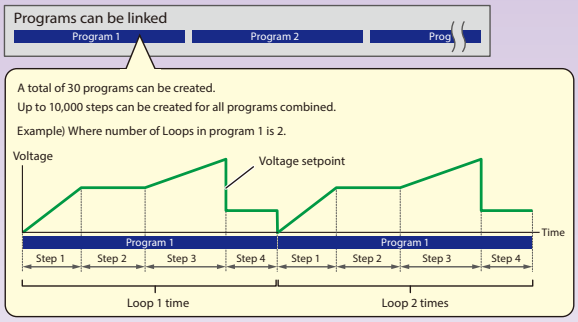
General-purpose isolated digital output terminals are available for Ch.1 to Ch.6. Any setting value from the items listed on the right can be selected.



- ▶OFF
- ▶LOAD 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

● Sequence Function

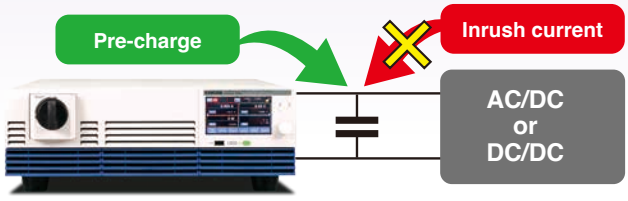
Preset operations can be run continuously. A total of 30 programs and up to 10,000 steps can be created for all programs. Programs stored in the unit’s memory, and data can be exported to a USB memory stick from the front panel.



● Pre-charge Function*

The pre-charge function allows 5% of the rated current to flow in CC mode until the set CV voltage is reached. This function can be used to charge DC link capacitors during inverter evaluation in OBC development or charge the DC link capacitor for DC/DC converter evaluation to a desired voltage before starting discharge tests. This suppresses inrush current and prevents battery and DUT device deterioration. In addition, when conducting system verification with the PXZ as a battery simulator, the pre-charge function can be used to raise the voltage to a set level in advance, avoiding a situation where the test cannot be started due to false system diagnostics (wire breakage, battery failure, etc.).

*The interlock must be released and precharge enabled.

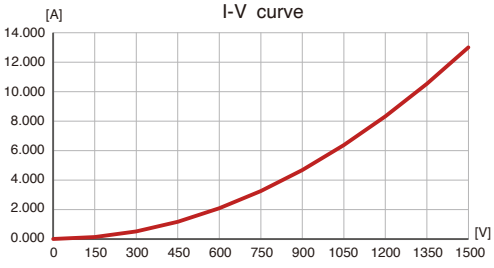


● I-V Characteristic Function

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.

PXZ20K-1500 CC mode setting example

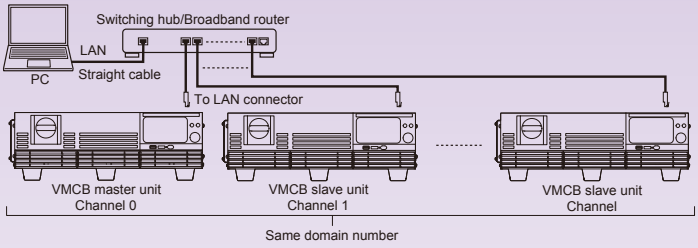
Points	Voltage [V]	Current [A]
1	0	0.000
2	150	0.130
3	300	0.520
4	450	1.170
5	600	2.080
6	750	3.250
7	900	4.680
8	1050	6.370
9	1200	8.320
10	1350	10.530
11	1500	13.000



● Equipped with Standard LAN Interface and VMCB Function

The PXZ series is equipped with LAN, USB, and RS232C interfaces as standard features. By using the feature of virtual multi-channel bus (VMCB), it allows you to control remotely and monitoring for 1-to-N as well as N-to-M for large-scale networks. This feature can also be used to save communication ports or to synchronize the control timing of multiple PXZ series units (up to 8 units). The PXB series manufactured by our company can also be mixed and matched for multi-channel connection.

When connecting the VMCB master unit via LAN



Communication monitoring function

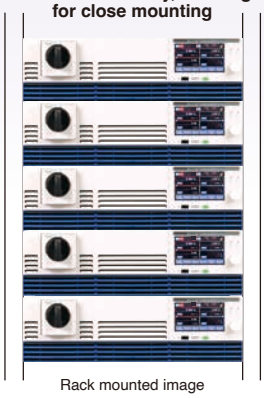
This function monitors the communication status.
For example, the alarm will be activated and the output will be turned off when the LAN cable is disconnected and the communication is not being confirmed within the specified time of setting. This function protects the operation from the uncontrolled condition, and it improves the system reliability.

● Security for LAN connections

Access to the built-in web server can be restricted with a password. Also, when using VXI-11, HiSLIP, and SCPI-RAW for control, host restrictions can be set with the IP address. It is possible to prevent access from any terminal other than the ones registered as a host (up to 4 hosts can be registered).

● 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



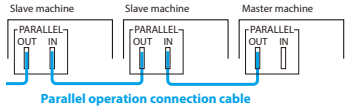
Rack mounted image

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.

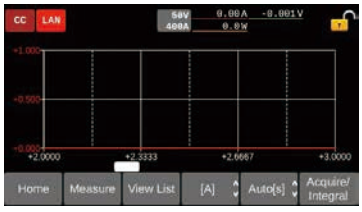
Connection conceptual diagram



● Data Logging Function

The data logging function allows the user to log measurement values (voltage, current, power, elapsed time, integrated current, and integrated power) in the internal memory, and display logged data on a list and graph forms.
By setting measurement recording conditions, you can control the timing that measurements are recorded.

▲ List display example



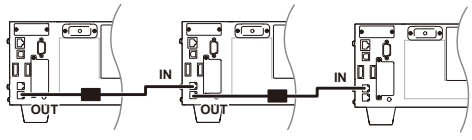
▲ Graph display example

● Synchronized Operation

When the PXZ series units are connected to each other with a synchronous operation signal cable, load on/off measurement and sequence synchronous operation can be performed from any of the PXZ series devices.
Any of the PXZ series models can be connected to each other. Synchronized operation is possible even when devices are operating in parallel.

- Synchronizing load on/off of multiple devices.
- Synchronizing measurements.
- Synchronizing the start time and resume time for sequences across multiple units.

Connection example



Connect the OUT connector and IN connector of the EXT SYNC with a synchronized operation signal cables.

● Saving Measurement Data

Measurement data can be stored in CSV format to a USB memory device.

● Selectable Power Input

Three-phase 3-wire 200 V or Three-phase 3-wire 400 V models are available.
Devices can be adapted to the international power supply requirements.

● Reliable and Solid Performance Even Under High Temperatures

Solid performance under operating temperatures of 0°C to 50°C (32 °F to 122 °F). Full performance even in harsh ambient temperature environments, such as when installed in equipment.

● 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 INPUT terminals are opened.
•Vin: Indicates an input voltage.

●Rating

Item	PXZ20K-50	PXZ20K-500	PXZ20K-1000	PXZ20K-1500
Rated power	20000 W			
Rated voltage (DC) *1	3 V to 50 V	10 V to 500V	20 V to 1000 V	30 V to 1500 V
Rated current *1	800 A	120 A	60 A	30 A

*1. Maximum input current and maximum input voltage are limited by maximum input power.

●Constant voltage (CV) mode

Item	PXZ20K-50	PXZ20K-500	PXZ20K-1000	PXZ20K-1500
Maximum settable voltage	52.5 V	525 V	1050 V	1575 V
Setting accuracy	±(0.2 % of setting + 0.1 % of rating)			
Setting resolution	0.005 V	0.05 V	0.1 V	0.1 V
Remote sensing Maximum compensation voltage (reciprocating) (TYP)	10 % of rating			
Response switching	FAST, SLOW			
Slew rate switching (TYP)	12.5 V/ms or more *1	125 V/ms or more *1	250 V/ms or more *1	375 V/ms or more *1
	12.5 V/ms	125 V/ms	250 V/ms	375 V/ms
	1.25 V/ms	12.5 V/ms	25 V/ms	37.5 V/ms
	0.125 V/ms	1.25 V/ms	2.5 V/ms	3.75 V/ms
	0.0125 V/ms	0.125 V/ms	0.25 V/ms	0.375 V/ms

*1. MAX will appear on the display.

●Constant current (CC) mode

Item	PXZ20K-50	PXZ20K-500	PXZ20K-1000	PXZ20K-1500
Maximum settable current *1	+840 A	+126 A	+63 A	+31.5 A
Setting accuracy *2	±(0.75 % of rating)			
Setting resolution	0.1 A	0.01 A	0.005 A	0.002 A
Power fluctuation *3	±1600 mA	±240 mA	±120 mA	±60 mA
Load variation *4	±1600 mA	±240 mA	±120 mA	±60 mA
Rise time (TYP) *5	1 ms			
Fall time (TYP) *6	1 ms			
Response switching	FAST, SLOW			
Slew rate switching (TYP) *1	800 A/ms or more *7	120 A/ms or more *7	60 A/ms or more *7	30 A/ms or more *7
	400 A/ms	60 A/ms	30 A/ms	15 A/ms
	200 A/ms	30 A/ms	15.0 A/ms	7.5 A/ms
	20 A/ms	3 A/ms	1.50 A/ms	0.75 A/ms
	2 A/ms	0.3 A/ms	0.150 A/ms	0.075 A/ms

*1. During parallel operation, this will be the value multiplied by the number of units in the configuration.
*2. Applies to a range of 1 % to 100 % of the rated current.
*3. 180 Vac to 252 Vac for 200 Vac input, 342 Vac to 504 Vac for 400 Vac input. At the constant load.
*4. This is the amount of change when the voltage is changed from the rated voltage and rated power to 1/10 of the rated voltage.
*5. In the case that the CC mode response setting is set to FAST. The time required for the input current in CC mode to change from 10 % to 90 % of the rated current when the input current value is changed from 0 % to 100 % of the rated current. When the slew rate is set to MAX.
*6. In the case that the CC mode response setting is set to FAST. The time required for the input current in CC mode to change from 90 % to 10 % of the rated current when the input current value is changed from 100 % to 0 % of the rated current. When the slew rate is set to MAX.
*7. MAX will appear on the display.

●Constant resistance (CR) mode

Item	PXZ20K-50	PXZ20K-500	PXZ20K-1000	PXZ20K-1500
Conductance rating	160 S	2400.0 mS	600.000 mS	200.000 mS
Setting range	0 S to 168 S	0 mS to 2520.0 mS	0 mS to 630.000 mS	0 ms to 210.000 mS
Setting accuracy *1	±(0.5 % of setting + 0.5 % of rating)			
Setting resolution	20 mS	0.20 mS	0.05 mS	0.02 mS
Response switching	FAST, SLOW			

*1. Converted value at the input current.

●Constant power (CP) mode

Item	PXZ20K-50	PXZ20K-500	PXZ20K-1000	PXZ20K-1500
Maximum settable power *1	21000 W			
Setting accuracy *2	±(0.5 % of power rating + 0.5 % of current rating × Vin)			
Setting resolution	2 W			

*1. During parallel operation, this will be the value multiplied by the number of units in the configuration.
*2. Guaranteed in the range from 5 % to 100 % of rated power. Rating indicates the rated current value.

Specifications

●200 V three-phase three-wire input

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

Item	PXZ20K-50	PXZ20K-500	PXZ20K-1000	PXZ20K-1500
Nominal AC input rating	200 Vac to 240 Vac, 50 Hz to 60 Hz			
AC Input voltage range	180 Vac to 252 Vac			
AC Input frequency range	47 Hz to 63 Hz			
AC Input current (MAX) *1	80 A (When Input voltage is 180 V)			
AC Input power (MAX) *1	22 kVA			
Inrush current (TYP) *2	90 A			
Power factor (TYP) *1	0.96			
Input hold time	10 ms or more			

*1. At the rated input power for the rated input 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 400 Vac.

Item	PXZ20K-50	PXZ20K-500	PXZ20K-1000	PXZ20K-1500
Nominal AC input rating	380 Vac to 480 Vac, 50 Hz to 60 Hz			
AC Input voltage range	342 Vac to 504 Vac			
AC Input frequency range	47 Hz to 63 Hz			
AC Input current (MAX) *1	40 A (When Input voltage is 342 V)			
AC Input power (MAX) *1	22 kVA			
Inrush current (TYP) *2	70 A			
Power factor (TYP) *1	0.96			
Input hold time	10 ms or more			

*1. At the rated input power for the rated input current.

*2. Maximum peak current value when the POWER switch is turned on. (Excluding the surge current to the input filter capacitor.)

●Display

Item		PXZ20K-50	PXZ20K-500	PXZ20K-1000	PXZ20K-1500
Voltmeter	Maximum display	±60.000 V	±600.00 V	±1200.00 V	±1800.00 V
	Display accuracy	±(0.1 % of reading + 0.2 % of rating)			
Ammeter	Maximum display	±1120.000 A	±168.000A	±84.000 A	±42.000A
	Display accuracy	±(0.75 % of rating)			
Wattmeter	Maximum display *1	±24.000 kW			
	Display accuracy	Display the integrated value of voltmeter and ammeter			
Operation display	Load ON / OFF	The LOAD LED on the front panel lights in green			
	Operation mode	Indicate the followings on the upper left part of the display CV: CV icon, CC: CC icon, CR: CR icon, CP: CP icon			
	Remote (LAN)	Indicate the followings on the upper left part of the display			
	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 Specifications LOW alarm

An alarm not requiring a reboot to be cleared.

Item		PXZ20K-50	PXZ20K-500	PXZ20K-1000	PXZ20K-1500
OVP (overvoltage protection)	Protection operation	Load off, indicate “OVP” on the display. SLV OVP is displayed on the slave unit.			
	Setting range	5 V to 60 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	0.05 V	0.1 V	0.1 V
OCP (overcurrent protection)	Protection operation	Load off, indicate “OCP” on the display. SLV OCP is displayed on the slave unit.			
	Setting range	80 A to 880 A	12 A to 132 A	6 A to 66 A	3 A to 33 A
	Setting accuracy	±(0.75 % of rating)			
	Setting resolution	0.1 A	0.01 A	0.005 A	0.002 A
OPP (overpower protection)	Protection operation	Load off, indicate “OPP” on the display. SLV OPP is displayed on the slave unit.			
	Setting range	2 kW to 24 kW			
	Setting accuracy	±(1.0 % of power rating + 1.0 % of current rating × Vin)			
	Setting resolution	2 W			
UVP (undervoltage protection)	Protection operation	Load off, indicate “UVP” on the display. SLV UVP is displayed on the slave unit.			
	Setting range	0 V to 50 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	0.05 V	0.1 V	0.1 V
Watchdog Alarm (Communication error protection)	Protection operation	Load 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	Load off, indicate “EXT LOW” on the display			

●Protection Specifications HIGH alarm An alarm requiring a reboot to be cleared.

Item		PXZ20K-50	PXZ20K-500	PXZ20K-1000	PXZ20K-1500
Reverse Alarm (Reverse-connection detection protection)	Protection operation	Load off, indicate “REVE” on the display			
OHP (Overheat protection)	Protection operation	Load off, indicate “OHP” on the display. SLV OHP is displayed on the slave unit.			
Line OVP (Grid overvoltage protection)	Protection operation	Load 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	Load 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	Load 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	Load off, indicate “EXT HIGH” on the display			
SENS Alarm (incorrect sensing connection detection)	Protection operation	Load off, indicate “SENS” on the display			
	Setting range	Enable/Disable			
Parallel Communication Error (Parallel operation communication error detected)	Protection operation	Load off, indicate “PARA COM” on the display			
Para Other Slave Alarm (Parallel operation slave error occurred)	Protection operation	Load off, indicate “SLV OTHR” on the display			
Incorrect Slave Alarm (Not applicable device connected)	Protection operation	Load off, indicate “SLV INC” on the display			
Too many connections (Too many parallel connections)	Protection operation	Load off, indicate “TOO MANY” on the display			
Hardware ERR *1 (Hardware error)	Protection operation	Load off, indicate “ERRH” on the display. SLV ERRH is displayed on the slave unit.			
Software ERR *2 (Software error)	Protection operation	Load 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			PXZ20K-50	PXZ20K-500	PXZ20K-1000	PXZ20K-1500
Input	Input points		2 points			
	Voltage (CV) control	Setting range	0 % to 100 % of the rated 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 Resistance (CR) control *1	Setting range	0 % to 100 % of the rated current, rated power and rated conductance			
		Input voltage range	0 V to 5 V or 0 V to 10 V (Selectable)			
		Accuracy	±(1 % of rating)			
Output	Output points		2 points			
	Voltage monitor (VMON)	Output range	0 % to 100 % of the rated voltage			
		Output voltage	0 V to 5 V or 0 V to 10 V (Selectable)			
		Accuracy	±(1 % of rating)			
	Current monitor (IMON)	Output range	0 % to 100 % of the rated current			
		Output voltage	0 V to 5 V or 0 V to 10 V (Selectable)			
		Accuracy	±(1 % of rating)			

*1. Select either current control or power control.

●External digital input

Item		PXZ20K-50	PXZ20K-500	PXZ20K-1000	PXZ20K-1500
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			
	LOAD ON	Turn on the load			
	LOAD OFF	Turn off the load			
	LOAD CTRL	Turn on of off the load			
	L ALARM IN	LOW alarm occurrence			
	ALARM CLR	LOW alarm clearance			
	SEQ RUN	Sequence start/end			
	SEQ PAUSE	Sequence pause/resume			
	SEQ TRIG IN	Input the trigger for sequence			
	ACQUIRE TRIG	Input the measurement trigger			
	MEM1 RECALL	Recall preset memory 1			
	MEM2 RECALL	Recall preset memory 2			
	INTEG CTRL	Starting/stopping integration measurement			
	INTEG RESET	Resetting integration measurement data			
External circuit power supply range		12 V to 24 Vdc (±10 %)			

Specifications

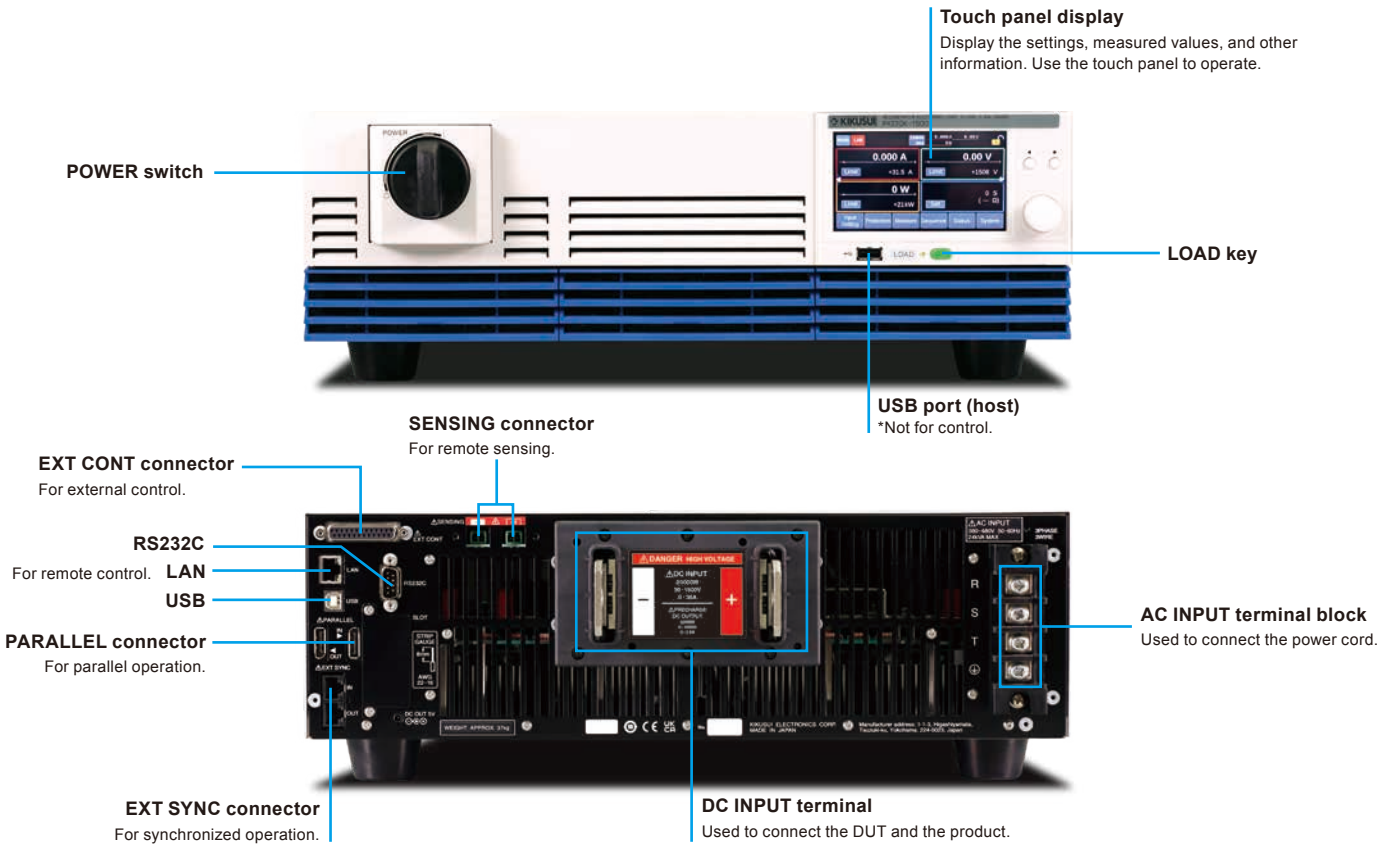
●External digital output

Item		PXZ20K-50	PXZ20K-500	PXZ20K-1000	PXZ20K-1500
Output points		6 points (Polarity switchable)			
Output form		Semiconductor relay output			
Selecting function	OFF	Do not use terminals			
	LOAD ON	Outputs a signal when load is turned on			
	POWER ON	Signal is output when power supply is on and load 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	Links with load on/off and outputs a signal with a time difference of approx. 100 ms. You can set this parameter to only Ch.6.			

●Communication Specifications

Item		PXZ20K-50	PXZ20K-500	PXZ20K-1000	PXZ20K-1500
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	HiSLIP: LF or END during reception, LF + END during transmission. SCPI-RAW: LF during reception, LF during transmission			
	Compliant standards	LXI Version 1.5 Specifications 2016			

Panel explanation



●Others

Item			PXZ20K-50	PXZ20K-500	PXZ20K-1000	PXZ20K-1500
Synchronization function (clock synchronization)	Overview		SYNC icon is displayed on the display when synchronization is established with the internal clock after connecting with other PXZ series using the EXT SYNC connector.			
	Sequence synchronization		Synchronization of the program start and step start.			
	Measurement synchronization		Synchronization of the measurement start			
	Load synchronization		Synchronization of load ON/OFF			
Sequence function	Operation mode		CV, CC, CR 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 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				
	CC	Maximum setting	Setting range up to 105 % of rated current			
		Maximum offset setting				
Pulse function	Operation mode		CV/CC/CR mode			
	Frequency setting range		1 Hz to 1000 Hz			
	Frequency precision setting	1 Hz to 10 Hz	0.01 Hz			
		10.1 Hz to 100 Hz	0.1 Hz			
		101 Hz to 1000 Hz	1 Hz			
	CV	High level	Setting range up to 105 % of rated voltage			
		Low level				
	CC	High level	Setting range up to 105 % of rated current			
		Low level				
	CR	High level	Setting range up to 105 % of rated conductance			
		Low level				
	Duty cycle		2.5 % to 97.5 %			
Over current protection (OCP) delay function	Setting range		1 ms to 2000 ms			
	Setting resolution		1 ms			
Multichannel (VMCB) function	Connection between the master unit and a PC		LAN, USB, RS232C			
	Connection with slave units		LAN			
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, when operating in synchronization, and when load off)			
	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, CP, and CR modes, and protection function values			
Setup Memory	Number of memory entries		21			
	Saved setting		Load on/off, Input voltage value/Input current value/Input power value/Conductance value, Input mode, Response, Slew Rate, Priority operation mode (Priority when load is ON), Value of the pulse function (Duty, Frequency, High, Low), Value of the sine function (Amplitude, Frequency, Offset), Number of I-V characteristics (Count), Over voltage protection (OVP), Under voltage protection (UVP, UVP Enable), Over current protection (OCP, Delay), Over power protection (OPP), Line overvoltage protection (Line OVP), Measurement trigger settings (Source, Count, Delay, Enable, Timer), Integration settings (Gate, Reset)			
Key Lock	Level 1		Load on/off and preset memory recall are available			
	Level 2		Load on/off are available			
	Level 3		Load off is available			
Number of units in parallel operation			Up to 25 units *Please contact us if you wish to operate more than 10 units in parallel.			
Pre-charge function *1	Maximum settable voltage		105 % of voltage ratings			
	Voltage setting accuracy		±(0.2 % of setting + 0.1 % of rating)			
	Current setting accuracy *2		±(1.0 % of rating)			

*1. Release the interlock.
*2. Fixed set value of 5 % of rated current.

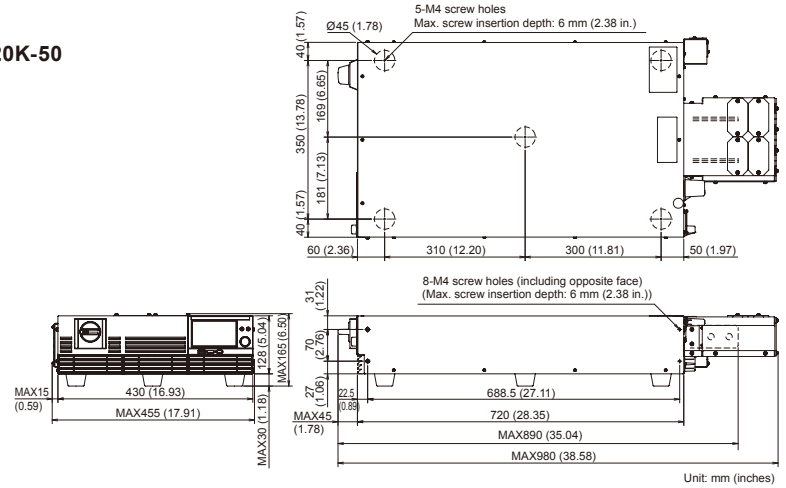
●General Specifications

Item		PXZ20K-50	PXZ20K-500	PXZ20K-1000	PXZ20K-1500
Weight		Approx. 41 kg (90.39 lbs)	Approx. 38 kg (83.78 lbs)	Approx. 37 kg (81.57 lbs)	Approx. 37 kg (81.57 lbs)
Dimensions		Refer to Outline 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 2000 m			
Cooling system		Forced air cooling using fan			
Accessories		AC INPUT terminal cover, External control connector kit (1 set), Chassis connection wire, DC INPUT terminal cover, DC INPUT 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 piece)			
Withstand voltage	Between primary and FG	2200 Vac for 1 minute			
	Between primary and secondary				
	Between secondary and FG	500 Vdc for 1 minute	1800 Vdc for 1 minute	1800 Vdc for 1 minute	3000 Vdc for 1 minute
Insulation resistance	Between primary and FG	30 MΩ, 500 Vdc			
	Between primary and secondary	30 MΩ, 500 Vdc	30 MΩ, 1000 Vdc		
Isolation voltage		±250 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)			

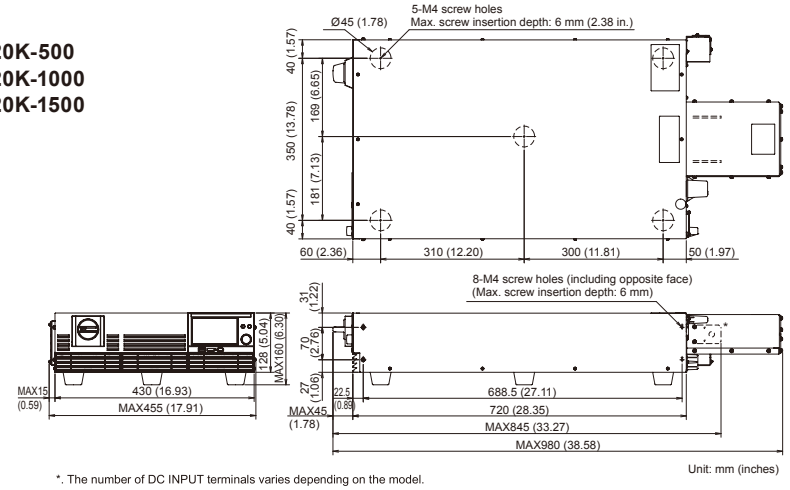
*1. Does not apply to specially ordered or modified products.
*2. Only for models with CE mark / UKCA mark on their body.
*3. This is a Class A instrument. This product is intended for use in an industrial environment. This product may cause interference if used in residential areas. Such use must be 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.

●Outline Drawing *Maximum dimensions include protrusions and accessory covers.

PXZ20K-50



PXZ20K-500
PXZ20K-1000
PXZ20K-1500



*. The number of DC INPUT terminals varies depending on the model.

Ordering information

● Example of 100 kW system configuration (1500 V)

Product name	Model name	Volume
High-capacity regenerative electronic load	PXZ20K-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
High-capacity regenerative electronic load	PXZ20K-1500	10
Parallel operation cable	PC01-PXB	9
Rack mount bracket	KRB3-TOS	10

* Rack for mounting PXZ 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 (Cable length: 1.5 m)
● GPIB converter
PIA5100 (Power cord set: 1 set, Magnetic sheet: 1 sheet)
● 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	PXZ20K-50
DC80-2P3M-M10M10		200 A	M10/M10	PXZ20K-500
HV22-2P3M-M12M8		80 A	M12/M8	PXZ20K-1000, PXZ20K-1500

● Three-phase input power cord * The switchboard ends of the power cords have not been prepared for connection.

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

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