



High Power Intelligent Bipolar Power Supply
PBZ SR Series



Realizing the Large-Scale system of the high power Bipolar Power Supply!

New
High Power Intelligent Bipolar Power Supply

PBZ SR SERIES

PBZ20-60 SR	PBZ40-30 SR
PBZ20-80 SR	PBZ40-40 SR
PBZ20-100 SR	PBZ40-50 SR



* The SR model name is an abbreviation for "Smart Rack."

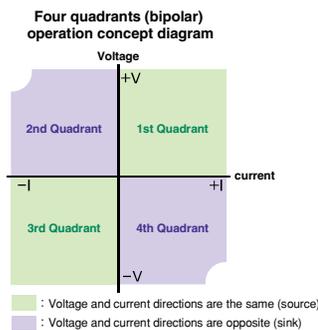
High Power Intelligent Bipolar Power Supply

PBZ SR series

High-speed response even with high power

With 100 kHz (CV), 10 kHz (CC: 20 V model), and 5 kHz (CC: 40 V model) frequency characteristics, the superior waveform quality makes it possible to reproduce a variety of waveforms with high precision.

The PBZ SR series is a series of high-power bipolar DC stabilized power supplies. The PBZ SR series are designed based on the PBZ Intelligent Bipolar power supply series, that supports large currents (up to ± 100 A) and is assembled with exclusive rack system (Smart Rack). The 4-quadrant operation allows the power to be supplied (source) or absorbed (sink), and it is suitable for driving inductive loads or capacitive loads. Also, the PBZ SR series is equipped with LAN, USB, GPIB, and RS232C as standard communication interfaces.

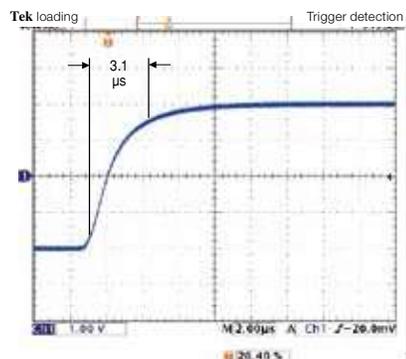


- User-defined waveform generation function
- Sequence function
- Synchronized operation function
- Central control with the master unit utilizing master and slave operation
- Displays the total output current of all units on the master unit (display of combined value) *1
- Safety design that switches all units off when ever the alarm is occurred on any unit of the system *2
- Guarantee of specifications with Smart Rack (test data standardly included)
- Equipped with LAN (Capable of LXI), USB, GPIB, and RS232C, as standard interface.

*1 Slave unit displays its own output current
 *2 If the alarm for the master unit is cleared, alarms for all units are cleared.

High-speed response (Voltage)

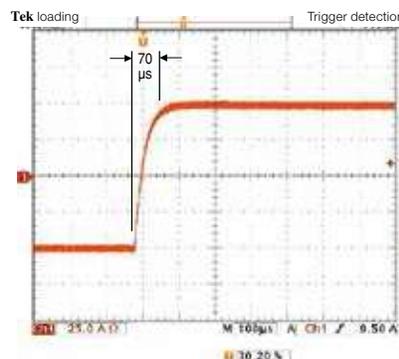
100 kHz frequency characteristic (CV). The superior waveform quality with rise and fall times of 3.5 μ s which makes it possible to reproduce a variety of waveforms with high precision.



▲ Sample of rising waveform
 When response of 3.5 μ s is set

High-speed response (Current)

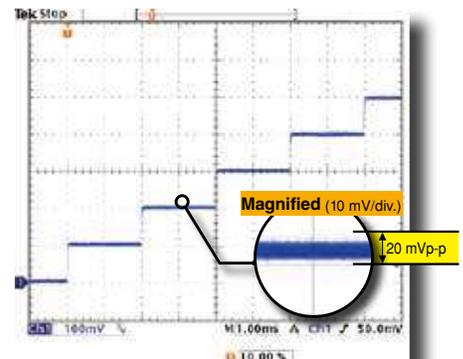
5 kHz frequency characteristic (CV). The superior waveform quality with rise and fall times of 70 μ s which makes it possible to reproduce a variety of waveforms with high precision. (PBZ40-50SR)



▲ Sample of rising waveform
 When response of 70 μ s is set

Low ripple noise

The superior quality of the waveforms prevents the waveform quality from affecting the simulations or pulse-driven devices.



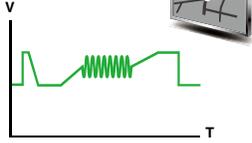
▲ Sample of actual 0.1 V step waveform
 Ripple 6 mVrms, noise 30 mVp-p (PBZ40-50SR)

applications

Expanded applications through the user-defined waveform generation

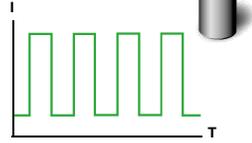
Power fluctuation test for automotive electronic components

Car navigation systems, others



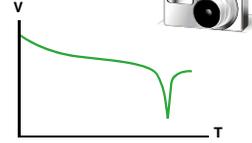
Rechargeable battery charge/discharge test

Various rechargeable batteries



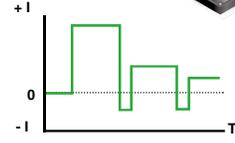
Simulated battery charge/discharge test

Digital cameras, cellular phones, and others



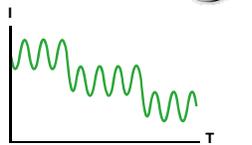
Constant current source for pulse plating

HDD, others



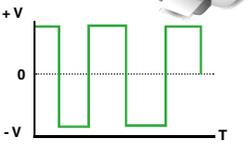
Ripple overlap test

Various electrical storage elements



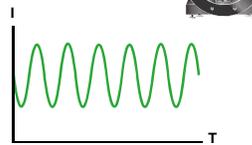
DC motor durability test

Printers, others



Constant current source for magnetic field generation

Helmholtz coil



Others

- Contact resistance test for breakers and relays
- Characteristics test for solenoid valves, coils and others

line-up

Available in total of 6 models with up to 2 kW of the maximum output power in 2 types of output voltage, ± 20 V and ± 40 V.

Capacity Appearance			
	Three parallel	Four parallel	Five parallel
20 V System	60 A PBZ20-60 SR	80 A PBZ20-80 SR	100 A PBZ20-100 SR
40 V System	30 A PBZ40-30 SR	40 A PBZ40-40 SR	50 A PBZ40-50 SR

appearance

The Smart Rack package offers the safety and easy to use, with adopting the know-how of which details can be found in the system.



Application software

Supporting Kikusui power supplies and electronic loads more intelligently!

Expanding the ideas of engineers "Wavy" sequence creation software

Wavy series



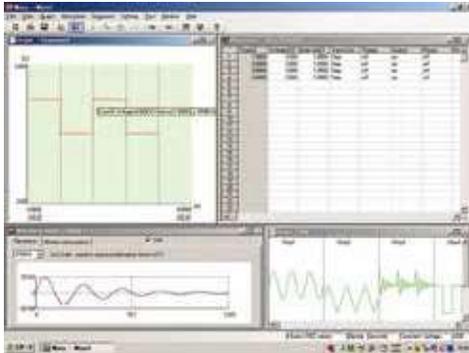
Wavy for PBZ

■ Sequence creation software "Wavy for PBZ"

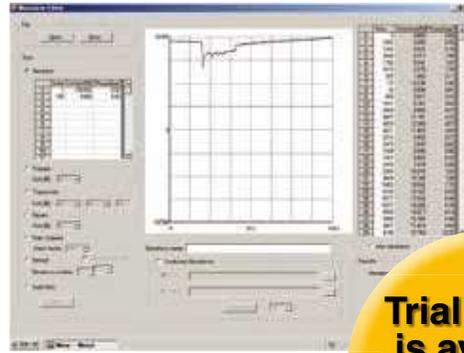
[Operating environment] Windows 2000 / Windows XP / Windows Vista / Windows 7

*For details, please see our company's homepage.

The "Wavy" is an application software that supports sequence creation and the operation for the Kikusui power supplies and electronic loads. Even a person without any programming knowledge can freely control the sequencing of power supplies and electronic loads. Sequences can easily be created, just like drawing a picture or with the feel of a spreadsheet.



▲ Main screen



▲ User-defined waveform edit screen

Trial version is available on our web!!

<http://www.kikusui.co.jp/en/download/index.html>

Download!

- It makes easier for creation or editing the test condition file required for the sequence operation.
- By using the storage function of test condition data file, it enables you to manage the test condition of the standard routine test.
- The progress of execution sequence will be displayed on the "execution graph" with the setting value and the cursor.
- It is possible to observe the intuitionistic output through by the "monitor graph" that plots the ongoing monitor value.
- You can save the acquired monitor data as a test result.
- Added the "waveform image" window. You can easily kept track of the AC signal.
- Allows you to edit and create the new arbitrary waveform easily. You can instantly write then output the created arbitrary waveform.
- Supports the status of description of sequence step for "selected" or "not selected". It enables you to select depends on the requirement such as the "pausing function", "trigger function", or "AC waveform".
- Data from Wavy for the PBX series (the former model of the PBZ series) can be loaded (upward compatibility).

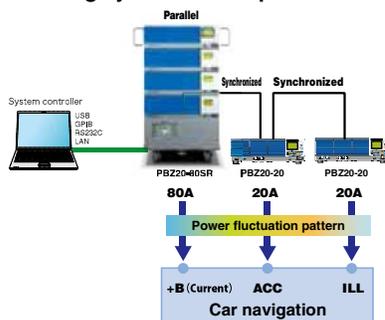
Example of Wavy use ~ Automotive equipment power fluctuation test ~

Achievement of multichannel power fluctuation testing (specification testing)!

[Example of multichannel power fluctuation test]

With automobiles, electricity is supplied from a battery. Multiple automotive electronic components either switch ON or OFF depending on the order in which the electricity is turned ON = order in which the key is turned (+B → ACC → IG). There are an extremely large number of unstable elements in an automobile's power supply environment, including engine start-up and electrical circuit chattering; thus, potential power supply problems caused by these elements, such as instantaneous power interruptions and fluctuations, a power fluctuation test is performed for the channels of automotive electronic components.

■ Example of using synchronized operation



[Car navigation system]

CH1 : +B LINE

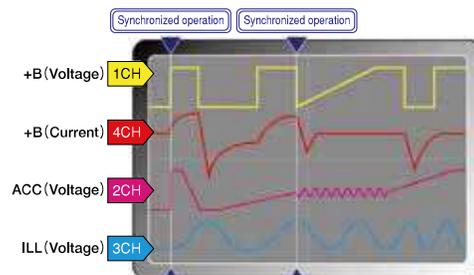
Power is continuously being supplied from the battery to components such as clocks and memory.

CH2 : ACC LINE

A car navigation system's power supply is turned on via the ignition switch's ACC contact. In this condition, it becomes possible to make navigation settings, listen to music, and perform other operations.

CH3 : ILL LINE

Power supply line (ILL) that directly pulls up +B, IG, and ACC. It is a backup power supply line.



Example of application using the "Wavy" software ~ Automotive equipment power fluctuation test ~

Achievement of actual waveforms with the PBZ series!



▼ Example of the creation of actual waveform reproduction program

1

Sampling of the waveform with oscilloscope

This voltage waveform is reproduced by the "Wavy" software.

First, import the battery waveform when the engine starts. Connect the probe to the battery terminal, and start the engine.

2

Start up with the "Wavy" software then using the numerical data that was imported with the oscilloscope, load the data onto the desired waveform on the edit screen.

The format of the numerical data differs according to the oscilloscope; therefore, specify the loading start position, row, and column as needed.

3

Select the file to be loaded. Specify the desired range to be used for the data that was loaded, and convert the maximum number of points that can be edited up to the maximum point of 1024 with "Wavy" software.

4

Load the saved file and write it into the user-defined waveform memory 1 of the PBZ series main unit.

The main unit's user-defined waveform memory is used to operate it faster.

5

Next, display the sequence creation screen and set up the execution of the aforementioned user-defined waveform as a program.

Even if the waveform pattern is complex, it can be written on just one line when the user-defined waveform is assigned to a step.

6

Finally, transfer the sequence to the program memory 1 of the PBZ series main unit. The preparation is now completed.

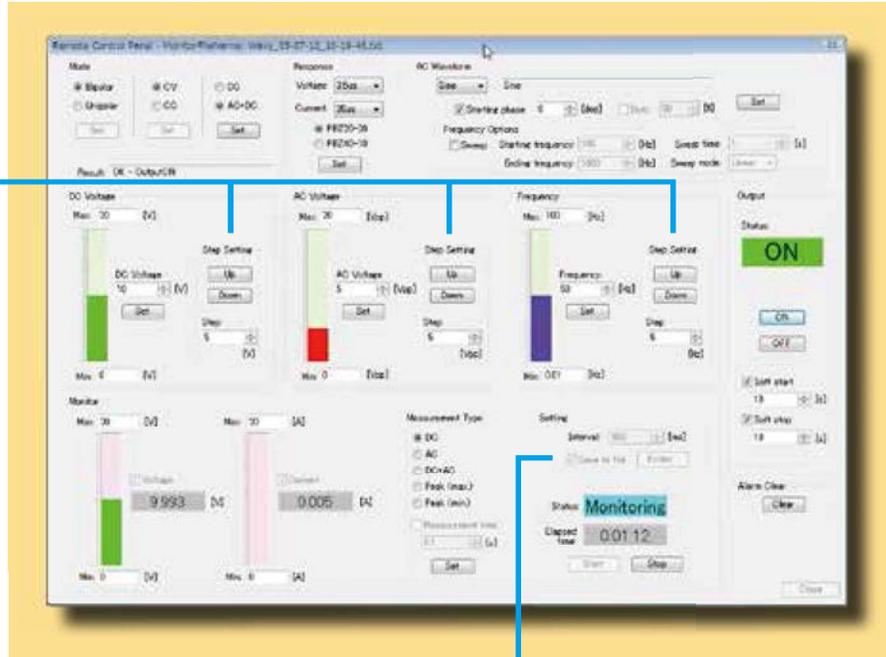
OK, it's ready to reproduce the waveform!

Example of application using the "Wavy" software ~ Step conversion capability and monitoring ~

Simple, convenient "direct control" with a sense of remote control

When the "Wavy" software's direct control is used for delicate operations and complicated settings that cannot be performed by the panel operation of the power supply. The "Wavy" software can be used conveniently as a "remote control" for power supplies and electronic loads, and also as a simple data logger.

Capable of step change, that is like the steps on stairs. This is something that cannot be operated from the knobs of a power supply main unit.



Time[s]	Current[A]	Voltage[V]	Power[W]
0.000	0.001	0.00	--
1.014	0.001	0.00	--
2.021	0.001	0.00	--
3.050	0.001	0.00	--
4.064	0.001	0.00	--
5.078	2.189	2.98	--
6.092	2.016	50.91	--
7.108	2.014	50.98	--

The output can be monitored and the data can be saved as a text file in CSV or tab-separated value (TSV) form.

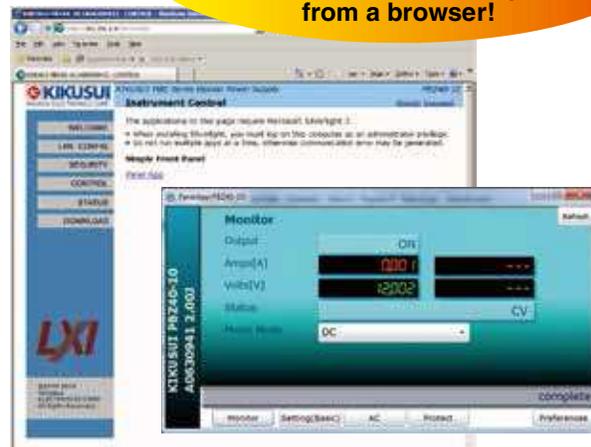
interface

LAN INTERFACE

The PBZ SR series is equipped with the LAN interface (LXI compliant) as a standard interface in addition to the GPIB, RS232C, and USB interface. In regards to the command, it applies to the SCPI in addition to IEEE488.2. Using the instrument drivers (downloaded from our website) allows you to control with Excel VBA and LabVIEW, as well as sequence control with the sequence creation software Wavy (Wavy for PBZ). By using the LAN interface, power control and monitoring from a web browser is also possible.

LXI compliant !!

control and monitor the power from a browser!



specifications

Input / Output		PBZ20-60/80/100 SR	PBZ40-30/40/50 SR
Input rating	Nominal input voltage	200 Vac to 240 Vac	
	Voltage range	180 Vac to 250 Vac	
	Frequency range	47 Hz to 63 Hz	
	Current	5 A × parallel unit max	
	Inrush current	40 A × parallel unit peak or less	
	Power	900 VA × parallel unit or less	
	Power factor	0.95 TYP.	
Output rating	Power	400 W × parallel unit	400 W × parallel unit
	Voltage	±20 V	±40 V
	Current	±20 A × parallel unit	±10 A × parallel unit
Output terminal	Output terminal	Rear panel output terminals	
	Isolation Voltage	500Vdc Only the output's COM terminal can be grounded.	
Constant Voltage(CV)			
DC voltage	Settable range *1	0V to ±(105 % of rating)(BIPOLAR), or 0V to+(105 % of rating)(UNIPOlar)	
	Resolution(Fine resolution)	0.001 V(0.0001 V)	
	Accuracy *2	±(0.05 % of setting+0.05 % of rating)	
	Temperature coefficient	±(100 ppm/°C of rating) TYP.	
AC voltage	Voltage	Settable range *1	0Vp-p to(210 % of rating)p-p
		Resolution	0.1 V
	Accuracy *3	±(0.5 % of rating)	
	Frequency	Settable range	0.01 Hz to 100.00 kHz
Constant voltage characteristics	Frequency response *4	DC to 100 kHz(-3 dB)	
	Ripple noise	3 mVrms (10 Hz to 1 MHz)	6 mVrms(10 Hz to 1 MHz)
		30 mVp-p TYP. (10 Hz to 20 MHz)	
	Load effect *5	±(0.005 % of setting + 1 mV)	
	Source effect *6	±(0.005 % of setting + 1 mV)	
	Response *7	3.5 μs.10 μs. 35 μs. 100 μs TYP.	
Overshoot *8	5 % or less(TYP)		
Constant current(CC)			
DC current	Settable range *9	0 A to ±(105 % of rating)	
	Resolution(Fine resolution)	0.001 A(0.0001 A)	
	Accuracy *10	±(0.3 % of rating)	
	Temperature coefficient	±(100 ppm/°C of rating) TYP.	
AC current	Current	Settable range *9	0 Ap-p to(210 % of rating)p-p
		Resolution	0.1 A
	Accuracy *11	±(0.5 % of rating)	
	Frequency	Settable range	0.01 Hz to 100.00 kHz
Constant current characteristics	Frequency response *12	DC to 10 kHz(-3 dB) TYP.	DC to 5 kHz(-3 dB) TYP.
	Ripple noise	5 mArms. (10 Hz to 1 MHz)	
	Load effect *13	±(0.01 % of setting + 1 mA)	
	Source effect *14	±(0.01 % of setting + 1 mA)	
	Response *15	35 μs. 100 μs. 350 μs. 1 ms TYP.	70 μs. 100 μs. 350 μs. 1 ms TYP.
	Overshoot *16	5 % or less(TYP)	
AC common characteristics			
Frequency resolution		0.01 Hz	
Frequency Accuracy *10		±200 ppm	
Sweep		Linear and logarithmic	
Waveform	Type	Sine wave, square wave, triangle wave, and 16 user-defined arbitrary waveforms	
	Start phase	0 to 359°	
	Square wave duty cycle	0.1 % to 99.9 % (f < 100 Hz)	
		1 % to 99 % (100 Hz ≤ f < 1 kHz)	
		10 % to 90 % (1 kHz ≤ f < 10 kHz)	
	fixed to 50 % (10 kHz ≤ f)		

*1 : The peak value of the sum of the DC voltage and AC voltage is limited by the DC voltage's settable range.
 *2 : At an ambient temperature between 18 °C and 28 °C.
 *3 : 1 kHz sine wave, 3.5 μs response.
 *4 : A frequency where the amplitude ratio of the output voltage to the external signal input voltage is -3 dB (when the reference frequency is 1 kHz, the response is 3.5 μs, and when a rated load is connected).
 *5 : The change in the output voltage in response to a change in the output current from 0 % to 100 % of the current rating (measured at the sensing terminals when remote sensing is used).
 *6 : The change in the output voltage in response to a ±10 % change in the input voltage in reference to the nominal input voltage (measured at the sensing terminals when remote sensing is used).
 *7 : The rise or fall time (at rated load; excluding when output is turned on and off).
 The frequency response is based on the specified response setting (frequency bandwidth = 0.35/(the rise time)).
 Rise time: The time it takes for the output voltage to rise from 10 % to 90 % of the rating when the output voltage is changed from 0 V to the rated voltage.
 Fall time: The time it takes for the output current to fall from 90 % to 10 % of the rating when the output current is changed from the rated current to 0 A.
 *8 : Under no load or rated load.
 *9 : The peak value of the sum of the DC current and AC current is limited by the DC current's settable range.
 *10 : At an ambient temperature between 18 °C and 28 °C.
 *11 : 100 Hz sine wave, 35 μs/70 μs response, and shorted output.
 *12 : A frequency where the amplitude ratio of the output current to the external signal input voltage is -3 dB (when the reference frequency is 100 Hz, the response is 35 μs/75 μs, and a rated load is connected).
 The frequency response changes according to the load impedance. When the load impedance increases, the frequency response decreases.
 *13 : The change in the output voltage in response to a change in the output current from 10 % to 100 % of the current rating

[Conditions]
 Condition in which the output COM terminal is connected to the chassis with the short piece (included) at the rear output terminal. If not specified, condition in which remote sensing is not performed.
 Warm-up time is 30 minutes (condition with current flowing). Load is pure resistance. TYP value is typical value for 23°C, but performance is not guaranteed.

Measurement function		PBZ20-60/80/100 SR	PBZ40-30/40/50 SR
Voltage measurement	Measurement range	120 % of rating	
	Resolution	0.001 V	
	Accuracy *17	±(0.05 % of reading + 0.05 % of rating)	
	Temperature coefficient	±(100 ppm/°C of rating) TYP.	
Voltage measurement (AC DC + AC)	Measurement range	AC	120 % of rating/CF
		DC + AC	120 % of rating
	Resolution	0.001 V	
	Accuracy *17,*18	5Hz<f ≤ 10kHz	±(0.5 % of reading + 0.1 % of rating)
10kHz<f ≤ 50kHz		±(1 % of reading + 0.2 % of rating)	
50kHz<f ≤ 100kHz		±(2 % of reading + 0.2 % of rating)	
Voltage measurement (PEAK)	Measurement range	120 % of rating	
	Resolution	0.01 V	
	Accuracy *17,*19	±(0.5 % of rating)	
Current measurement (DC)	Measurement range	120 % of rating	
	Resolution	0.001Ax parallel unit	
	Accuracy *17	±(0.3 % of reading + [0.1 %+0.3(parallel unit-1)] of rating)	
	Temperature coefficient	±(150 ppm/°C of rating) TYP.	
Current measurement (AC DC + AC)	Measurement range	AC	120 % of rating/CF
		DC + AC	120 % of rating
	Resolution	0.001Ax parallel unit	
	Accuracy *17,*18	5Hz<f ≤ 10kHz	±(3 % of reading + 0.1 % of rating)
10kHz<f ≤ 100kHz		±(10 % of reading + 1 % of rating)	
Current measurement (PEAK)	Measurement range	120 % of rating	
	Resolution	0.01 Ax parallel unit	
	Accuracy *17,*19	±(0.5 % of rating)	
Common	Measurement time(Aperture)	100 μs to 3600 s	

Protection Features

Overvoltage protection, Overcurrent protection, Overheat protection, Power limit(sink power)

Interface

RS232C, GPIB, USB, LAN

General

Operating temperature range	0 °C to 40 °C	
Operating humidity range	20 %RH to 85 %RH(no condensation)	
Storage temperature range	-25°C to 70°C	
Storage humidity range	90 %rh or less (no condensation)	
Insulation resistance	Across the primary circuit and the output terminals	500 Vdc, 30 M or greater
	Across the primary circuit and chassis	(at 70 %rh humidity or less)
	Across the output terminals and chassis	500 Vdc, 200 k or greater(at 70 %rh humidity or less)
Withstand voltage	Across the primary circuit and the output terminals Across the primary circuit and chassis	No abnormalities at 1500 Vac for 1 minute
Leakage current (250V/60Hz)	10 mA or less	
Earth continuity	100 Aac, 0.1 or less	
Cooling method	Forced air cooling using variable-speed, heat-sensitive fan	
Battery backup	Settings are retained when the power is off. At least three years of battery life(at 25 °C).	
Weight	Three parallel	Approx. 110 kg (242.51 lbs)
	Four parallel	Approx. 130 kg (286.60 lbs)
	Five parallel	Approx. 160 kg(352.74 lbs)
Dimensions (maximum)	Three parallel	432.6(545) Wx579.4(685) Hx700(735) Dmm
	Four parallel	432.6(545) Wx712.1(815) Hx700(735) Dmm
	Five parallel	432.6(545) Wx844.8(950) Hx700(735) Dmm
Accessories	Setup Guide(Smart rack) : 1 pc Manuals(PBZ-SR series) : 1 pc J1 connector kit : 1 pc	

*14 : The change in the output current in response to a ±10 % change in the input voltage in reference to the nominal input voltage (when the output voltage is in the range of 10 % to 100 % of the voltage rating).
 *15 : The rise or fall time (at rated load; excluding when output is turned on and off). The rise and fall times change according to the load impedance.
 Rise time: The time it takes for the output current to rise from 10 % to 90 % of the rating when the output current is changed from 0 A to the rated current.
 Fall time: The time it takes for the output current to fall from 90 % to 10 % of the rating when the output current is changed from the rated current to 0 A.
 *16 : Under no load or rated load.
 *17 : At an ambient temperature between 18 °C and 28 °C.
 *18 : When the input signal is in the 100 kHz bandwidth and has a crest factor of 3 or less (the measurement time is at least 10 times the input signal period).
 *19 : Calibrated with a 1 kHz sine wave.

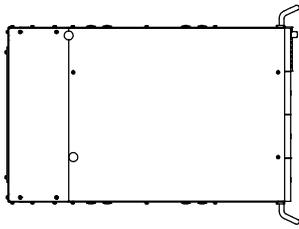
Cable option

Model	Part	Remarks
AC8-3P3M-M5C	AC Input Cable	8sq3-core 3m
TL02-PLZ	LOW Inductance Cable	100A 1m
TL03-PLZ	LOW Inductance Cable	100A 2m

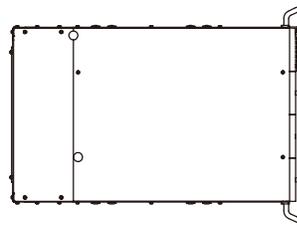
* LOW inductance cable can be used only when output is grounded, and cannot be used when not grounded.



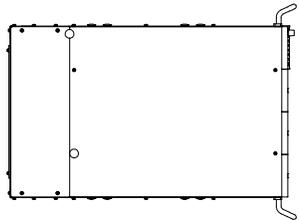
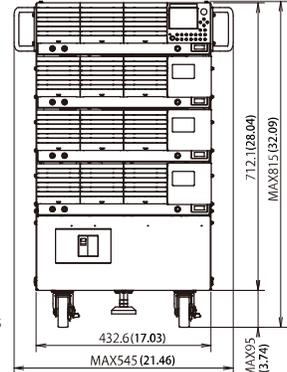
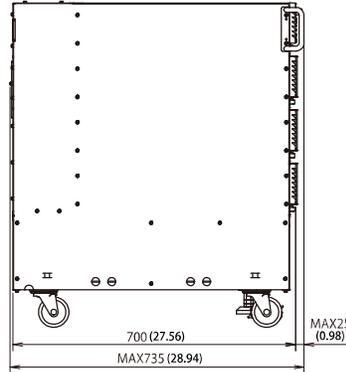
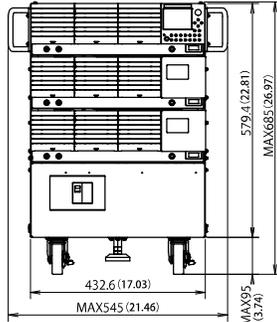
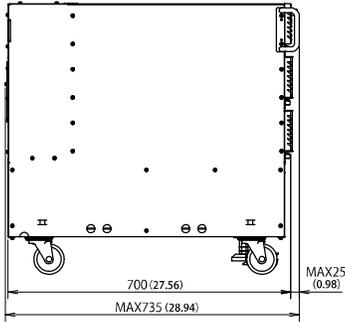
dimensions



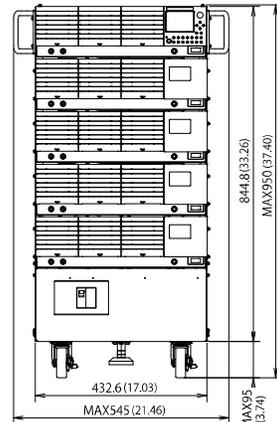
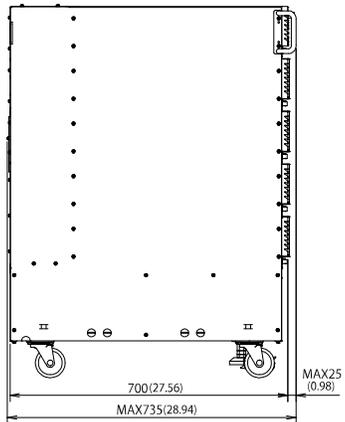
PBZ20-60SR
PBZ40-30SR



PBZ20-80SR
PBZ40-40SR



PBZ20-100SR
PBZ40-50SR



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