

P A T - T S E R I E S



Power factor: 0.95

Equipped with power factor correction circuit.

3 kW maximum power output even with single-phase input (4 kW type)

Maximum power output

8kW

[8kW type]

High-Efficiency, Large-Capacity Switching Power Supply PAT-T Series

8 kW type (11 models) and 4 kW type (4 models): 15 models in total.

PAT-T Series Smart Rack System 200 V/400 V input type Total of 164 models.

Continuous operation capable under full load even with an ambient temperature of 50°C. (Smart Rack System : 40°C)

Extending the capacity by parallel operation up to five units (40 kW).

Equipped with power factor correction circuit.

High noise resistance.

Equipped with RS-232C interface as standard.

Optional interface USB, GPIB, and LAN (factory option).

LAN interface applies to **LXI**

Large-capacity, yet compact, tough, and environment friendly.

*Maximum dimension appears in parentheses ().

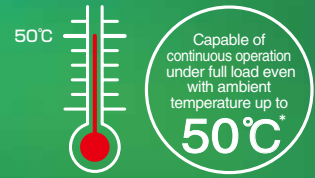
550 (620) mm
21.65" (24.41")

129.2 (155) mm
5.09" (6.1")

430 (440) mm
16.93" (17.32")



[Guaranteed operating temperature]
*Smart Rack System : 40°C



Weight: Approx.
25 kg (55.12 lb)
(PAT40-200T)

High-Efficiency, Large-Capacity Switching Power Supply PAT-Tseries



Available in 2 types, with rated power outputs of 8 kW and 4 kW: 15 models in total.

Outline

The PAT-T Series is a constant voltage/constant current auto-shifting switching DC power supply. It features a soft switching system that offers greater efficiency and lower noise. At the same time, the high-density packaging technology has achieved great reduction of the size and weight of the unit. It features an exceptional "power factor correction circuit" for its class, and improves the power supply environment (suppresses harmonic currents). It also greatly contributes to "energy saving," as exemplified by its simplified and miniaturized power reception and distribution modules, and lower power consumption. Furthermore, an optimized heat radiation design makes operation guaranteed at ambient temperatures of up to 50°C. It can thus be deployed in demanding usage environments where it must provide full-load, continuous operation despite high ambient temperatures.

The layout of the operation and display panel is simple and intuitive, and it has been designed with viewability and usability in mind. An RS-232C interface is provided as standard feature along with external analog control, monitor output, and status output connectors, that enables you to control from an external computer or sequencer. In addition, a USB, GPIB, or LAN (LXI*) interface can be equipped as a factory option. The unit can either be used in a stand-alone configuration or can be incorporated into a test system.

*8 kW-type 400 V input models (20V type, 40V type, 60V type, and 160V type) and 4 kW types are not LXI compliant.

Lineup

Rated Power	Model	Rated Voltage	Rated Current
8 kW ★	PAT20-400T	0 V to 20 V	0 A to 400 A
	PAT30-266T	0 V to 30 V	0 A to 266 A
	PAT40-200T	0 V to 40 V	0 A to 200 A
	PAT60-133T	0 V to 60 V	0 A to 133 A
	PAT80-100T	0 V to 80 V	0 A to 100 A
	PAT160-50T	0 V to 160 V	0 A to 50 A
	PAT250-32T	0 V to 250 V	0 A to 32 A
	PAT350-22.8T	0 V to 350 V	0 A to 22.8 A
	PAT500-16T	0 V to 500 V	0 A to 16 A
	PAT650-12.3T	0 V to 650 V	0 A to 12.3 A
4 kW	PAT850-9.4T	0 V to 850 V	0 A to 9.4 A
	PAT20-200T	0 V to 20 V	0 A to 200 A
	PAT40-100T	0 V to 40 V	0 A to 100 A
	PAT60-67T	0 V to 60 V	0 A to 67 A
	PAT160-25T	0 V to 160 V	0 A to 25 A

★ For 8kW type models, 3-phase 400V input is available.

PERFORMANCE

[Model with breaker]

[Model without breaker]



Smart Rack System (PAT-TX/TMX)

Maximum output of 40 kW, 2000 A!

This large-current model assembles multiple PAT-T Series units with special rack parts.

- Capacity: 16 kW to 40 kW, 4 types
- Built-in power factor correction (PFC) circuit contributes to harmonic current control and energy saving!
- Built-in circuit breaker (model with "X" at end of name)
- Input of three-phase 200 V specifications or three-phase 400 V specifications
- RS232C equipped as standard interface. USB, GPIB, and LAN (LXI*) are available as factory options.
- Lineup: 164 models are available in total (The 82 models in the table below are of a type having three-phase 200 V input specifications.)

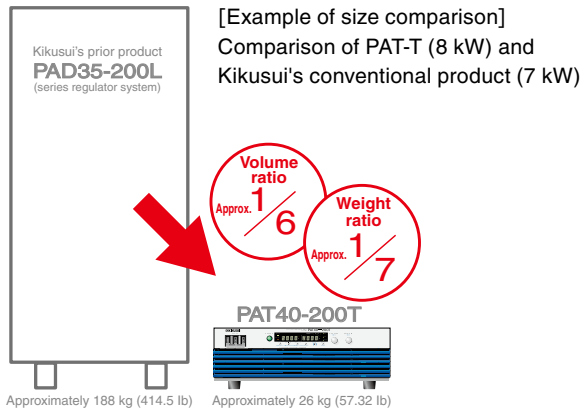
Output rating	16 kW	24 kW	32 kW	40 kW
20V type	PAT20-800TM	PAT20-1200TM	PAT20-1600TM	PAT20-2000TM
	PAT20-800TMX	PAT20-1200TMX	PAT20-1600TMX	PAT20-2000TMX
30V type	PAT30-532TM	PAT30-798TM	PAT30-1064TM	PAT30-1330TM
	PAT30-532TMX	PAT30-798TMX	PAT30-1064TMX	PAT30-1330TMX
40V type	PAT40-400TM	PAT40-600TM	PAT40-800TM	PAT40-1000TM
	PAT40-400TMX	PAT40-600TMX	PAT40-800TMX	PAT40-1000TMX
60V type	PAT60-266TM	PAT60-399TM	PAT60-532TM	PAT60-665TM
	PAT60-266TMX	PAT60-399TMX	PAT60-532TMX	PAT60-665TMX
80V type	PAT80-200TM	PAT80-300TM	PAT80-400TM	PAT80-500TM
	PAT80-200TMX	PAT80-300TMX	PAT80-400TMX	PAT80-500TMX
160V type	PAT160-100TM	PAT160-150TM	PAT160-200TM	PAT160-250TM
	PAT160-100TMX	PAT160-150TMX	PAT160-200TMX	PAT160-250TMX
250V type	PAT250-64TM	PAT250-96TM	PAT250-128TM	PAT250-160TM
	PAT250-64TMX	PAT250-96TMX	PAT250-128TMX	PAT250-160TMX
350V type	PAT350-45.6TM	PAT350-68.4TM	PAT350-91.2TM	PAT350-114TM
	PAT350-45.6TMX	PAT350-68.4TMX	PAT350-91.2TMX	PAT350-114TMX
500V type	PAT500-32TM	PAT500-48TM	PAT500-64TM	PAT500-80TM
	PAT500-32TMX	PAT500-48TMX	PAT500-64TMX	PAT500-80TMX
650V type	PAT650-24.6TM	PAT650-36.9TM	PAT650-49.2TM	PAT650-61.5TM
	PAT650-24.6TMX	PAT650-36.9TMX	PAT650-49.2TMX	PAT650-61.5TMX
850V type	PAT850-18.8TM	*Smart rack system based on 8 kW-type 400 V input models (20V type, 40V type, 60V type, and 160V type) are not LXI compliant.		
	PAT850-18.8TMX			

★How to define the model name: The first part of number indicates the rated voltage and the second part of number indicates the rated current.
 [Example] PAT20-2000TM, rated voltage : 0V to 20V, rated current : 0A to 2,000A. The model with "X" at the end of the model name is equipped with the breaker.

Tough & Eco

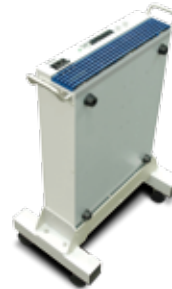
Large capacity yet compact!

Neatly fits into smaller spaces!



Can use vertically, too! (Optional)

Easy to carry and can use on test table side. Compatible with all PAT-T series models.
Comes with caster-equipped frame and handle kit.



Option

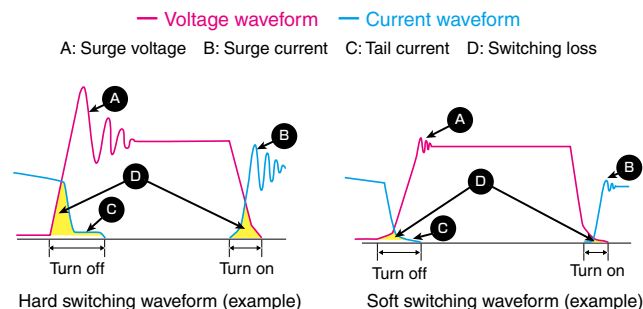
- Vertical stand
- VS01

*PAT-T series main unit is not included.

Offers compactness, high efficiency, and energy saving!

Soft switching system

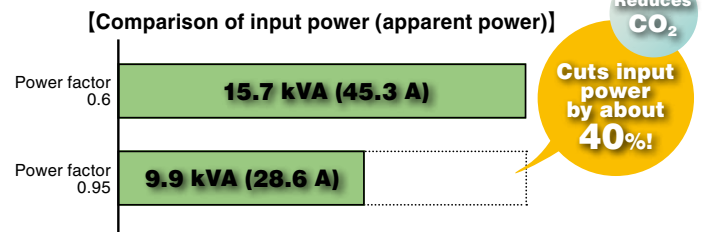
This power supply circuit system skillfully utilizes resonance to execute power device switching when the voltage or current is zero. Thus, in principle, the unit can operate without switching loss and without transient crossover of voltage and current. In general, switching that occurs when voltage is zero is called zero voltage switching (ZVS), while switching that occurs when current is zero is called zero current switching (ZCS). With conventional power supply circuits, problems such as increasing power loss and diminishing efficiency occur when switching operations increase in speed. A soft switching system, however, features a high-efficiency power supply circuit that reduces heat loss generated from the power supply and enables the miniaturization of circuits, not only making it possible to miniaturize equipment but to considerably minimize noise generated from the power supply.



Power factor correction circuit

The power factor (PF) is a value that indicates the efficiency of an alternating current circuit, and it refers to the ratio of the effective power to the apparent power. The closer the power factor is to 1, the better will be the efficiency of electric power energy usage in the equipment (circuit). Incorporating a power factor correction circuit into a power circuit's input unit will correct AC voltage and current phase differences (waveform deviations cause reactive power), and improve the efficiency of electric power usage. Specific advantages include the following:

- Promotes energy saving.
- Downsizes power reception and distribution equipment.
- Improves the power supply environment.
- Reduces transmission loss.
- Reduces noise.



The above values apply when DC-power, full-load operation is performed with an output of 40 V and 200 A, and an efficiency of 85%.

Improving the power factor from 0.6 to 0.95 reduces the required input power by about 40%. Thus, a high power factor **saves energy!**

Capacity expansion by parallel operation: maximum 40 kW, 2000 A

Parallel operation up to five units (same model)!

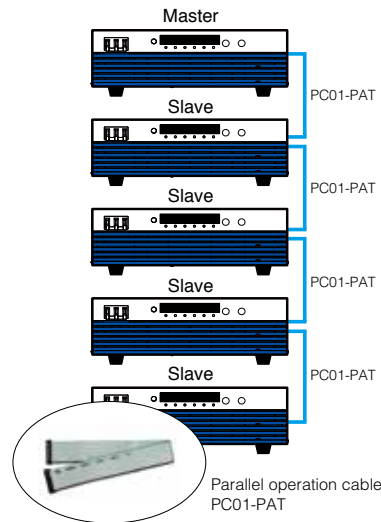
Up to five units (up to two units with PAT850-9.4T) can be connected in parallel in master-slave operation. It allows you to control the whole system from the master unit front panel and enables to displays the sum current (maximum output current : rated output current of single unit × number of parallel units). Also, the output current of each slave unit can be displayed while you press the STORE button of each slave unit*. For parallel connection, parallel operation cable PC01-PAT is required depending the number of slave units.

*8 kW-type 400 V input models (20V type, 40V type, 60V type, and 160V type) and 4 kW types are not LXI compliant.

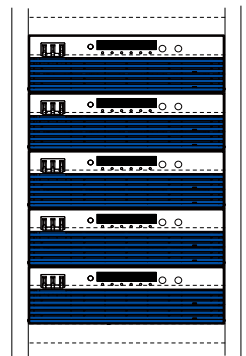
Serial operation up to two units (same model)

Up to two units can be connected in series with 8 kW types (PAT20-400T, PAT30-266T, PAT40-200T, PAT60-133T, PAT80-100T, and PAT160-50T) and 4 kW types. However, master-slave operation is not supported. The sum of the output voltages of two units is supplied to the load.

Parallel operation with up to five units (same model) possible



With air supply and exhaust at front and rear panels only, cohesive packaging is possible

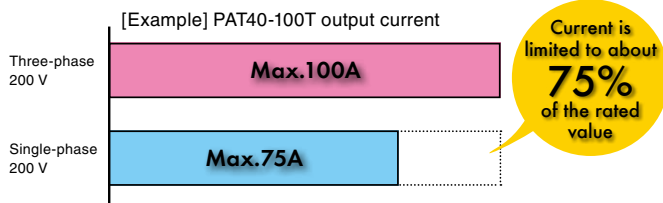


Rack assembly example (rack in inches)

More convenient, easier to use, and safer

4 kW type can operate even with single-phase 200 V input.

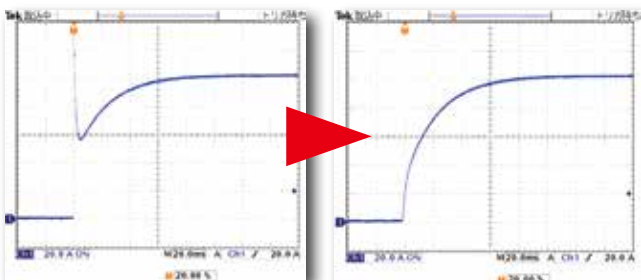
The current is limited to about 75% of the rated value. Accordingly, the power is limited to 3 kW.



CV, CC priority starting function*

When output is ON, the unit can be set to start up as a constant voltage (CV) power supply or as a constant current (CC) power supply. When CV priority mode is used during constant voltage operation and when CC priority mode is used during constant current operation, it becomes possible to start up smoothly without overshoot.

■ Comparison of output current rise waveforms with constant current operation (example)



▲With CV priority mode setting

▲With CC priority mode setting

External analog control function

Output voltage can be controlled by an external voltage (V_{ext}) of 0 V to 10 V or an external resistance (R_{ext}) of 0 k to 10 k. When FAST mode* is selected, external voltage control can be directly controlled not through the CPU, and output voltage changes without delay with respect to V_{ext} .

Other functions

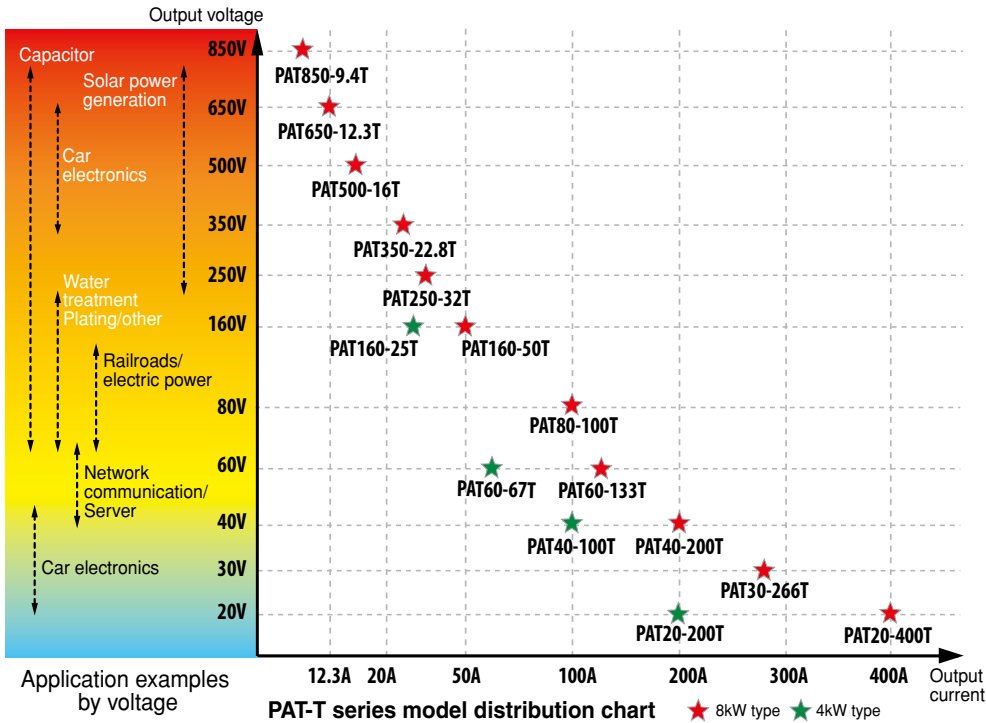
- RS-232C interface equipped as standard
- USB/GPIB/LAN interface available as factory option
- Reliable output ON/OFF delay function for sequence operations
- Memory function (three sets of voltage/current)
- Voltage/current monitor output
- Status signal output
- Remote sensing function
- Protection functions
 - Shutdown, as well as protection against overvoltage, overcurrent, overheat, input phase interruption, fan malfunction, sensing, and bleeder circuit overheat
- High noise resistance (for reassurance during car electronics testing)
- Good maintainability, including easy fan replacement

*8 kW-type 400 V input models (20V type, 40V type, 60V type, and 160V type) and 4 kW types are not LXI compliant.

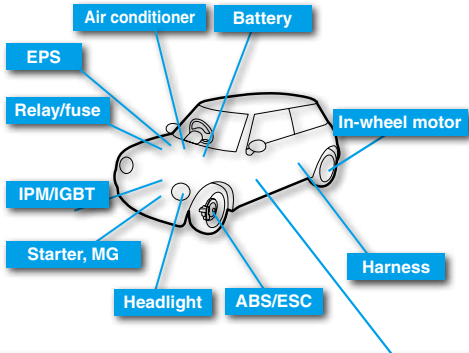
APPLICATION

Purpose and Application Examples/Various Functions

The output voltage lineup ranges from 20 V to 850 V. The product can be used as a power supply for various evaluations and tests.



Car electronics applications

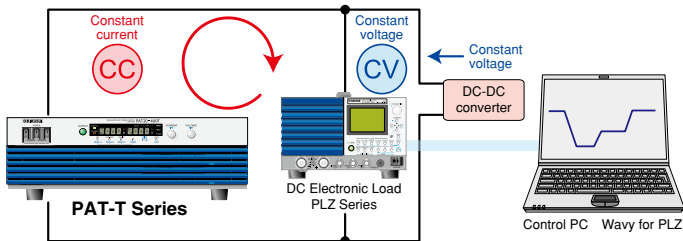


- Lifetime testing of headlights
- Performance and endurance testing of inverters for use in high-capacity air conditioners and motors
- Performance and endurance testing of brushless motors for use in EPS and MG units
- Performance testing of IPM, IGBT, and other power modules
- Performance testing of starter motors
- Performance testing of EV/HEV electrical components

DC-DC converter and related devices

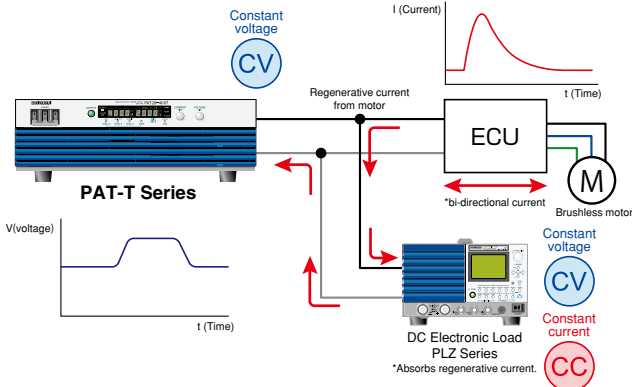
● For simple voltage variation tests

It simulates a medium-speed voltage variation as a simulated battery by connecting a high voltage DC power supply and a DC electronic load. Voltage variation waveform can be created with the optional sequence creation software Wavy .



● For surge absorption measures of brushless motor

It protects the power supply and ECU by absorbing the regenerative current from the motor during the performance test of brushless motor.

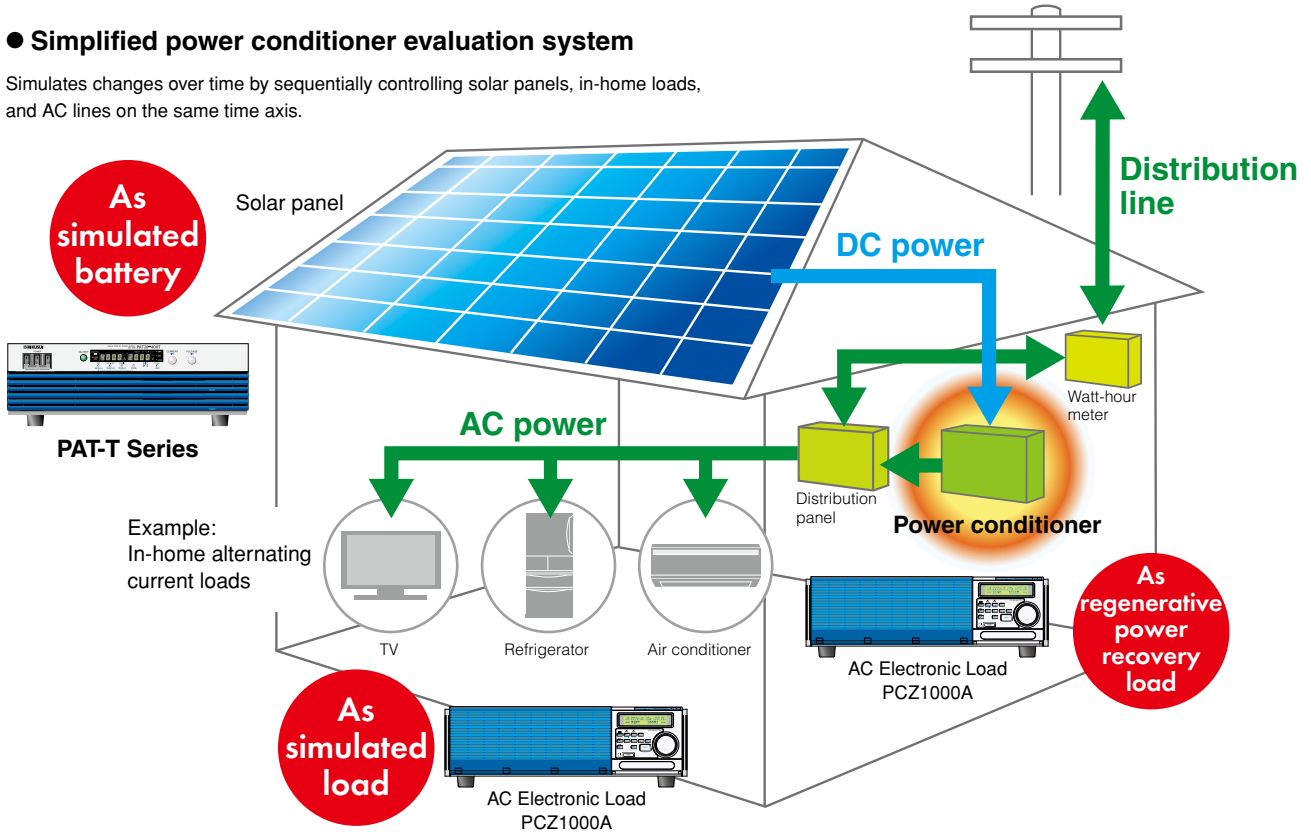


Purpose and Application Examples/Various Functions

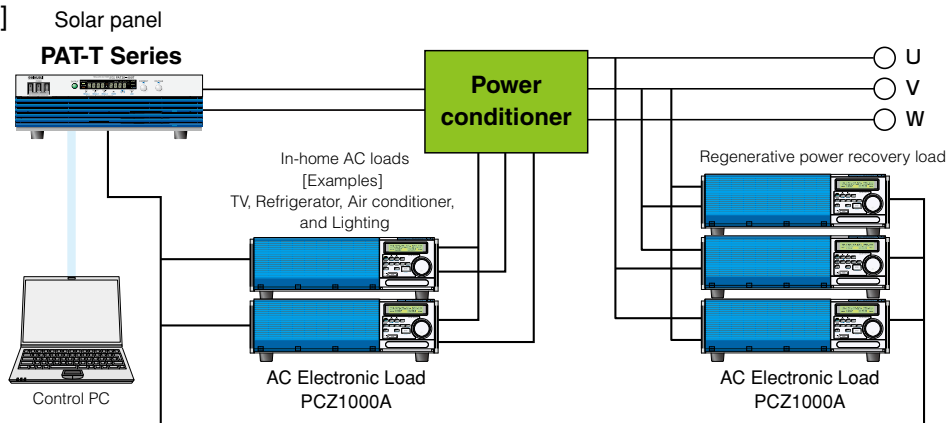
Application example in solar power generation

● Simplified power conditioner evaluation system

Simulates changes over time by sequentially controlling solar panels, in-home loads, and AC lines on the same time axis.



[System concept]



AC Electronic Load
PCZ1000A



Dimensions

430(16.93")W × 128(5.04")H × 400(15.75")Dmm /22kg(48.5 lbs)

For load test of inverters or transformers used for Fuel Cell, UPS, or Solar power generation

- Crest Factor function
Equipped with Crest Factor function that facilitates performing load tests for peak or harmonic currents. Crest Factor value can be set from 1.4 to 4.0.
- Parallel operation function
As master-slave control, up to 4 slave units can be connected in parallel. (Maximum 5kW, 50Arms)
- Equipped with tracking operation function
Same setting value as that of master unit will be set on slave unit. It is convenient as a single-phase 3-wire or three-phase 3-wire AC source load.

*For details on the PCZ1000A, see the separate product catalog or our home page.

8 kW Type Specifications

Item		PAT20-400T	PAT30-266T	PAT40-200T	PAT60-133T	PAT80-100T	
Input	Nominal input rated voltage	Three-phase 200 to 240 VAC, 50-60 Hz					
	Input voltage range/Input frequency range	180 V to 250 V / 47Hz to 63 Hz					
	Efficiency	85% (min) [at input voltage of 200 VAC and rated load]					
	Power factor	0.95 (typical) [at input voltage of 200 VAC and rated load]					
	Input current	32 A (max) [rated load]					
	Inrush current	100 A peak (max)					
	Input power	10kVA (max)					
Output	Rating	Rated output power	8 kW				
		Rated output voltage	20.00 V	30.00 V	40.00 V	60.0 V	80.0 V
		Rated output current	400.0 A	266.0 A	200.0 A	133.0 A	100.0 A
	Constant voltage	Setting accuracy	± (0.2% of rating +50 mV)				
		Max setting voltage	105% of rating				
		Line regulation	± (0.05% of rating +5 mV)				
		Load regulation	± (0.1% of rating +5 mV)				
		Transient response time	5 ms (at an instantaneous change in the load current from 50% to 100%)				
		Ripple noise	100 mVp-p	300 mVp-p	300 mVp-p	350 mVp-p	350 mVp-p
			When the measurement frequency band is 10 Hz to 20 MHz				
			10 mVrms	20 mVrms	30 mVrms	30 mVrms	30 mVrms
		Raise time	When the measurement frequency band is 5 Hz to 1 MHz				
			100 ms (rated load)/100 ms (no load)				
	Fall time						
	100 ms (rated load)/2000 ms (no load)						
	Temperature coefficient	100 ppm/°C (max) [with external analog control]					
	Constant current*	Setting accuracy	± (0.5% of rating +50 mA)				
		Max setting current	105% of rating				
		Line regulation	± (0.1% of rating +30 mA)				
		Load regulation	± (0.2% of rating +30 mA)				
Ripple noise		500 mArms	400 mArms	400 mArms	350 mArms	300 mArms	
Temperature coefficient		200 ppm/°C (typ) [with external analog control]					
OUTPUT ON/OFF delay		OFF. 0.1 to 10.0 s (resolution: 0.1 s)					
Voltage display	Maximum display	99.99					
	Error	± (0.2% of reading +5 digits) at 23°C ±5°C					
Current display	Maximum display	999.9					
	Error	± (0.5% of reading +5 digits) at 23°C ±5°C					
Protection function		Overvoltage protection (OVP) / Overcurrent protection (OCP) / Overheat protection (OHP) / Input open phase protection (PHASE) / Fan error protection (FAN) / Mis-connection protection (SENSE) / Breeder circuit overheat protection (BOHP) / Shutdown (SD)					
External analog control	OUTPUT ON/OFF control, etc.	OUTPUT ON/OFF, SHUTDOWN					
	Constant voltage, external voltage control	0% to 100% of the rated output voltage at 0 to 10 V					
	Constant voltage, external resistance control	0% to 100% or 100% to 0% of the rated output voltage at 0 Ω to 10 kΩ					
	Constant current, external voltage control	0% to 100% of rated output current at 0 to 10 V					
	Constant current, external resistance control	0% to 100% or 100% to 0% of rated output current at 0 Ω to 10 kΩ					
Monitor output	Output voltage	10.00 V ±0.25 V at rated voltage output					
		0.00 V ±0.25 V at 0 V output					
	Output current	10.00 V ±0.25 V at rated current output					
		0.00 V ±0.25 V at 0 A current					
Status output		OUT ON, CV, CC, ALARM, POWER ON, POWER OFF, insulated open collector					
Remote control		Equipped with RS-232C interface as standard. SCPI commands, up to 38,400 bps					
Operating temperature/humidity range		0°C to 50°C, 20% to 85% rh					
Storage temperature/humidity range		-25°C to 70°C, 90% rh or less (non-condensing)					
Dimensions (maximum)		430 (440)(16.93"(17.32")) W × 129.2 (155)(5.09"(6.10")) H × 550 (620)(21.65"(24.41")) D mm					
Weight		Approx. 26 kg (57.32 lb)	Approx. 27 kg (59.52 lb)	Approx. 25 kg (55.12 lb)	Approx. 24 kg (52.91 lb)		

*During constant current operation (set the output voltage at the rated output current greater than equal to the rated output voltage)

Rated load: Refers to a load with a resistance that makes the voltage drop when the rated output current is supplied to be 95% to 100% of the maximum output voltage at the rated output current. The output voltage of the PAT including the voltage drop in the load cable must not exceed the maximum output voltage at the rated output current.

No load: Refers to a load with a resistance that makes the voltage drop when the rated output current is supplied to be 10% of the maximum output voltage or 1 V, whichever is greater, at the rated output current.

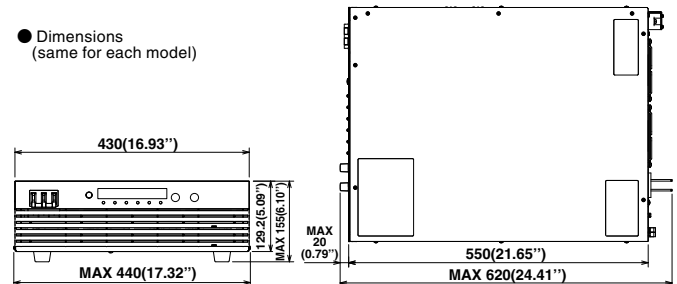
8 kW Type Specifications

Item		PAT160-50T	PAT250-32T	PAT350-22.8T	PAT500-16T	PAT650-12.3T	PAT850-9.4T		
Input	Nominal input rated voltage	Three-phase 200 to 240 VAC, 50-60 Hz							
	Input voltage range/Input frequency range	180 V to 250 V / 47Hz to 63 Hz							
	Efficiency	85% (min) [at input voltage of 200 VAC and rated load]							
	Power factor	0.95 (typical) [at input voltage of 200 VAC and rated load]							
	Input current	32 A (max) [rated load]							
	Inrush current	100 A peak (max)							
	Input power	10kVA (max)							
Output	Rating	8 kW							
		Rated output voltage	160.0 V	250.0 V	350.0 V	500.0 V	650.0 V	850.0 V	
		Rated output current	50.0 A	32.0 A	22.8 A	16.0 A	12.3 A	9.4 A	
	Constant voltage	Setting accuracy	± (0.2% of rating +50 mV)						
		Max setting voltage	105% of rating						
		Line regulation	± (0.05% of rating +5 mV)						
		Load regulation	± (0.1% of rating +5 mV)						
		Transient response time	5 ms (with sensing at external output, at an instantaneous change in the load current from 50% to 100%)						
		Ripple noise		350 mVp-p	450 mVp-p	450 mVp-p	600 mVp-p	600 mVp-p	600 mVp-p
				When the measurement frequency band is 10 Hz to 20 MHz					
				30 mVrms	50 mVrms	50 mVrms	100 mVrms	100 mVrms	100 mVrms
			When the measurement frequency band is 5 Hz to 1 MHz						
		Raise time	100 ms (rated load)/100 ms (no load)						
	Fall time	100 ms (rated load)/2000 ms (no load)			200 ms (rated load)/4000 ms (no load)				
	Temperature coefficient	100 ppm/°C (max) [with external analog control]							
	Constant current*	Setting accuracy	± (0.5% of rating +50 mA)			± (1% of rating +100 mA)			
		Max setting current	105% of rating						
		Line regulation	± (0.1% of rating +30 mA)						
		Load regulation	± (0.2% of rating +30 mA)						
		Ripple noise		200 mArms	200 mArms	200 mArms	200 mArms	150 mArms	120 mArms
			When the measurement frequency band is 5 Hz to 1 MHz						
Temperature coefficient	200 ppm/°C (typ) [with external analog control]								
OUTPUT ON/OFF delay		OFF. 0.1 to 10.0 s (resolution: 0.1 s)							
Voltage display	Maximum display	999.9							
	Error	± (0.2% of reading +5 digits) at 23°C ±5°C							
Current display	Maximum display	999.9	99.99						
	Error	± (0.5% of reading +5 digits) at 23°C ±5°C							
Protection function		Overvoltage protection (OVP) / Overcurrent protection (OCP) / Overheat protection (OHP) / Input open phase protection (PHASE) / Fan error protection (FAN) / Mis-connection protection (SENSE) / Breeder circuit overheat protection (BOHP) / Shutdown (SD)							
External analog control	OUTPUT ON/OFF control, etc.	OUTPUT ON/OFF, SHUTDOWN							
	Constant voltage, external voltage control	0% to 100% of the rated output voltage at 0 to 10 V							
	Constant voltage, external resistance control	0% to 100% or 100% to 0% of the rated output voltage at 0 Ω to 10 kΩ							
	Constant current, external voltage control	0% to 100% of tared output current at 0 to 10 V							
	Constant current, external resistance control	0% to 100% or 100% to 0% of rated output currennt at 0 Ω to 10 kΩ							
Monitor output	Output voltage	10.00 V ±0.25 V at rated voltage output							
		0.00 V ±0.25 V at 0 V output							
	Output current	10.00 V ±0.25 V at rated current output							
		0.00 V ±0.25 V at 0 A current							
Status output		OUT ON, CV, CC, ALARM, POWER ON, POWER OFF, insulated open collector							
Remote control		Equipped with RS-232C interface as standard. SCPI commands, up to 38,400 bps							
Operating temperature/humidity range		0°C to 50°C, 20% to 85% rh							
Storage temperature/humidity range		-25°C to 70°C, 90% rh or less (non-condensing)							
Dimensions (maximum)		430 (440)(16.93"(17.32")) W × 129.2 (155)(5.09"(6.10")) H × 550 (620)(21.65"(24.41")) D mm							
Weight		Approx. 24 kg (52.91 lb)	Approx. 23 kg (50.71 lb)			Approx. 22 kg (48.50 lb)	Approx. 23 kg (50.71 lb)		

●Rear panel (8 kW type PAT400-200T rear panel)

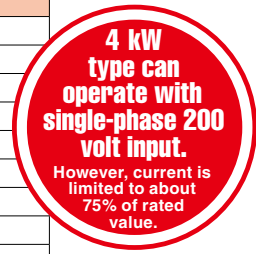


● Dimensions (same for each model)



4 kW Type Specifications

Item		PAT20-200T	PAT40-100T	PAT60-67T	PAT160-25T		
Input	Nominal input rated voltage	Single-phase/three-phase 200 to 240 VAC, 50-60 Hz					
	Input voltage range/Input frequency range	180 V to 250 V / 47 Hz to 63 Hz					
	Efficiency	84% (min)	85% (min) [at input voltage of 200 VAC and rated load]				
	Power factor	0.95 (typical) [at input voltage of 200 VAC and rated load]					
	Input current	Single-phase 22 A (max) [at 3 kW load]/three-phase 17 A (max) [at rated load]					
	Inrush current	50 A peak (max)					
	Input power	Single-phase 4 kVA (max) [at 3 kW load]/three-phase 5 kVA (max) [at rated load]					
Output	Rating	Rated output power	4 kW(three-phase input mode) / 3 kW(single-phase input mode)				
		Rated output voltage	20.00 V	40.00 V	60.00 V	160.0 V	
		Rated output current	200.0 A	100.0 A	67.00 A	25.00 A	
	Constant voltage	Setting accuracy	± (0.2% of rating +50 mV)				
		Max setting voltage	105% of rating				
		Line regulation	± (0.05% of rating +5 mV)				
		Load regulation	± (0.1% of rating +5 mV)				
		Transient response time	5 ms (at instantaneous change in load current from 50% to 100%)				
		Ripple noise		100 mVp-p	300m Vp-p	350 mVp-p	350 mVp-p
				When the measurement frequency band is 10 Hz to 20 MHz			
				10 mVrms	30 mVrms	30 mVrms	30 mVrms
			When the measurement frequency band is 5 Hz to 1 MHz				
		Raise time	100 ms (rated load)/100 ms (no load)				
	Fall time	100 ms (rated load)/2000 ms (no load)					
	Temperature coefficient	100 ppm/°C (max) [with external analog control]					
	Constant current*	Setting accuracy	± (0.5% of rating +50 mA)				
		Max setting current	105% of rating × 75% (with single-phase input) / 105% of rating (with three-phase input)				
		Line regulation	± (0.1% of rating +30 mA)				
		Load regulation	± (0.2% of rating +30 mA)				
		Ripple noise		400 mArms	300 mArms	250 mArms	200 mArms
			When the measurement frequency band is 5 Hz to 1 MHz				
Temperature coefficient	200 ppm/°C (typ) [with external analog control]						
OUTPUT ON/OFF delay		OFF. 0.1 to 10.0 s (resolution: 0.1 s)					
Voltage display	Maximum display	99.99			999.9		
	Error	± (0.2% of reading +5 digits) at 23°C ±5°C					
Current display	Maximum display	999.9		99.99			
	Error	± (0.5% of reading +5 digits) at 23°C ±5°C					
Protection function		Overvoltage protection (OVP) / Overcurrent protection (OCP) / Overheat protection (OHP) / Input open phase protection (PHASE) / Fan error protection (FAN) / Mis-connection protection (SENSE) / Breeder circuit overheat protection (BOHP) / Shutdown (SD)					
External analog control	OUTPUT ON/OFF control, etc.	OUTPUT ON/OFF, SHUTDOWN					
	Constant voltage, external voltage control	0% to 100% of the rated output voltage at 0 to 10 V					
	Constant voltage, external resistance control	0% to 100% or 100% to 0% of the rated output voltage at 0 Ω to 10 kΩ					
	Constant current, external voltage control	0% to 100% of tared output current at 0 to 10 V					
	Constant current, external resistance control	0% to 100% or 100% to 0% of rated output curren at 0 Ω to 10 kΩ					
Monitor output	Output voltage	10.00 V ±0.25 V at rated voltage output					
		0.00 V ±0.25 V at 0 V output					
	Output current	10.00 V ±0.25 V at rated current output					
	0.00 V ±0.25 V at 0 A current						
Status output	OUT ON, CV, CC, ALARM, POWER ON, POWER OFF, insulated open collector						
Remote control	Equipped with RS-232C interface as standard. SCPI commands, up to 38,400 bps						
Operating temperature/humidity range	0°C to 50°C, 20% to 85% rh						
Storage temperature/humidity range	-25°C to 70°C, 90% rh or less (non-condensing)						
Dimensions (maximum)	430 (440)(16.93"(17.32")) W × 129.2 (155)(5.09"(6.10")) H × 550 (620)(21.65"(24.41")) D mm						
Weight	Approx. 20 kg(44.09 lb)	Approx. 19 kg(41.89 lb)	Approx. 18 kg(39.68 lb)				



*During constant current operation (set the output voltage at the rated output current greater than equal to the rated output voltage)
 Rated load: Refers to a load with a resistance that makes the voltage drop when the rated output current is supplied to be 95 % of the maximum output voltage at the rated output current. The output voltage of the PAT including the voltage drop in the load cable must not exceed the maximum output voltage at the rated output current.
 No load: Refers to a load with a resistance that makes the voltage drop when the rated output current is supplied to be 10 % of the maximum output voltage or 1 V, whichever is greater, at the rated output current.

Communication Interface (Each Model is the Same)	
RS-232C	Conforms to EIA232D specifications. D-SUB 9-pin connector Baud rate: 1200, 2400, 4800, 9600, 19200, 38400 bps Data length: 7 or 8 bits, Stop bit length: 1 or 2 bits, Parity: None, flow control
GPiB*	Conforms to IEEE Std 488.1-1987 specifications. SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT1, C0, E1
USB*	Conforms to USB2.0 specifications. Communication speed: 12 Mbps (full speed) Conforms to USBTMC-USB488 device class specifications.
LAN*	Conforms to the protocol VXI-11 IEEE 802.3 100Base-TX/10Base-T Ethernet IPv4, RJ-45 connector
Common	Conforms to the messaging protocol IEEE Std 488.2-1992. SCPI Specification 1999.0

Note: An input power cable is not included with the PAT-T series. Customers should either provide an input cable themselves or request an input cable (AC8-4P4M-M6C) sold optionally by Kikusui.

*Only one of these can be built in the power supply unit optionally.

Smart Rack model specifications*

*The specifications table below applies to typical models. For other models, please refer to our web site.

Unless otherwise stated, the specifications shall conform to the settings and conditions indicated hereinafter. ■Loads shall be purely resistance. ■Warm-up time shall be 30 minutes (condition with current flowing). ■After warm-up is completed, it will be necessary to calibrate correctly in a 23°C±5°C environment and in accordance with instruction manual procedures. *Typ* values or standard values do not guarantee performance. ■**% of rating* indicates **% of the rated output voltage or rated output current. ■***% of reading* indicates ***% of the output voltage or output current reading.

Specifications Model Name *1	Output		Voltage/Frequency	Input					Weight *2 kg (Approx.)
	CV V	CC A		Current A (max.)	Inrush Current A (max.)	Power VA (max.)	Power Factor typ.	Efficiency % (min.)	
PAT20-800TM (X)	0 to 20	0 to 800	Three-phase AC200V to AC240V (AC180V to AC250V) 50Hz to 60Hz (47Hz to 63Hz)	62	200	20000	0.950	85	80 (90)
PAT20-1200TM (X)		0 to 1200		96	300	30000			120 (130)
PAT20-1600TM (X)		0 to 1600		128	400	40000			150 (160)
PAT20-2000TM (X)		0 to 2000		160	500	50000			180 (200)
PAT40-400TM (X)	0 to 40	0 to 400		62	200	20000			80 (90)
PAT40-600TM (X)		0 to 600		96	300	30000			120 (130)
PAT40-800TM (X)		0 to 800		128	400	40000			150 (160)
PAT40-1000TM (X)		0 to 1000		160	500	50000			180 (200)
PAT60-266TM (X)	0 to 60	0 to 266		62	200	20000			80 (90)
PAT60-399TM (X)		0 to 399		96	300	30000			120 (130)
PAT60-532TM (X)		0 to 532		128	400	40000			150 (160)
PAT60-655TM (X)		0 to 655		160	500	50000			180 (200)
PAT160-100TM (X)	0 to 160	0 to 100		62	200	20000			80 (90)
PAT160-150TM (X)		0 to 150		96	300	30000			120 (130)
PAT160-200TM (X)		0 to 200		128	400	40000			150 (160)
PAT160-250TM (X)		0 to 250		160	500	50000			180 (200)

*1: Breaker-equipped models have an "X" attached at the end of the model name. *2: Models appearing in () are breaker-equipped models.

Common specifications and general specifications

Voltage display Maximum display : 99.99 (model with less than 100 V rating)
: 999.9 (model with at least 100 V rating)
Display error : ± (0.2% of reading+5 digits)

Current display Maximum display : 999.9 (model with less than 1000 A rating)
: 9999 (model with at least 1000 A rating)
Display error : 16kW type : ± (0.6% of reading+5 digits)
: 24kW, 32kW type : ± (0.6% of reading+10 digits)
: 40kW type : ± (0.6% of reading+15 digits)

Monitor signal output VMON (voltage) : At rated voltage output: 10.00V ± 0.25V
: At 0 V output : 0.00V ± 0.25V
IMON (current) : At rated current output: 10.00V ± 0.25V
: At 0 A output : 0.00V ± 0.25V

Digital control RS232C : Conforms to EIA232D specifications
GPIB (option) : Conforms to IEEE STD.488.1-1978 specifications
USB (option) : Conforms to USB2.0 specifications

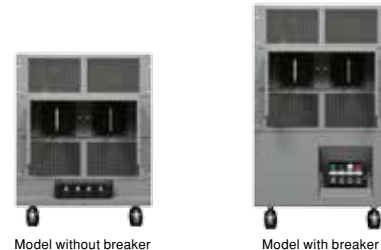
External analog control OUTPUT ON/OFF, SHUTDOWN
Constant voltage, external voltage control : 0% to 100% of rated output voltage at 0 to 10 V
Constant voltage, external resistance control : 0% to 100% or 100% to 0% of rated output voltage at 0 Ω to 10 k Ω
Constant current, external voltage control : 0% to 100% of rated output current at 0 to 10 V
Constant current, external resistance control : 0% to 100% or 100% to 0% of rated output current at 0 Ω to 10 k Ω

Environment specifications... Operating temperature : 0°C to 40°C
Operating humidity : 20% to 85% rh (no condensation)
Storage temperature : -25°C to 70°C
Storage humidity : 90% rh or less (no condensation)
Cooling system : Forced air cooling with fan
Ground polarity : Negative or positive ground possible
Ground voltage : +250 Vmax (models less than 100 V)
+500 Vmax (models from 100 V to less than 500 V)

Dimensions (mm) Model without breaker
16kW type : W433 (445) × H337 (425) × D765 (945)
24kW type : W433 (445) × H470 (555) × D765 (945)
32kW type : W433 (445) × H602 (705) × D765 (945)
40kW type : W433 (445) × H735 (835) × D765 (945)
Model with breaker
16kW type : W433 (445) × H487 (575) × D765 (945)
24kW type : W433 (445) × H620 (705) × D765 (945)
32kW type : W433 (445) × H752 (855) × D765 (945)
40kW type : W433 (445) × H975 (1075) × D765 (945)
Value appearing in () is maximum that includes protruding portion.

Accessories Instruction manual, protective cover, connecting screws

Rear panel (24 kW example) *Protective cover was removed for photograph.



Options

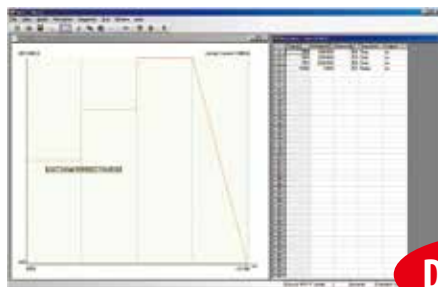
“Wavy” sequence creation software

Wavy series

Wavy for PAT-T

[Operating environment] Windows 2000 / Windows XP / Windows Vista / Windows 7
*For details, please refer to our product catalog and web site.

Software that further enhances PAT-T Series waveform generation and sequence function
You can use the Wavy to create and edit sequences with a mouse.



- Makes it easy to create and edit test condition data required in sequence operations.
- A test condition data file saving function makes it easy to manage standard test conditions.
- Displays the progress of an execution sequence on an “execution graph” with setting values and a cursor.
- A “monitor graph” that plots monitored values during execution makes it possible to observe actual power output intuitively.
- Capable of saving acquired monitor data as test results.
- A “waveform image” window has been newly added. Waveforms of alternating current (AC) signals can be easily monitored.
- Arbitrary waveforms can be easily created and edited. Once created, arbitrary waveforms can be promptly written and output.
- Supports the selection and de-selection of sequence step items. The pause function, trigger function, AC waveform, and other functions can be selected as needed.

Download!

Trial version available on our web !!

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

Options

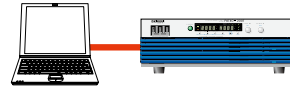
■ Communication interface (factory option) *

GPIB / USB / LAN

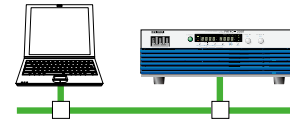
Command supports SCPI in addition to the IEEE 488.2 standard. Also, utilization of a measuring instrument driver (which can be downloaded at our web site) enables controlling with Excel VBA and LabView, and sequence control with "Wavy for PAT-T" sequence creation software is also possible. Furthermore, The LAN interface applies to the LXI(LAN eXtention for Instrumentation). If a LAN interface is used, it is possible to control and monitor the power supply from a browser.

*Only one of these can be built in the power supply unit optionally.

● RS-232C / GPIB / USB



● LAN (Ethernet)



■ Vertical stand

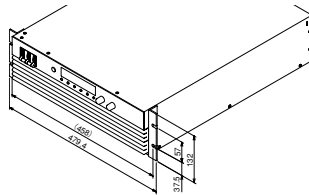
● VS01



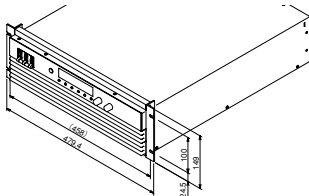
*PAT-T series main unit is not included.

■ Rack mount bracket

● KRB3-TOS (inch size)



● KRB150-TOS (millimeter size)



■ Input power cable

● AC8-4P4M-M6C



(Three-phase, four-conductor, 8 mm², 4 m, M6)

■ Parallel operation cable

● PC01-PAT



(Flat cable: 250 mm)

■ Power switch guard

● OP01-PAT



KIKUSUI ELECTRONICS CORPORATION

1-1-3, Higashiyamata, Tsuzuki-ku, Yokohama, 224-0023, Japan
Phone: (+81) 45-593-7570, Facsimile: (+81) 45-593-7571, www.kikusui.co.jp

KIKUSUI AMERICA, INC. 1-877-876-2807 www.kikusuiamerica.com



2975 Bowers Avenue, Suite 307, Santa Clara, CA 95051
Phone: 408-980-9433 Facsimile: 408-980-9409

KIKUSUI TRADING (SHANGHAI) Co., Ltd. www.kikusui.cn



Room 216, Building 4, No.641, Tianshan Road, Shanghai City, China
Phone: 021-5887-9067 Facsimile: 021-5887-9069

For our local sales distributors and representatives, please refer to "sales network" of our website.

■ Distributor:

■ All products contained in this catalogue are equipment and devices that are premised on use under the supervision of qualified personnel, and are not designed or produced for home-use or use by general consumers. ■ Specifications, design and so forth are subject to change without prior notice to improve the quality. ■ Product names and prices are subject to change and production may be discontinued when necessary. ■ Product names, company names and brand names contained in this catalogue represent the respective registered trade name or trade mark. ■ Colors, textures and so forth of photographs shown in this catalogue may differ from actual products due to a limited fidelity in printing. ■ Although every effort has been made to provide the information as accurate as possible for this catalogue, certain details have unavoidably been omitted due to limitations in space. ■ If you find any misprints or errors in this catalogue, it would be appreciated if you would inform us. ■ Please contact our distributors to confirm specifications, price, accessories or anything that may be unclear when placing an order or concluding a purchasing agreement.