Specifications of PROGRAMMABLE AC POWER SOURCE DP Series

■Power Outputs

Model Name			Single-phase								Single-phase 3-wire				Three-phase	
			DP015S	DP030S	DP045S DP045M	DP060S	DP075S	DP090S DP090M	DP105S	DP120S	DP030D DP045M	DP060D DP090M	DP090D	DP120D	DP045T DP045M	DP090T DP090M
AC Output *1	Output Power *2		1.5kVA	3kVA	4.5kVA	6kVA	7.5kVA	9kVA	10.5kVA	12kVA	3kVA	6kVA	9kVA	12kVA	4.5kVA	9kVA
	Output Type		1P2W								1P3W				3P4W	
			Floating output, it can be used with grouding of Lo terminal.								Floating output, it can be used with grouding of N terminal.					
	Setting Mode		-								Balanced mode, unbalanced mode					
	Rated Output Voltage		100V/200V								Phase voltage：100V/200V					
	Output Range		100V/200V													
	Voltage Setting Range		0.0V to 155.0V/0.0V to 310.0V 0.0Vp-p to 440.0Vp-p/0.0Vp-p to 880.0Vp-p (Arbitrary wave)								Phase voltage setteng (batch setting of whole phase for ballanced mode, individual setting for unballanced mode) 0.0V to 155.0V/0.0V to 310.0V 0.0Vp-p to 440.0Vp-p/0.0Vp-p to 880.0Vp-p (Arbitrary wave) Line to line voltage setting (only for ballanced mode for sine 0.0V to 310.0V/0.0V to 620.0V				0.0V to 268.4V/ 0.0V to 536.8V	
		Resolution	0.1V								Phase votage setting:0.1V, line to line setting:0.2V					
		Accuracy *3	± (1% of set + 0.6V/1.2V)								Phase voltage± (1% of set + 0.6V/1.2V)					
	Max. Current *4 *5		15A/7.5A	30A/15A	45A/22.5A	60A/30A	75A/37.5A	90A/45A	105A/52.5A	120A/60A	15A/7.5A	30A/15A	45A/22.5A	60A/30A	15A/7.5A	30A/15A
	Max. Peak Current *4 *6		4 times value of maximum current.													
	Road Power Factor Range		0 to 1 (lead or lag, at 45Hz to 65Hz)													
	Frequency Setting Range		AC mode 40Hz to 550Hz, AC+DC mode:1Hz to 550Hz													
		Resolution	0.1Hz													
		Accuracy	±0.01% of setting (23℃±5℃)													
	Frequency Stability *7		±0.005%													
	Output Waveform		Sine wave, arbitrary waveform (16 types),clipped sine waveform (3 types)													
	Output ON Phase *8		Variable 0.0deg. to 359.9deg. (resolution 0.1deg.)													
	Output OFF Phase *8		Variable 0.0deg. to 359.9deg. (resolution 0.1deg. Selectable between valid or invalid)													
	Phase Angle Setting Range (unballance mode only)		-								L2:180deg. ±35deg.				L2:120deg.±35deg. L3:240deg.±35deg.	
		Resolution	-								0.1deg.					
	Phase Angle Accuracy *9		-								45Hz to 65Hz:±1.0deg., 40Hz to 550Hz:±2.0deg.					
	DC Offset *10		Within±20mV (typ. ;can be fine-tuned)													
DC Output *11	Output Power *12		1.5kW	3kW	4.5kW	6kW	7.5kW	9kW	10.5kW	12kW	-					
	Type		Floating output, it can be used with grouding of Lo terminal.													
	Rated Output Voltage		100V/200V													
	Voltage Setting Range		-220V to +220V/-440V to +440V													
		Resolution	0.1V													
		Accracy *13	± (1% of setting + 0.6V/1.2V)													
	Max. Current *7		15A/7.5A	30A/15A	45A/22.5A	60A/30A	75A/37.5A	90A/45A	105A/52.5A	120A/60A						
	Max. Insatantaneous Current *15		4 times value of maximum current.													
Output Voltage Stability (phase voltage)			Line reguratin *16 :within ±0.15% Load reguration *17 :within ±0.15V/±0.30V (DC) , within ±0.15V/±0.30V (45Hz to 65Hz) , within ±0.5V/±1.0V (40Hz to 550Hz)													
Output Voltage Distortion Factor			0.5% or less (40Hz to 550Hz, 50% or more of rated outpot voltage, maximum output current or blow, AC mode or AC+DC mode)													

■Power Input

Model Name	Single-phase								Single-phase 3-wire				Three-phase	
	DP015S	DP030S	DP045S	DP060S	DP075S	DP090S	DP105S	DP120S	DP030D	DP060D	DP090D	DP120D	DP045T DP045M	DP090T DP090M
Voltage/Phase *18	AC100V to 230V±10% (Maximum voltage 250V) single-phase													
Frequency	50Hz±2Hz or 60Hz±2Hz													
Power Factor *19	0.95 or more (at AC100V input, typ.) , 0.90 or more (at AC200V input, typ.)													
Efficiency *19	77% or more (at AC200V input, typ.)													
Power Comsumption (Maximum)	2.25kVA	4.5kVA	6.75kVA	9kVA	11.25kVA	13.5kVA	15.8kVA	18kVA	4.5kVA	9kVA	13.5kVA	18kVA	6.8kVA	13.5kVA

■General Informations

Model Name	DP015S	DP030S	DP045S	DP060S	DP075S	DP090S	DP105S	DP120S	DP030D	DP060D	DP090D	DP120D	DP045T DP045M	DP090T DP090M
Withstand Voltage	AC 1500 V or DC 2130 V 1 min.. (Power inputs vs all outputs and chassis in, all power inputs and chassis vs. outputs)													
Insulation Resistance	30 MΩor higher (DC 500 V) , (Power inputs vs all outputs and chassis in, all power inputs and chassis vs. outputs)													
Operating Temperature	0 ℃ to + 50 ℃													
Operating Humidity	5 % to 85 % RH (Absolute humidity 1 to 25 g/m3, no condensation)													
Dimensions (W×H×D) mm	DP015S, DO030S, DP030D: 430×398×562. DP045S, DP045T, DP045M, DP060S, DP060D: 430×665×562.													
	DP075S, DP090S, DP090D, DP090T: 430×1021×562. DP090M, DP105S, DP120S, DP120D: 430×1287×562													
Weight (approx.)	38kg	50kg	69kg	81kg	110kg	125kg	140kg	155kg	50kg	81kg	125kg	155kg	75kg	130kg
Accessories	Instruction manual, Application software, LabVIEW driver (supports LabVIEW version 8.6 or higher), power input cable, clamp core.													
Options	*Refer to Page 7.													

*1: When [V] = Vrms, [A] = Arms, and power input voltage is 200 V, unless otherwise specified.
*2: If power input voltage is 170 V, there are limitations on output power capacity with models of 6 kVA or higher.
*3: For output voltageis 10V to 150V or 20V to 300V, sine wave, unloaded, output freqency is 45Hz to 65Hz, DC voltage setting: 0V, temperature: 23℃± 5℃.
*4: For single-phase 3-wire and three-phase, value is phase current.
*5: If above the rated output voltage, this is limited (reduced) to be at or below the output power capacity. If there is DC superimposition, the RMS current value of AC+DC will be less than maximum current. The maximum output current may be reduced if output frequensy lower than 40Hz or higher than 400Hz or at an ambient temperature is higher than 40℃.
*6: At output frequency is from 45Hz to 65Hz, with the rated output voltage and load is a capacitor input type rectifying circuit (crest factor=4).
*7: At output frequency is from 45Hz to 65Hz, rated output voltage, unloaded or resistive load yielding maximum output current, within operating temperature range.
*8: Set for L1 phase, and the amount of the phase angle setting is added for other phases.
*9: At the output votage is 50V or more, sine wave, and same load conditions and voltage settings for each phases.
*10: For AC mode, 23℃±5℃.
*11: Single-phase models only. [V] =Vdc, [A] = Adc, and power input voltage is 200 V, unless otherwise specified. Reference of polarity is Lo terminal.
*12: If power input voltage is lower than 170V, there are limitations on output power capacity with models of 6 kVA or higher.
*13: At output voltagesetting is from -212V to -10V and +10V to +212V or from -424V to -20V and +20 V to +424V, unloaded, AC setting is 0V, tenperature is 23℃±5℃.
*14: If above the rated output voltage, this is limited (reduced) to be at or below the output power capacity. If there is AC superimposition, the RMS current of AC+DC will be less than maximum output current. The maximum current may be reduced if an ambient temperature is higher than 40℃.
*15: Instantaneous current time is within 2 ms, and at rated output voltage.
*16: Power input voltage is from 90V to 250V for 1.5kVA, 3kVA and 4.5kVA models, from 170V to 250V for 6kVA or higher models, reference at power input votage is 200V, resistive load yielding maximum current, rated output voltage, output is DC or output frequency is from 45Hz to 65Hz.
*17: When output current is changed from 0% to 100% of maximum output current. When output voltage is from 75V to 150V or 150V to300 V at unloaded.
*18: With models of 6 kVA or more, output capacity is limited to 4.5 kVA(W) if input voltage is less than AC170V.
*19: For AC-INT, rated output voltage, resistive load yielding maximum current, and output frequency is between 45Hz to 65Hz.

■Measurement Function

Model Nane	Singel-Phase		DP015S	DP030S	DP045S	DP060S	DP075S	DP090S	DP105S	DP120S
	Singel-phase 3-wire		DP030D	DP060D	DP090D	DP120D	-	-	-	-
	Three-phase		DP045T	DP090T	-	-	-	-	-	-
	Multi-phase		DP045M	DP090M	DP045M	-	-	DP090M	-	-
Display		Normal Mode	Displays almost all measurement value and setting (exept harmonic current value)							
		Simple Mode	Displays three measurement value (exept harmonic current value) enlarged.							
Voltage *20	RMS Value (rms)	Full scale	Phase voltage:250V/500V , Line to line voltage:500V/1000V(single-phase 3-wire), 433V/866V(three-phase)							
		Resolution	0.1V							
	DC Average (avg) (only single phase)	Full scale	±250V/±500V							
		Resolution	0.1V							
	Peak Value (pk)	Full scale	±250V/±500V							
		Resolution	0.1V							
Current *21	RMS (rms)	Full scale	20A/10A	40A/20A	60A/30A	80A/40A	100A/50A	120A/60A	140A/70A	160A/80A
		Resolution	0.01A							
	DC Average (avg)	Full scale	±20A/±10A	±40A/±20A	±60A/±30A	±80A/±40A	±100A/±50A	±120A/±60A	±140A/±70A	±160A/±80A
		Resolution	0.01A							
	Peak Value (pk) Max/min Individial Display	Full scale	±80A/±40A	±160A/±80A	±240A/±120A	±320A/±160A	±400A/±200A	±480A/±240A	±560A/±280A	±640A/±320A
		Resolution	0.01A							
		Hold	Hold the absolute value of maximum current and the absolute value of minimum current with polarity.							
Power *22	Effective (W) *23	Full scale	1800W	3600W	5400W	7200W	9000W	10800W	12600W	14400W
		Resolution	0.1W/1W							
	Apparent (VA) *24	Full scale	2250VA	4500VA	6750VA	9000VA	11250VA	13500VA	15750VA	18000VA
		Resolution	0.1VA/1VA							
	Reactive (var) (OP) *24 *25	Full scale	2250var	4500var	6750var	9000var	11250var	13500var	15750var	18000var
		Resolution	0.1var/1var							
Load Power Faxtor (OP) *24		Range	0.00 to 1.00							
		Resolution	0.01							
Load Crest Factor (OP)		Range	0.00 to 50.00							
		Resolution	0.01							
Synchronizing Frequency		Range	38.0Hz to 525.0Hz							
		Resolution	0.1Hz							
Harmonic Current (OP) *26		Range	Up to 40th order.							
		Full scale (rms)	20A/10A	40A/20A	60A/30A	80A/40A	100A/50A	120A/60A	140A/70A	160A/80A
		Full scale (%)	100%							
		Resolution	0.01A or 0.1%							
CO2 Emissions Display		Contents	Instantaneous (kg CO_2/h) or cumulative (t CO_2) value for amount of internal loss or output power. CO_2 emissions coefficientt (CO2/kWh): variable (resolution: 0.000001)							

*20: For phase voltage for polyphase model and polyphase output of multi-phase type.
*21:Phase current. When output current is 5% to 100% of maximum output current.
For phase current for polyphase model and polyphase output of multi-phase type.
*22: With sine wave, output voltage 50 V or more, and output current of 10% ore more of maximum current.
For each phase with polyphase model and polyphase output of multi-phase type.
Can display total for all phases with polyphase model and polyphase output of multi-phase type.
*23: With load of power factor 1.
*24: Excluding DC mode.
*25: With load of power factor 0.5 or more.
*26: AC-INT mode, fundamental is 50 Hz or 60 Hz only, for phase current.
This measurement method does not conform to IEC standards.

■Current Limiter

Model Name	Singel Phase		DP015S	DP030S	DP045S	DP060S	DP075S	DP090S	DP105S	DP120S
	Singel-phase 3-wire		DP030D	DP060D	DP090D	DP120D	-	-	-	-
	Three-phase		DP045T	DP090T	-	-	-	-	-	-
	Multi-phase ＊		DP045M	DP090M	DP045M	-	-	DP090M	-	-
Limit Operations			Selectable whether to automatic recovery (output will be continue, this is defort setting.) or output turn off when the limit state has continued for the designated time (designation range 1 s to 10 s, resolution 1 s)							
Setting Range (Peak)		Positive	+ (50 % to 420% of maximum output current for each output voltage ranges.)							
		Negative	- (420 % to 50% of maximum output current for each output voltage ranges.)							
		Resolution	0.1A							
Setting Range (RMS)			5 % of maximum AC output current to 105% of maximum output current for each output voltage ranges.							
		Resolution	0.1A							

■Sequence Function (OP)

Number of Memoris	5 (nonvolatile)
Number of steps	255 max. (for 1 sequence)
Step time setting range	0.0010s to 999.9999s
Operation within step	Constant, keep, linear sweep.
Parameters	Output range, mode of AC or DC, ACV (phase voltage), frequency, waveform, DCV, start phase, stop phase, phase angle, step Term., jump count (1 to 9999 or ∞), jum-to, step coad (2 bit), branch 1, branch 2, trigger output.
Sequence Control	Start, stop, hold, resume, branch 1, branch 2
Others	1) Sequence function works with AC-INT, AC+DC-INT and DC-INT. 2) AC voltage, frequency, waveform, start phase and stop phase cannot be set with DC-INT. 3) Phase angle setting is only for the polyphase model and polyphase output of the multi-phase model. 4)Also, the start phase and stpo phase are set for L1 phase.

■AC Line Simulation (OP)

Number of Memoris	5 (nonvolatile) .
Number of steps	6 (initial, normal 1, transition 1, abnormality, transition 2, normal 2).
Step time setting range	0.0010s～999.9999s (0 s can be set for transition steps only).
Parameters	Output range, AC voltage, frequency, waveform (sine wave only), start phase (excluding transition steps), steop phase
Simulation Control	Start, stop.
Others	In AC line simulation function, only AC and sine wave, fixed for AC+DC-INT.

■Control Software

Functions	Remote Control	Parameter setting, saving, loading, and others.
	Status Monitor	Monitors and displays status of connected equipment.
	Logging	Reads and saves measurement values
	Arbitrary waveform	Waveform creation, waveform edit, transfer, display and file operations
	Sequence	Sequence data creation, edit, save, transfer, preview, execution control, monitor/display during execution, and others.
	AC Line simulatin	
Operating Environment	CPU	300 MHz min. (1 GHz min. recommended)
	Memory	256 MB min. (512 MB min. recommended)
	Free space on hard disk	50MB min.
	Display	Can display 1024 x 768 pixels or more, and 256 colors or more
	OS	Windows 2000/XP/Vista (made by Microsoft)
	Disk drive	CD-ROM dorive
	Interface	USB1.1or higher

■ Another Functions

Setting Limitation	Voltage (RMS)	Phase voltage, line to line voltage (single-phase 3-wire, three-phase 4-wire)
	Frequency	Upper limit or lower limit.
Remorte Sensing（OP）		Voltage detection point is output terminal or sensing input terminal. (switchable)
AGC		Function for continuously performing automatic correction so that the detection point RMS value may become equal to the voltage setting value. Response time less than 100 ms (typ.) (At DC/50 Hz/60 Hz, rated output voltage)
Auto Cal.		When AUTO CAL key was pushed, the output voltage is automatically corrected so that the detection point RMS value may become equal to the voltage setting value.
Clipped sine wave	Number of memories	Number of memories: 3 (nonvolatile)
	CF	Variable range: 1.10 to 1.41; setting resolution: 0.01; RMS value correction: yes
	Clipping rate	Variable range 40.0% to 100.0%; setting resolution: 0.1%; RMS value correction: no
Arbitrary wave	Number of memories	16 (nonvolatile)
	Waveform length	4096 words
	Waveform data	16-bit binary (two's complement)
External signal input	External sync input	Sync signal source switching: external sync signal (EXT) or power supply input (LINE)
	VCA input	Gain setting range: 0.0 to 220.0 times/0.0 to 440.0 times. Setting resolution: 0.1
	External signal input	Input frequency range: DC to 550 Hz (sine wave), DC to 100 Hz (not sine wave).
Memory Function		Store and recall settings from nonvolatile memory
	Number of memories	Basic settings: 30; sequences: 5; AC line simulations: 5; clipped sine waves: 3; arbitrary waves: 16
Protections		Protective operation for output abnormality (output overvoltage, output overcurrent, etc.), power unit abnormality, and internal control abnormality (internal communication abnormality, etc.)
External control I/O		Enables control of the system using external signals (or no-voltage contacts) and state output.
Interface		USB interface［USB1.1, USBTMC］ RS-232 interface (not capable of binary transfer) GPIB interface (IEEE 488.1 std 1987) (OP) (not capable of binary transfer or serial polling)
USB Memory		Usable memory: conforms to USB 1.1 or USB 2.0. Connector: USB-A (front panel) Readable/writable content: basic setting memory, sequences, AC line simulation, arbitrary waves.
Output relay control		Selects either ON/OFF using output relay, or high-impedance without using output relay.
Output waveform monitor		Monitors waveform of output voltage or output current. (switchable)
LCD Display		5.7 inch, contrast 0 to 99, blue or white base color.
Others		Beep sound, keylock, output setting when power is on trigger output setting, time unit setting, reset function.