

PROGRAMMABLE DC POWER SUPPLY (SOLAR ARRAY SIMULATION) MODEL 62000H-S SERIES

The latest programmable solar array simulator power supply 62000H-S Series released by Chroma provide simulation of Voc (open circuit voltage) up to 1000V and lsc (short circuit current) up to 25A. The 62000H-S provides an industry leading power density in a small 3U high package. The solar array simulator is highly stable and has a fast transient response design, which are both advantageos to MPPT performance evaluation on PV inverter devices.

The 62000H-S Series have many unique advantages including high speed & precision digitizing measurement circuits with a 100kHz A/D, 25kHz D/A controlled I-V curve and a digital filter mechanism. It can simulate an I-V curve accurately and response the mains ripple effect from the PV inverter. In addition, the built-in EN50530/Sandia SAS I-V model in the standalone unit can easily program the Voc, Isc, Vmp, and Imp parameters for I-V curve simulation, without a PC controller.

The real solar array is influenced by various weather conditions such as irradiation, temperature, rain and shade by trees or clouds, which will affect the I-V curve output. The 62000H-S Series are capable of storing up to 100 I-V curves into the simulator memory, with a programmed time interval range of 1-15,000 seconds. It can simulate the I-V curve from the early morning to nightfall for PV inverter testing or dynamic I-V curve transient testing. The 62000H-S Series have a built-in 16 bit digital control and precision voltage & current measurement circuits with a voltage accuracy of 0.05% + 0.05% F.S. and a current accuracy of 0.1% + 0.1% F.S.. It is ideal for real time MPPT analysis and tracking monitoring for PV inverters through our softpanel. The user can also enable the data recording function on the softpanel during the static MPPT performance test.

When high power solar array simulation is required, it is common to connect two or more power modules in parallel. The 62000H-S Series with a current range up to 25A and a voltage range up to 1000V offers a high power density envelope maximum of 15kW in a 3U package. It can easily parallel up to ten units in a Master/Slave configuration to provide 150kW with current sharing and synchronized control signals for commercial utility PV inverter (10kW ~100kW) testing. The 62000H-S Series supplies have a smart Master/Slave control mode that makes the parallel operation fast and simple. In this mode, the master scales values and downloads data to slave units so that the programming is as simple as using a standalone unit.

The 62000H-S Series DC power supplies are very easy to operate from the front panel keypad or from the remote controller via USB/RS232/RS485/ APG (standard) and GPIB & Ethernet (optional). Its compact size (3U) makes it ideal for both benchtop and standard racking.



Programmable DC Power Supply (Solar Array Simulation)

MODEL 62000H-S Series

Key Features :

- Voltage range : 0 ~150V/600V/1000V/1500V
- AC input voltage range : 200/220Vac, 380/400Vac , 440/480Vac
- 3U/15kW high power density module with easy master/slave parallel operation up to 1.5MW
- Fast transient response solar array simulation
- Simulation of multiple solar cell material's
- I-V characteristic (fill factor)
- Simulation of dynamic irradiation intensity and temperature level from clear day to cloud cover conditions
- Shadowed I-V curve output simulation (up to 4096 data points)
- Low leakage current (< 3mA)
- Precision V & I measurements
- Auto I-V program: 100 I-V curves & Dwell time 1-15,000s
- Static & dynamic MPPT efficiency test (accumulated energy methods)
- Data recorded via softpanel
- Standard USB / RS232 / RS485 interface
 - Optional GPIB / Ethernet interface
 - Real time analysis of PV invertes' MPPT tracking via softpanel
 - Optional graphic user interface softpanel for operation
 - Real world weather simulation fast I-V curve update rate : 1s
 - Support up to ten-channel SAS control for multi-MPPT testing
 - Build-in dynamic MPPT test profile of EN50530, Sandia, CGC/GF004 and NB/T 32004



Chroma

SOLAR ARRAY I-V CURVE SIMULATION POWER SUPPLY

The Model 62000H-S Series have a built-in EN50530 and Sandia's SAS model that can easily program the Voc. Isc. Vmp. Imp parameters to simulate different solar cell materials I-V characteristic outputs with fast response time. Moreover, the TABLE mode is capable of saving a 128~4096 point array of user programmed voltages and currents via a remote interface. It can easily create a shadowed I-V curve and the I-V PROGRAM mode can save up to 100 I-V curves and dwell time intervals (1-15,000s) in memory. These advantages provide steady repetitive control conditions required for PV Inverter design as well as for verification testing. The solar array simulator is ideal for the following testing:

- Design and verify the maximum power tracking circuit and algorithm of the PV inverter
- Verify the high/low limit of operating input voltage allowed for the PV inverter
- Verify the high/low limit of operating input voltage allowed for the invertes' maximum power point
- Verify the static maximum power point tracking efficiency of the PV inverter.
- Measure and verify the overall efficiency & conversion efficiency of PV inverter *





Solar Array Simulator



- Verify the maximum power point tracking performance of the inverter for dynamic curves. (EN50530, Sandia, CGC/GF004, NB/T 32004 standard)
- Verify the maximum power point tracking performance of the inverter under different time period conditions spanning from morning to nightfall
- Verify the maximum power point tracking mechanism of the inverter for the I-V curve when the solar array is shaded by clouds or trees
- Simulate the I-V curve under the actual environmental temperatures within burn-in room to do inverter burn-in testing *Requires an extra power meter.



SAS Mode					
Isc Imp	Vmp Voc				

Point 5 6 128 1 2 3 4 120 150 Voltage(V) 0 30 60 90 180 600 Current(A) 11 10 9 0 8 7 6 5

SOLAR ARRAY I-V CURVE SIMULATION SOFTPANEL



Solar Array Simulation Softpanel





Standard Crystalline Array

High-efficiency Crystalline

The model 62000H-S Series include a graphical user Interface software through remote digital interface (USB / GPIB / Ethernet / RS232) control. The user can easily program the I-V curve of the 62000H-S Series as well as the I-V & P-V curves for real-time testing. In addition it will display the MPPT status for the PV inverter. Readings and the report function with real-time monitoring using the softpanel are shown left.

SIMULATES DIFFERENT SOLAR CELL MATERIALS I-V CHARACTERISTIC (FILL FACTOR)

The purpose of the PV inverter is to convert the dc voltage (from solar array) to the ac power (utility). The better a PV inverter can adapt to the various irradiation & temperature conditions of sun, the more power that can be fed into the utility grid over time. So, the MPPT performance is a very important factor for PV generation system. The model 62000H-S Series are capable of simulating different types of standard crystalline, multi-crystalline and thin-film fill factor* parameters to verify the MPPT tracking algorithm mechanism and efficiency.

*Fill Factor = (Imp*Vmp)/(Isc*Voc)

Thin-Film

STATIC MPPT EFFICIENCY TESTING

The 62150H-600S DC power supply with solar array simulation can program the I-V curve through SAS mode and table mode via front panel or softpanel easily and up to 100 I-V curves can be stored in the unit. The user can recall the I-V curve from 62150H-600S afterwards for testing and monitoring the MPPT performance of PV inverter with the real-time tracking feature. The softpanel allows the user to set the duration for static MPPT efficiency testing. Each curve test time should be set at between 60s-600s for best MPPT efficiency performance analysis.



DYNAMIC MPPT EFFICIENCY TESTING

The latest test standards EN50530, CGC/GF004 & Sandia have provided a procedure for testing patterns of the dynamic MPPT efficiency of inverters, those standards can accelerate the MPP tracking algorithm mechanism to the optimal for PV inverter manufactures. The advanced Dynamic MPPT Test function complies with EN50530, CGC/GF004, Sandia test regulations and can be controlled via the graphical softpanel by selecting CGC/GF004 or Sandia or EN50530 I-V mathematical expressions and test items. This function simulates the irradiation intensity and temperature change of the I-V curve under actual weather variations to test the PV inverter's dynamic MPPT performance. The GUI will calculate the MPPT performance for analysis after running the test. A test data recording function is integrated into the software where users can edit and control the test parameters to be recorded such as voltage, current, power, watt and MPPT performance along with the sampling interval (1 - 10,000s) and total time length to facilitate the analysis and validation of the PV inverter.





SHADOW I-V CURVE SIMULATION

It has easy-to-use software to simulate the shadowed I-V curve and its dynamic change as the figure shown aside. The user can select the PV Module from the database or create individual PV module parameters for storage; and then set the amount of PV string to form a PV Array in series or parallel. Next, the user can set the irradiation, temperature, moving direction and time of dynamic shadowed change for PV Module that can simulate the cloud cover change or make Shadow I-V curve simulation for other shadow such as under the trees or the buildings. Each I-V curve is formed with maximum 4096 data points of voltage and current.



EVALUATING THE PV INVERTER'S CONVERSION EFFICIENCY *

The photovoltaic I-V curve model of Sandia Lab and EN50530's built in the softpanel allows the user to input the maximum dc input power (Pmax), I-V Fill Factor, Vmin, Vnom and Vmax desired to test the PV Inverter. Click the maximum power percentage value (5%, 10%, 20%, 25%, 30%, 50%, 75%, 100%) desired directly and , the softpanel will produce the tested solar cell I-V curve automatically. Next, download it to the standalone unit to start simulating the I-V curve for the PV Inverter to test the conversion efficiency. *Required an extra power meter.



REAL WORLD WEATHER SIMULATION

The real world weather simulation function allows the user to import real conditions of irradiation and temperature profiles of a whole day from excel file to Softpanel, in order to simulate the irradiation intensity and temperature level from early morning to nightfall. It can also set the interval time resolution to 1s for I-V curve update rate and enable the user to perform MPPT tracking tests under the simulation of actual weather environments.



AUTO RUN FUNCTION OF STATIC & DYNAMIC MPPT TESTING

In order to easily test the static & dynamic MPPT performance of standard EN50530 & Sandia for PV inverter, the SoftPanel has an auto run function, which the user only has to set the Vmin, Vnom, Vmax, Pmax, Stabilization time & Testing period time parameter and testing items of EN50530 & Sandia, then the softpanel can run tests automatically and generate reports after finished.

EN50530 Dynamic MPPT Efficiency Test Report (30%~100%)							
From-to W/m²	Delta W/m²		Pmp Value (W)	Vnom (V)	c-Si technology	Waiting time setting (S)	
300-1000	700		2000.00	350.00		300	
#number	Slope W/m ²	Ramp UP (S)	Dwell time (S)	Ramp DN (S)	Dwell time (S)	Duration (S)	MPPT Efficiency (%)
10	10.0	70	10	70	10	1900	99.89
10	14.0	50	10	50	10	1500	99.90
10	20.0	35	10	35	10	1200	99.87
10	30.0	23	10	23	10	967	99.84
10	50.0	14	10	14	10	780	99.86
10	100.0	7	10	7	10	640	99.71
			· · · · · · · · · · · · · · · · · · ·		Total	6987 s	99.84
						01 : 56 : 27 h	

taonization tin	ne (5) () 300	1	Testing period time (5)	1
nable		Test Item		
EN50530-	Static MPPT Effe	ciency (c-Si)		
EN50530-	Static MPPT Effic	ciency (TF)		
Sandia-St	atic MPPT Efficie	ency (TF)		
Sandia-St	atic MPPT Efficie	ency (c-Si)		
Sandia-St	atic MPPT Efficie	ency (High-efficiency c-5	5i)	-
EN50530-	Dynamic MPPT 8	Efficiency 10%-50% Pd	ion (c-Si)	
EN50530-	Dynamic MPPT 8	Efficiency 30%-100% P	idon (c-Si)	
EN50530-	Dynamic MPPT 8	Efficiency 1%-10% Pdc	n (c-Si)	
EN50530-	Dynamic MPPT 8	Efficiency 10%-50% Pd	ion (TF)	
EN50530-	Dynamic MPPT 8	Efficiency 30%-100% P	don (TF)	
EN50530-	Dynamic MPPT 8	Efficiency 1%-10% Pdc	n (TF)	
Sandia-D	marnic MPPT Eff	ficiency 0%-100% Slow	Ramp (TF)	
Sandia-D	namic MPPT Eff	ficiency 10%-80% Fast	Ramp (TF)	
Sandia-D	namic MPPT Eff	ficiency 10%-80% Trian	gle Ramp (TF)	
Sandia-D	namic MPPT Eff	ficiency 0%-100% Slow	Ramp (c-Si)	
Sandia-D	marnic MPPT Eff	ficiency 10%-80% Fast	Ramp (c-Si)	
Sandia-D	marnic MPPT Eff	ficiency 10%-80% Trian	gle Ramp (c-Si)	
Sandia-D	marnic MPPT Eff	ficiency 0%-100% Slow	Ramp (High-efficiency c-Si)	
Sandia-D	namic MPPT Eff	ficiency 10%-80% Fast	Ramp (High-efficiency c-Si)	
Sandia-D	marnic MPPT Eff	ficiency 10%-80% Trian	gle Ramp (High-efficiency c-Si) 🔻

EN50530 Static MPPT Efficiency Test Report									
MPPT voltage of the simulated I/U Simulated I/U Pmp Value(W)=1000.00									
characteristic of the PV generator	characteristic	0.050	0.100	0.200	0.250	0.300	0.500	0.750	1.000
Umin = 200.0	c-Si	99.510	98.703	99.589	99.728	99.533	99.868	99.930	99.908
Unom = 300.0	c-Si	99.478	99.609	99.661	99.702	99.791	99.896	99.837	99.848
Umax = 400.0	c-Si	99.452	99.040	99.701	99.036	99.779	99.751	99.908	99.936

REPORT FUNCTION

The softpanel also provides data recording capabilities, which include: voltage, current, power, energy and MPPT efficiency and the corresponding parameter sampling time (1s~10000s) for the recording process. The report can be utilized for R&D design characterization verification, QA verification and production quality control.

Report Path & File Name		Browse	
Parameter	s Selection ;	Timing Control	
IP Penp(H) IP Penerage(W) IP Venp(Y) IP Venp(Y) IP Venp(Y) IP texterage(V) IP texterage(A) IP texterage(A)	APPT Ettoency(%) APP Test State V Run State V Run State T v neasure(V) I neasure(A) P neasure(M)	To be Hervel(Sec) Record Total Tree 01 0 (0-1000 peak (0-000 peak	Peccer 2

MASTER / SLAVE PARALLEL OPERATION UP TO 150KW

When high power is required, it is common to connect two or more power supplies in parallel. The 62000H-S series supplies have a smart master / slave control mode making the parallel operation fast and simple. In this mode, the master scales values and downloads data to slave units with a high speed sync signal process and automatic current sharing control.





Model 62150H-600S/1000S 600V/1000V/15kW



Model A620027/A620028 Slave Unit 600V/1000V/15kW



CUSTOMIZATION SOLAR ARRAY SIMULATOR UP TO 1500KW



CUSTOMIZATION SOLAR ARRAY SIMULATOR 1500V/60A/90KW



When high voltage 1500V is required, the customized solar array simulator system of 1500V/60A/90kW which can provide the I-V curve simulation for PV Inverter testing, please contact with Chroma sales representative for detailed information.

1500V/60A/90kW output Solar Array Simulator

PANEL DESCRIPTION



- 1. POWER Switch
- 2. VFD Display
- Display setting, readings and operating status
 3. LOCK Key
- Lock all settings **4. OUTPUT Key**
- Enable or disable the output
- 5. CONFIG Key Set the system configuration
- 6. VOLTAGE Key Set the output voltage
- 7. CURRENT Key Set the output current
- 8. PROG Key Program the sequence
- 9. NUMERIC Key

ORDERING INFORMATION

- Set the data
- **10.ROTARY Key**

Adjust the V&I and set the parameter

11. Analog programming interface

For analog level to program and monitor output voltage & current

- 12. RS-232 or RS-485 Interface (alternative)
- 13. System Bus
- For master/slave parallel and series control **14. USB Interface**
- 15. OUTPUT Terminal
 - Connect the output cable to a UUT
- **16. System Fan** With fan speed control
- **17. Current Sharing Terminal** Connect the cable to slave unit
- **18. Sense Terminal** Connect the UUT for voltage compensation
- 19. GPIB or ETHERNET Interface (optional)
- 20. AC Input Terminal

Power Rating	62000H-S Series Programmable DC Power Supply
2kW	62020H-150S : Programmable DC Power Supply 150V/40A/2kW with Solar Array Simulation
5kW	62050H-600S : Programmable DC Power Supply 600V/8.5A/5kW with Solar Array Simulation
10kW	62100H-600S : Programmable DC Power Supply 600V/17A/10kW with Solar Array Simulation
1 E L/M	62150H-600S : Programmable DC Power Supply 600V/25A/15kW with Solar Array Simulation
IJKW	62150H-1000S : Programmable DC Power Supply 1000V/15A/15kW with Solar Array Simulation
	A620024 : GPIB Interface for 62000H series (Factory installed)
	A620025 : Ethernet Interface for 62000H series (Factory installed)
	A620026 : Rack Mounting kit for 62000H series
	A620027 : Parallelable Power Stage 15kW for 62150H-600S
Options	A620028 : Parallelable Power Stage 15kW for 62150H-1000S
	A620029 : Control and Supervisor Unit for 150kW~1.5MW
	A620030 : 19" Rack (41U) for 62000H-S Series (380Vac input)
	B620000 : 19" Rack Mounting Kit 2U for 62020H-150S

Note *1: Call for more information regarding the customized solar array simulator of 150kW~1.5MW.

Note *2: All models output power are available for 200/220Vac, 380/400Vac and 440/480Vac line voltage.





Model 62020H-150S

A620027/A620028

ELECTRICAL SPECIFICATIONS-WITH SOLAR ARRAY SIMULATION

MODEL										
MODEL	62020H-150S	62050H-600S	62100H-600S	62150H-600S	62150H-1000S					
Output Ratings										
Output Voltage	0-150V	0-600V	0-600V	0-600V	0-1000V					
Output Current	0-40A	0-8.5A	0-17A	0-25A	0-15A					
Output Power	2000W	5000W	10000W	15000W	15000W					
Line Regulation										
Voltage			+/- 0.01% F.S.							
Current			+/- 0.05% F.S.							
Load Regulation										
Voltage	+/- 0.05% F.S.									
Current	+/- 0.1% F.S.									
Voltage Measurement										
Range	60V / 150V	120V / 600V	120V / 600V	120V / 600V	200V / 1000V					
Accuracy		0.05% + 0.05%F.S.								
Current Measurement										
Range	16A / 40A	3.4A / 8.5A	6.8A / 17A	10A / 25A	6A / 15A					
Accuracy			0.1% + 0.1%F.S.							
Output Noise&Ripple										
Voltage Noise(P-P)	450 mV	1500 mV	1500 mV	1500 mV	2550 mV					
Voltage Ripple(rms)	65 mV	650 mV	650 mV	650 mV	1950 mV					
Current Ripple(rms)	80 mA	150 mA	300 mA	450 mA	270mA					
OVP Adjustment Range										
Bange		0-110% programm	nable from front panel, rem	note digital inputs						
Accuracy		e nevo program	\pm /- 1% of full-scale output	iote algital inputs.						
Programming Response T	ime									
Pice Time: 50%ES (Cload	10ms (6.66A loading)	30mc	30mc	30mc	25mc					
Rise Time: No Load	10mc	20mc	20ms	20mc	251115					
Fall Times 50% ES. CC Load	10ms (6.66 A loading)	20mc	30mc	20mc	251115					
Fall Time: 10%F.S. CC Load	10ms (0.00A loading)	100mm	201115	100mm	201115					
Fall Time: 10%F.S. CC LOad	83ms (1.33A loading)	1.2-	1.2-	1.2-	80ms					
Fail Time: No Load	300ms	1.25	1.25	1.25	55					
Slew Rate Control	0.004)// 4.5)//	0.001)// 201//	0.004)// 20)//	0.0011// 201//	0.004)// 40)//					
Voltage Slew Rate Range	0.001V/ms - 15V/ms	0.001V/ms - 20V/ms	0.001V/ms - 20V/ms	0.001V/ms - 20V/ms	0.001V/ms - 40V/ms					
Current Slew Rate Range	0.001A/ms - 1A/ms,	0.001A/ms - 0.1A/ms,	0.001A/ms - 0.1A/ms,	0.001A/ms - 0.1A/ms,	0.001A/ms - 0.1A/ms,					
	or INF	or INF	or INF	or INF	or INF					
Minimum Transition Time			0.5ms							
Transient response time	Recovers within	1ms to +/- 0.75% of stead	y-state output for a 50% to	100% or 100% to 50% load	d change(1A/us)					
Efficiency	0.77(Typical)		0.87(T	ypical)						
Programming & Measure	ment Resolution									
Voltage (Front Panel)	10 mV	10 mV	10 mV	10 mV	100mV					
Current (Front Panel)	1mA	1mA	1mA	1mA	1mA					
Voltage (Digital Interface)			0.002% of Vmax							
Current (Digital Interface)			0.002% of Imax							
Voltage (Analog Interface)			0.04% of Vmax							
Current (Analog Interface)			0.04% of Imax							
Programming Accuracy										
Voltage (Front Panel and			0.10/ - 61/							
Digital Interface)	0.1% of Vmax									
Current (Front Panel and			0.20/ (1							
Digital Interface)			0.3% of Imax							
Voltage (Analog Interface)			0.2% of Vmax							
Current (Analog Interface)			0.3% of Imax							
Parallel Operation*2		Master / Slave control via	CAN for 10 units up to 150	kW. *1 (Parallel: ten units)						
Auto Sequencing (I-V pro	gram)									
Number of program			10							
Number of sequence			100							
Dwell time Range			15 - 15 0005							
			Manual / Auto							
ing. Jource	Manual / Auto									

All specifications are subject to change without notice. Please visit our website for the most up to date specifications.

Note*1 : Max. Power is 20kW for 62020H-150S.

Note*2: There is parallel mode for DC power supply when the I-V curve function is enabled.

GENERAL SPECIFICATIONS

Ramola programming Standard Standard USB Standard Standard S5232 Standard Standard S5245 Standard Standard S5245 Standard for master/slave control GPIB GPIB Optional Standard for master/slave control GPIB control System busiCAN Under GPIB send command to DC source receiver <20ms Measure V2 Weasure V3 Under GPIB send command to DC source receiver <20ms Measure V3 Vottage and Current Programming Inputs (//P) -0104c/ 0-5V4c/ 4-20mA of F.S. Standard for Master/slave control Vottage and Current Programming Inputs (//P) Clovel by user define. (Time delay = 1 mis at voltage slew rate of 10V/ms.) TTL Active Low or High/Slective) Optional Source IDP Indicator (/O/P) TTL Active Low or High/Slective) CV or Conde Indicator (/O/P) TTL Active Low Source IDP Indicator (/O/P) TTL Active Low Standard for Master Jave Low Slew PhiloP INTL Active Low Source IDP Indicator (/O/P) TTL Active Low Stard Valage Source IDP Indicator (/O/P) TTL Active Low Stard Valage Source Indicator (/O/P)	MODEL		62020H-150S	62050H-600S	62100H-600S	62150H-600S	62150H-1000S			
Analog programming Standard US8 Standard US8 Standard S232 Standard R5485 Optional GPI8 Optional Ethernet Optional System bus(CAN) GPI8 send command to DC source receiver <20ms	Remote Interface									
USB Standard Standar	Analog programming				Standard					
BS232 Standard RS485 Standard GPIB Optional Coptional Optional GPIB Command Response Time Optional Vota setting GPIB send command to DC source receiver <20ms	USB		Standard							
PS485 Standard Standard GPIB Optional Optional System busi(CAN) Standard for master/slave control Standard for master/slave control GPIB Command Response True GPIB Seminard for master/slave control Standard for master/slave control Measure V8I GPIB Seminard for master/slave control Control Measure V8I GPIB Seminard for master/slave control Standard for master/slave control Measure V8I Under GPIB Seminard for master/slave control Standard for master/slave control Votage and Current Programming Inputs (I/P) 0-10Vdc / 0-SVdc / 0-SVdc / 4-20m Aof FS. Standard for master/slave control C/O N Signal (O/P) Control TTL Active Low or HighSelective Control C/O N Signal (O/P) TTL Level High-CV mode ; TTL Level Low CC mode Control System fault Indicator (O/P) TTL Active Low TTL Active Low Audilary power supply(O) Nominal supply voitage : 12Vdc / Maximum control is k capability: 10m A Matio for forgram TTL Active Low TTL Active Low Number of program TTL Active Low TTL: Active Low Number of sequence 100 Sop	RS232			Standard						
GPIB Optional CAN Standard for master/slave control GPIB Command Response Time GPIB Command Response Time GPIB Command Response Time GPIB Command Response Time GPIB Command Ling Measure <25ms Analog Interface (I/O)* Voltage and Current Programming Inputs (I/P) O-10Vdc / 0-5Vdc / 0.5Vdc / 0.	RS485			Standard						
Ethernet Optional System busi(CAN) Standard for master/slave control GPIB Command Response Time GPIB send command to DC source receiver <20ms	GPIB				Optional					
Standard for master/slave control GPIB send command to DC source receiver <20ms GPIB send command to DC source receiver <20ms Masure V&BI Coll Colspan="2">Coll Colspan="2">Colspan="2"Colspan="2"Colspan="2">Colspan="2"Colspan="2"Colspan="2"Colspan="	Ethernet			Optional						
GPIB Command Response Time Volt setting GPIB send command to DC source receiver <20ms Measure V8I Volt setting Volt setting Volt setting Voltage and Current Monitor output (0/P) O-10Vdc / 0-SVdc / 0-SVdc / 4-20m A of F.S. Voltage and Current monitor output (0/P) CON Signal (Stept Medica) = 1 ms at voltage selverate of 10V/ms.) CV or Conde Indicator (0/P) TTL Active Low or High/Selective) OC mode Indicator (0/P) TTL: Level High=CV mode : TTL Level Low= CC mode OTP Indicator (0/P) TTL: Level High=CV mode : TTL Level Low Auxiliary power supply(0/P) Nominal supply voltage : 12Vdc / Maximum current sink capability: 10m A Safety inter/ock(I/P) TTL: Active Low Aux Sequencing (List Mode) Number of program 10 Number of program 10 Number of program 10 Sams : 150005 Sams	System bus(CAN)			Standar	d for master/slave cor	ntrol				
GPIB send command to DC source receiver <20ms Under GPIB command using Massure <25ms Malag interface (I/O) * Voltage and Current Programming Inputs (I/P) O-10Vdc / 0-SVdc /	GPIB Command Response T	ime								
Measure V8I Under GPIB command using Measure <25ms Analg Interface (I/O)* Under GPIB command using Measure <25ms Voltage and Current Programming Inputs (I/P) 0-10Vdc / 0-5Vdc / 0-5k ohm / 4-20 m A of F.S. Voltage and Current monitor output (O/P) 0-10Vdc / 0-5Vdc / 0-5k ohm / 4-20 m A of F.S. External ON/OFF (I/P) TLL Active Low or High(Selective) OC_ON Signal (O/P) Level by user define. (Time delay = 1 ms at voltage slew rate of 10V/ms.) CV or CC mode Indicator (O/P) TTL Level High=/CV mode; TTL Level Low = CC mode OTP Indicator (O/P) Nominal supply voltage : 12Vdc / Maximum current sink capability: 10mA Safety interlock(I/P) TTL: Active Low Auto Sequencing(List Mode) TTL: Active Low Number of program 10 Number of sequence 100 Durel time Range 0 to Full scale End voltage 0 to Full scale End voltage 0 to Full scale End voltage 3Phase, 3Wire+Ground 102 200-220Vac 302 200-220Vac ± 10% Vi, 30 3080-400Vac ± 10% Vi, 440/480Vac 30 4404-480Vac ± 10% Vi, 400Vac Act Input Volatage 3Phase, 3Wire+Ground	Vout setting		GPIB send command to DC source receiver <20ms							
Analog Interface (I/O)* 0-10Vdc / 0-5Vdc / 0-5	Measure V&I			Under GPIB co	ommand using Measu	ire <25ms				
Voltage and Current Programming Inputs (I/P) 0-10Vdc / 0-5Vdc / 0-5K ohm / 4-20 mA of F.S. Voltage and Current Programming Inputs (I/P) 0-10Vdc / 0-5Vdc / 4-20mA of F.S. External OX/OFF (I/P) TTL-Active Low or High(Selective) DC_ON Signal (O/P) Level by user define. (Time delay = 1 ma at voltage slew rate of 10V/ms.) CV or CC mode Indicator (O/P) TTL-Active Low System Fault Indicator(O/P) TTL: Active Low System Fault Indicator(O/P) TTL: Active Low Safety Interlock(I/P) TTL: Active Low Safety Interlock(I/P) TTL: Active Low Acto Sequencing(List Mode) TTL: Active Low Number of program TTL: Active Low Number of program 10 Number of sequencing (Step Mode) TT: Active Low Start voltage 0 to Full scale End voltage 0 to Full scale End voltage 100 Number of sequencing (Step Mode) 30 200~220Vac ± 10% V ₁ , 30 380-400Vac ± 10% V ₁ , 30 440-480Vac ± 10% V ₁ , 30 440-480Va	Analog Interface (I/O) *				j					
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$\begin{array}{c c c c c c } DC_ON Signal (O/P) & Level by user define. (Time delay = 1 ma at voltage slew rate of 10V/ms.) \\ \hline CV or CC mode Indicator (O/P) & TTL Level High=CV mode; TTL Level Low=CC mode \\ TTL : Active Low \\ \hline TTL : Active Low \\ \hline TTL : Active Low \\ \hline Auxilary power supply(O/P) & Nominal supply voltage: 12Vdc/ (Naximum current sink capability: 10mA \\ \hline Safety interJock (V/P) & TTL: Active Low \\ \hline TT: Active$	External ON/OFE (I/P)	output (0,1)		TTI :Acti	velow or High(Selec	tive)				
	DC ON Signal (O/P)		level	by user define. (Time	delay = 1 ms at voltage	ne slew rate of 10V/m	15.)			
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	CV or CC mode Indicator (O/F	 າ)		TTL Level High=C	V mode · TTL Level L	w = CC mode	.,			
$\begin that of (OP) = 0 \end{tabular} the form of th$	OTP Indicator (O/P)	/		The Levennight e	TTL · Active Low					
$\begin{tabular}{ c $	System Fault indicator(O/P)				TTL: Active Low					
$\begin{tabular}{ c $	Auxiliary power supply (O/P)		Nomin	al supply voltage · 12	Vdc / Maximum curre	nt sink canability: 10	mA			
$\begin the sequencing (List Mode) $$ TTL: Active Low $$ TTL: Active Low $$ Auto Sequencing (List Mode) $$ TTL: Active Low $$ $$ $$ $$ $$ $$ $$ $$ $$ $$ $$ $$ $$$	Safety interlock(I/P)			Tim	rac / maximum curre	ine sink capability. For				
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$\begin the sequence in the sequence is the s$	Auto Sequencing(List Mode	2)								
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$\begin{tabular}{ c c c c c c c } \hline Higher Wide Formula (100 Formula $	Trig Source		Manual / Auto / External							
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	Auto Sequencing (Step Mor	1e)		Ma						
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440/480Vac19A32A44A44AGeneral SpecificationMaximum Remote Sense Line Drop Compensation 2% of full scale voltage per line (4% total) 2% of full scale voltage per line (4% total)Operating Temperature Range $0^{\circ}C \sim 40^{\circ}C$ $0^{\circ}C \sim 40^{\circ}C$ Storage Temperature Range $89 \times 428 \times 465 \text{ mm}/$ $3.5 \times 16.85 \times 16.73 \text{ inch}$ $132.8 \text{ mm} \times 428 \text{ mm} \times 610 \text{ mm} / 5.23 \times 16.85 \times 24.02 \text{ inch}$ WeightApprox. 17 kg / $Approx. 17 kg /$ Approx. 23 kg / $Approx. 23 kg /$ Approx. 35 kg / $Approx. 35 kg /$ Approx. 35 kg / $Approx. 17 \text{ con model}$	Max Current (each phase)	380/400Vac		22A	37A	50A	50A			
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Maximum Remote Sense Line Drop Compensation2% of full scale voltage per line (4% total)Operating Temperature Range $0^{\circ}C \sim 40^{\circ}C$ Storage Temperature Range $-40^{\circ}C \sim +85^{\circ}C$ Dimension (HxWxD) $89 \times 428 \times 465 \text{ mm/}$ $3.5 \times 16.85 \times 16.73 \text{ inch}$ WeightApprox. 17 kg / $Paper Approx. 17 kg /Approx. 23 kg /Paper Approx. 29 kg /Paper Approx. 35 kg /Paper Approx. 35 kg /Paper Approx. 35 kg /Paper Approx. 35 kg /$	General Specification									
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37.44 lbs 55.70 lbs 63.88 lbs 77.09 lbs 77.09 lbs	Weight		Approx. 17 kg / 37.44 lbs	Approx. 23 kg / 55.70 lbs	Approx. 29 kg / 63.88 lbs	Approx. 35 kg / 77.09 lbs	Approx. 35 kg / 77.09 lbs			
Approval CE CE CE CE CE	Approval		CE	CE	CE	CE	CE			

All specifications are subject to change without notice. Please visit our website for the most up to date specifications.

Note *: None APG interface for A620027/A620028

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