90kW High Power System Series Specifications

REV.

Unless otherwise noted, specifications are warranted over the ambient temperature range of 0° to 50° Celsius.

OUTPUT RATING		20-4500	30-3000	40-2256	60-1500	80-1128	100-900	150-600	200-450	300-300	600-150	1000-90	1500-60
1.Rated output voltage (*1)	V	20	30	40	60	80	100	150	200	300	600	1000	1500
2.Rated output current (*2)	A	4500	3000	2256	1500	1128	900	600	450	300	150	90	60
3.Rated output power	W	90000	90000	90240	90000	90240	90000	90000	90000	90000	90000	90000	90000

INPUT CHARACTERISTICS		V	20	30	40	60	80	100	150	200	300	600	1000	1500
1.Input voltage/freq. 3 phase, 3 wire+ground (*4)		---	3-Phase, 480V models: 342~528Vac, 47~63Hz (Covers 380/400/415/440/460/480Vac).											
2.Maximum Input current at 100% load	3-Phase, 480V models:	---	162A @ 380Vac.											
3.Power Factor (Typ.)		---	0.94 @ 380Vac, rated output power.											
4.Efficiency (Minimum) (*3) (*5)		%	89	89	89	90								

CONSTANT VOLTAGE MODE		V	20	30	40	60	80	100	150	200	300	600	1000	1500
1.Max. Line regulation (*6)		---	0.01% of rated output voltage.											
2.Max. Load regulation (*7)		---	0.01% of rated output voltage +5mV.											
3.Temperature coefficient		---	50PPM/^{O}C from rated output voltage, following 30 minutes warm-up.											
4.Temperature stability		---	0.01% of rated Vout over 8hrs. interval following 30 minutes warm-up. Constant line, load & temperature.											
5.Warm-up drift		---	Less than 0.05% of rated output voltage +2mV over 30 minutes following power on.											
6.Remote sense compensation/wire (*8)		V	2	5										
7.Up-prog. response time (*9)		mS	30	30	30	50	50	50	50	50	50	100	150	200
8.Down-prog. response time	Full load (*10)	mS	50	80	80	80	100	100	100	100	100	100	100	100
	No load (*10)		600	600	1000	1000	1000	1500	2500	2500	3000	3000	3000	3000
9.Transient response time		---	Time for output voltage to recover within 1% of its rated output for 20~30V; 0.5% of its rated output for 40~1500V, for a load change 10~90% of rated output current Local sense. Output set point: 10~100%. Less than 1mS for models up to and including 100V. 2mS for models above 100V.											

CONSTANT CURRENT MODE	V	20	30	40	60	80	100	150	200	300	600	1000	1500
1.Max. Line regulation (*6)	---	0.05% of rated output current.											
2.Max. Load regulation (*11)	---	0.08% of rated output current.											
4.Temperature coefficient	---	20~100V models: 100PPM/^{O}C from rated output current, following 30 minutes warm-up.											
		150~1500V models: 70PPM/^{O}C from rated output current, following 30 minutes warm-up.											
5.Temperature stability	---	0.01% of rated Iout over 8hrs. interval following 30 minutes warm-up. Constant line, load & temperature.											
6.Warm-up drift	---	20~100V models: Less than +/-0.25% of rated output current over 30 minutes following power on.											
		150~1500V models: Less than +/-0.15% of rated output current over 30 minutes following power on.											

ANALOG PROGRAMMING AND MONITORING (ISOLATED FROM THE OUTPUT)

1.Vout voltage programming	---	0~100%, 0~5V or 0~10V, user selectable. Accuracy and linearity: +/-0.15% of rated Vout.
2.Iout voltage programming (*13)	---	0~100%, 0~5V or 0~10V, user selectable. Accuracy and linearity: +/-0.4% of rated Iout.
3.Vout resistor programming	---	0~100%, 0~5/10KΩ full scale, user selectable. Accuracy and linearity: +/-0.5% of rated Vout.
4.Iout resistor programming (*13)	---	0~100%, 0~5/10KΩ full scale, user selectable. Accuracy and linearity: +/-0.5% of rated Iout.
5.Output voltage monitor (*12)	---	0~5V or 0~10V, user selectable. Accuracy: +/-0.5% of rated Vout.
6.Output current monitor (*12) (*13)	---	0~5V or 0~10V, user selectable. Accuracy: +/-0.5% of rated Iout.

SIGNALS AND CONTROLS (ISOLATED FROM THE OUTPUT)

1.Power supply OK #1 signal	---	Power supply output monitor. Open collector. Output On: On. Output Off: Off. Maximum Voltage: 30V. Maximum Sink Current: 10mA.
2.CV/CC signal	---	CV/CC Monitor. Open collector. CC mode: On. CV mode: Off. Maximum Voltage: 30V. Maximum Sink Current: 10mA.
3.LOCAL/REMOTE Analog control	---	Enable/Disable analog programming control by electrical signal or dry contact. Remote: 0~0.6V or short. Local: 2~30V or open.
4.LOCAL/REMOTE Analog signal	---	Analog programming control monitor signal. Open collector. Remote: On. Local: Off. Maximum Voltage: 30V. Maximum Sink Current: 10mA.
5.ENABLE/DISABLE signal	---	Enable/Disable PS output by electrical signal or dry contact. 0~0.6V or short, 2~30V or open. User selectable logic.
6.INTERLOCK (ILC) control	---	Enable/Disable PS output by electrical signal or dry contact. Output ON: 0~0.6V or short. Output OFF: 2~30V or open.
7.Programmed signals	---	Two open drain programmable signals. Maximum voltage 25V. Maximum sink current 100mA (shunted by 27V zener).
8.TRIGGER IN / TRIGGER OUT signals	---	Maximum low level input voltage = 0.8V. Minimum high level input voltage = 2.5V. Maximum high level input = 5V positive edge trigger: tw = 10uS minimum. Tr,Tf = 1uS maximum. Min delay between 2 pulses 1mS.
9.DAISY_IN/SO control signal	---	By electrical Voltage: 0~0.6V/2~30V or dry contact.
10.DAISY_OUT/PS_OK #2 signal	---	4~5V = OK, 0V (500Ω impedance) = Fail.

FUNCTIONS AND FEATURES

1.Parallel operation	---	Consult with manufacturer.
4.Constant power control	---	Limits the output power to a programmed value. Programming via the communication ports or the front panel.
5.Output resistance control	---	Emulates series resistance. Resistance range: 1~1000mΩ. Programming via communication ports or front panel.
6.Slew rate control	---	Programmable Output rise and Output fall slew rate. Programming range: 0.0001~999.99 V/mS. or A/mS. Programming via communication ports or front panel.
7.Arbitrary waveforms	---	Profiles of up to 100 steps can be stored in 4 memory cells. Activation by command via communication ports or front panel.

PROGRAMMING AND READBACK (USB, LAN, RS232/485, Optional (*15) Interfaces)

	V	20	30	40	60	80	100	150	200	300	600	1000	1500
1.Vout programming accuracy (*14)	---	0.05% of rated output voltage.											
2.Iout programming accuracy (*13)	---	0.3% of rated output current.											
3.Vout programming resolution	---	0.002% of rated output voltage.											
4.Iout programming resolution	---	0.002% of rated output current.											
5.Vout readback accuracy	---	0.1% of rated output voltage.											
6.Iout readback accuracy (*13)	---	0.2% of rated output current.											
7.Vout readback resolution	% of rated output voltage	0.006%	0.004%	0.004%	0.003%	0.002%	0.011%	0.008%	0.006%	0.004%	0.003%	0.011%	0.008%
8.Iout readback resolution	% of rated output current	0.002%	0.002%	0.002%	0.002%	0.002%	0.002%	0.002%	0.003%	0.002%	0.002%	0.002%	0.002%

PROTECTIVE FUNCTIONS	V	20	30	40	60	80	100	150	200	300	600	1000	1500
1.Foldback protection	---	Output shut-down when power supply changes mode from CV or Power Limit to CC mode or from CC or Power Limit to CV mode. User presetable. Reset by AC input recycle in autostart mode, by Power Switch, by OUTPUT button, by rear panel or by communication.											
2.Over-voltage protection (OVP)	---	Output shut-down. Reset by AC input recycle in autostart mode, by Power Switch, by OUTPUT button, by rear panel or by communication.											
3.Over-voltage programming range	V	1~24	2~36	2~44.1	5~66.15	5~88.2	5~110.25	5~165.37	5~220.5	5~330.75	5~661.5	5~1102.5	5~1653.75
4.Over-voltage programming accuracy	---	+/-1% of rated output voltage.											
5.Output under voltage limit (UVL)	---	Prevents from adjusting Vout below limit. Does not apply in analog programming. Preset by front panel or communication port.											
6.Over temperature protection	---	Shuts down the output. Auto recovery by autostart mode.											
7.Output under voltage protection (UVP)	---	Prevents adjustment of Vout below limit. P.S output turns Off during under voltage condition. Reset by AC input recycle in autostart mode, by Power Switch, by OUTPUT button, by rear panel or by communication.											

FRONT PANEL

1.Control functions	---	Multiple options with 2 Encoders.
	---	Vout/Iout/Power Limit manual adjust.
	---	OVP/UVL/UVP manual adjust.
	---	Protection Functions - OVP, UVL, UVP, Foldback, OCL, ENA, ILC.
	---	Communication Functions - Selection of LAN, RS232, RS485, USB or Optional communication interface.
	---	Output ON/OFF. Front Panel Lock.
	---	Communication Functions - Selection of Baud Rate, Address, IP and communication language.
	---	Analog Control Functions - Selection Voltage/resistive programming 5V/10V, 5KΩ/10KΩ programming.
	---	Analog Monitor Functions - Selection of Voltage/Current Monitoring 5V/10V.
2.Display	---	Vout: 4 digits, accuracy: 0.05% of rated output voltage +/-1 count.
	---	Iout: 4 digits, accuracy: 0.2% of rated output current +/-1 count.
3.Front Panel Buttons Indications	---	OUTPUT ON, ALARM, PREVIEW, FINE, COMMUNICATION, PROTECTION, CONFIGURATION, SYSTEM, SEQUENCER.
4.Front Panel Display Indications	---	Voltage, Current, Power, CV, CC, CP, External Voltage, External Current, Address, LFP Autostart, Safetstart, Foldback V/I, Remote (communication), RS/USB/LAN/Optional communication interface, Trigger, Load/Store Cell.
5.Circuit breaker	---	The AC supply for the Power System unit is protected by 4 x 80A circuit breakers. These CB's are accessible on the front panel of the cabinet.

ENVIRONMENTAL CONDITIONS

1.Operating temperature	---	0~50^{O}C, 100% load.
2.Storage temperature	---	-25~65^{O}C.
3.Operating humidity	---	20~90% RH (no condensation).
4.Storage humidity	---	10~95% RH (no condensation).
5.Altitude(*15)	---	Operating: 10000ft (3000m), output current derating 2%/100m or Ta derating 1^{O}C/100m above 2000m. Non-operating: 40000ft (12000m).

MECHANICAL

1.Cooling	---	Forced air cooling by power supply internal fans. Airflow direction: From cabinet front panel to rear.
2.Weight	Kg	Less than 200.
3.Dimensions (WxHxD)	mm	W: 553, H: 1028 (With Castors; Without castors cabinet height is 947), D: 902.
4.Vibration (Package transportation)	---	ISTA 1H: 2014, Method: ASTM D4728 Random vibration test.
5.Shock & Drop (Package transportation)	---	ISTA 1H: 2014, Drop test Method: ASTM D5276 free fall; Rotation edge drop test: ASTM D6179 Rotational drop.

SAFETY/EMC

1.Safety standards	---	IEC61010-1, EN61010-1
1.1.Interface classification	---	Vout≤50V Models: Output, J1, J2, J3, J4, J5, J6, J7, J8 (sense) & J9 (communication options) are Non Hazardous.
		60≤Vout≤1500V Models: Output & J8 (sense) are hazardous, J1, J2, J3, J4, J5, J6, J7 & J9 (communication options) are Non Hazardous.
1.2.Withstand voltage	---	Vout≤50V Models: Input – Output & J8 (sense), J1, J2, J3, J4, J5, J6, J7 & J9 (communication options): 4242VDC 1min, Input - Ground: 2835VDC 1min.
		60V≤Vout≤100V Models: Input – Output & J8 (sense), J1, J2, J3, J4, J5, J6, J7 & J9 (communication options): 4242VDC 1min, Output & J8 (sense) - J1, J2, J3, J4, J5, J6, J7 & J9 (communication options): 850VDC 1min, Output & J8 (sense) - Ground: 1500VDC 1min, Input - Ground: 2835VDC 1min.
		100V<Vout≤600V Models: Input – Output & J8 (sense), J1, J2, J3, J4, J5, J6, J7 and J9 (communication options): 4242VDC 1min, Output & J8 (sense) - J1, J2, J3, J4, J5, J6, J7 & J9 (communication options): 1275VDC 1min, Output & J8 (sense) - Ground: 2500VDC 1min. Input - Ground: 2835VDC 1min.
		1000V<Vout≤1500V Models: Input – Output & J8 (sense), J1, J2, J3, J4, J5, J6, J7 and J9 (communication options): 4000VDC 1min, Output & J8 (sense) - J1, J2, J3, J4, J5, J6, J7 & J9 (communication options): 2000VDC 1min, Output & J8 (sense) - Ground: 3280VDC 1min. Input - Ground: 2835VDC 1min.
2.EMC standards (*16) (*17)	---	IEC/EN61204-3 Industrial environment.
2.1.Conducted emission (*17)	---	IEC/EN61204-3 Industrial environment, Annex H table H.1, FCC Part 15-A, VCCI-A.
2.2.Radiated emission (*17)	---	IEC/EN61204-3 Industrial environment, Annex H table H.3 and H.4, FCC Part 15-A, VCCI-A.

NOTES:

*1: Minimum voltage is guaranteed to maximum 0.15% of rated output voltage for 20V and 30V models; 0.1% of rated output voltage for 40~1500V models.
*2: Minimum current is guaranteed to maximum 0.2% of rated output current.
*3: Typ. at Ta=25°C, rated output power.
*4: For cases where conformance to various safety standards (UL, IEC, etc…) is required, to be described as 380~480Vac (50/60Hz) for 3-Phase 480V models.
*5: 3-Phase 480V: At 380Vac input voltage. With rated output power.
*6: 3-Phase 480V models: 342~528Vac. Constant load.
*7: From No-Load to Full-Load, constant input voltage. Measured at the sensing point in Remote Sense.
*8: The maximum voltage on the power supply terminals must not exceed the rated voltage.
*9: From 10% to 90% of Rated Output Voltage at rated resistive load.
*10: From 90% to 10% of Rated Output Voltage.
*11: For load voltage change, equal to the unit voltage rating, constant input voltage.
*12: For steady state only.
*13: The Constant Current programming, readback and monitoring accuracy do not include the warm-up and Load regulation thermal drift.
*14: Measured at the sensing point.
*15: Max. ambient temperature for IEEE is 40°C.
*16: Signal and control ports interface cables length: Less than 3m, DC output power port cables length: Less than 30m.
*17: EMC specs based on GSPL22.5kW series.

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