

# MicroGenius®

## Genset Battery Chargers

12 & 24 Volts, 6 to 100 Amps



**Small. Powerful. Rugged.**

- Hardened switchmode powertrain** - delivers first-class abuse resistance and energy efficiency
- Patented charging algorithms** - recharge faster and more safely; cut risk of sudden battery failure
- UL Listed for emergency generators** - from 6 to 100 amp output
- Tested to high vibration levels** - survive harsh genset duty
- Standard J-1939 and Modbus communications** - facilitate genset and building integration
- Small, lightweight packages** - enable installation in smaller spaces

# Robust reliability. More power in less space.

SENS MicroGenius advanced technology genset battery chargers deliver from 6 to 100 amps at 12 or 24 volts\*.

MicroGenius is the only family of genset chargers that meets all modern battery charging and energy efficiency regulations.

- UL listed to category BBHH required for "Emergency Generators"
- Legal for sale under California and Oregon energy efficiency regulations
- All units survive harsh EN 60068 standard vibration abuse at the 4G level

*\*Consult factory for higher output voltage MicroGenius chargers up to 120 volts DC nominal*

## State-of-the-art features

### Patented Dynamic Boost™ charging

Dynamic Boost charges batteries faster and more completely than similarly rated conventional chargers, but with lower risk of overcharge.

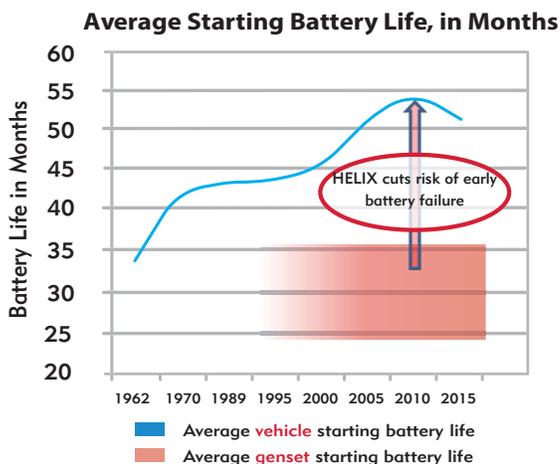


### Dependable modular architecture

MicroGenius S2 and S4 employ multiple MicroGenius chargers that enable either higher current output, internal redundancy or multiple outputs.

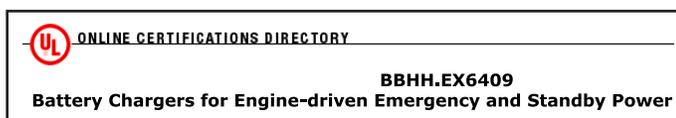
### Safer, more reliable battery performance

Revolutionary HELIX™ (High Efficiency, Life-eXtending) technology from SENS reduces the risk of both early and catastrophic genset battery failures.



### UL listed for emergency and standby generator duty

MicroGenius chargers rated 6 through 100A output are UL listed to category code BBHH "Emergency & Standby Generators"

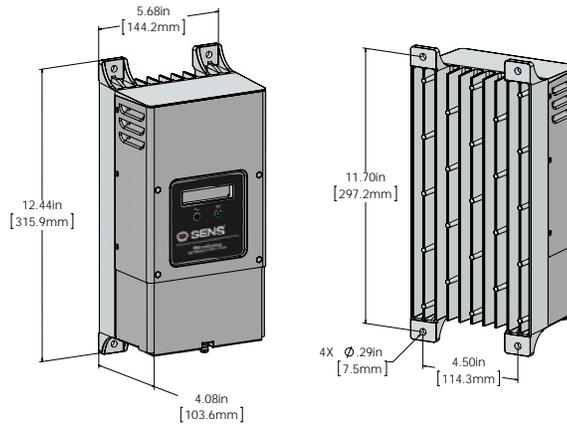


# MicroGenius 2

6.0 lbs. (2.8 kg) for 12/24V and ≤15A

7.2 lbs. (3.3 kg) maximum

Choose **MicroGenius 2** if your DC current requirement is ≤25A



## Specifications for MicroGenius 2: 6A to 25A Output

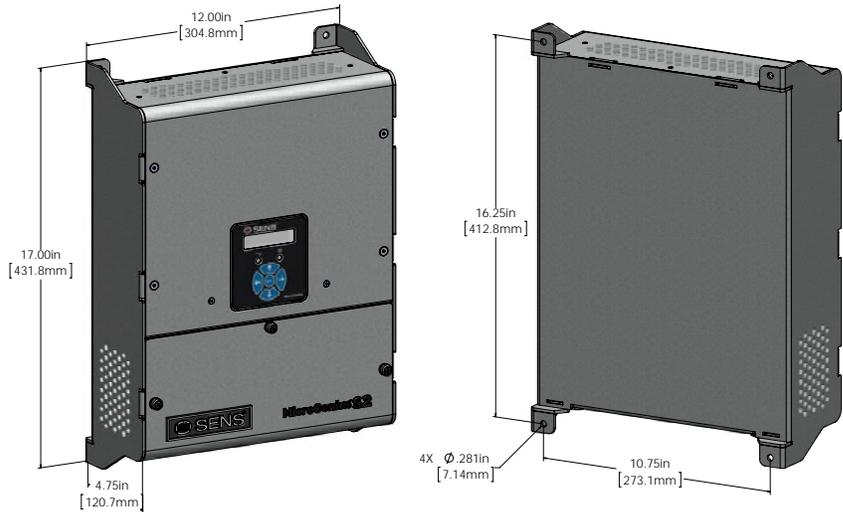
AC input	VAC, Hz	90-265 <sup>1</sup> single-phase VAC, 47-63 Hz DC voltage applied at AC terminals: 100-375 VDC, 0Hz (≥500W models only, output limited to 2/3 rated power)
	Protection	Supplementary overcurrent protection fuse, transient protected to EN 61000-4-5 level 4
	Power factor & efficiency	PF > .95 typical; max efficiency 93-95%; meets CEC Title 20 Efficiency Regulations; standby AC draw <3W for 180-450W and <7W for 500-750W
DC output	Volts, amps	12V/24V nom. at 10A/6A, 12A/10A, 15A/15A <sup>1</sup> , 20A/20A, or 25A/25A
	Charging modes	Multi-stage, including float, boost and two additional HELIX voltages in flooded lead-acid battery program
	Current limit	Factory set at 100% of rating. Field adjustable w/optional keypad or from PC. <sup>2</sup>
	Charging characteristic	Constant voltage, current limited; patented Dynamic Boost control and HELIX (when FLA battery is selected)
	Line & load regulation	±0.5%
	Output ripple	< 30 mVrms with or without battery. Delivers fast-responding, stable, well-filtered DC without battery.
	Battery temp. compensation	Standard. Optional remote battery temperature probe. <sup>3</sup>
	Output protection	Current limit, supplementary overcurrent protection fuse, transient protected
	Dead battery charge	Starts into, and recharges zero volt battery without user intervention
	Parallel operation	Two or more chargers operate with all modes synchronized for increased current or fault tolerance <sup>4</sup>
Adjustment & Controls	Charge mode control	Fully automatic patented Dynamic Boost system (VRLA or ultracap charging program disables boost mode). Manually initiated timed boost & commissioning modes available with keypad option. <sup>5</sup>
	Adjustments	12 or 24-volt; battery type program; fine voltage setting; alarm setpoints; alarm relay mapping
	Battery type programs	Flooded lead-acid, AGM, NiZn, NaCl (salt), NiCd, VRLA, ultracapacitor
	Field voltage adjustment	3 methods: jumper pins, from front panel keypad <sup>5</sup> or from PC <sup>2</sup>
Status display	LEDs	Two multi-color front panel status LEDs
	Metering & status display	Optional. Voltmeter accurate to +1%; ammeter to +1%; 20-character display of status & alarm messages. <sup>6</sup>
Alarms	Alarms	Factory set, field reconfigurable, latching or non-latching. Alarm functions announced on the J-1939 and Modbus ports and on the optional LCD include summary, AC fail, charger fail, high DC volts, low DC volts, low cranking volts, overvoltage shutdown, reverse polarity battery, incompatible battery, invalid settings, I/O bus inactive, thermal fold back, no temperature probe, current limiting, ground fault and low current. Any alarm is assignable to Form C contacts.
	Alarms: Form C contacts	Optional. Two <sup>7</sup> or five <sup>8</sup> Form C contacts, each rated 30V, 2A resistive, assignable. Standard configuration includes summary, AC fail, charger fail, high DC volts, low DC volts and low cranking volts.
Networking	J-1939 communications	CAN 2.0 extended ID on RJ-45 port
	Modbus communications	Modbus RS-485 on RJ-45 port
	SENSbus/USB	Proprietary bus for connection of paralleled chargers, SENS accessories and SENS Setup Utility
Environmental	Operating temperature <sup>9</sup>	Convection cooled; -40C to +70C; full spec from -40C to +50C <sup>10</sup>
	Humidity	5% to 95%, non-condensing
	Ingress protection	NEMA2/IP22; NEMA3R/IP34; UL Listed "Rainproof"
	Vibration & shock resistance	Vib: Swept Sine (EN60068-2-6): 4G, 18-500 Hz, 3 axes. Random: 20-500Hz, .01G <sup>2</sup> /Hz. Shock: EN 60068-2-27 (15G)
	Electrical transient	ANSI/IEEE C62.41 & EN 61000-4-12 on power terminals
Abuse protection	Reverse polarity	Charger self-protects without fuse clearing. Indication via LED & optional LCD.
	Wrong voltage battery	Charger-battery voltage mismatch shuts down charger. Indication via LED & optional LCD.
	Overvoltage shutdown	Selective; shutdown only operates if charger causes the overvoltage condition
	Overtemperature protection	Gradual output power reduction if heatsink temperature becomes excessive
Regulatory compliance	North America	C-UL Listed for US & Canada: UL 1236 categories BBGQ, BBHH, BBJY and QWIR <sup>11</sup> , CSA 22.2, No. 107.2. Certified to UL 1236 supplements SB (marine), SC (fire pump) and SE (emergency generator).
		NFPA-70, NFPA-110 <sup>12</sup>
		FCC Part 15, Class B, ≥ 600W models Class A
	European Union (CE)	Seismic: Rigid & non-structure wall mount; max S <sub>DS</sub> of 2.5G. IBC 2000-2022, Calif. BC 2007-2022
		American Bureau of Shipping, type approved
		EMC: 2014/30/EU (EN 61000-6-2 & EN 61000-6-4) LVD: 2014/35/EU (EN 60335-1 & EN 60335-2-29) RoHS: 2015/863 (EN 63000)
Construction	Housing/configuration	Die-cast aluminum heatsink base with stainless steel covers & fasteners
	Connections	AC & DC terminal blocks: 20 to 10 AWG. J-1939 and Modbus-485: RJ-45. Form C alarms: 28 to 16 AWG

<sup>1</sup> When set for 24-volt output, full 15A output of 450W available above 170 VAC input, 12A output current max between 100 VAC and 170 VAC input <sup>2</sup> Requires USB charger option or adapter SENS p/n 209254 plus free SENS software available at www.sens-usa.com <sup>3</sup> Remote battery temp sensor is optional. Order SENS p/n 209481 <sup>4</sup> Requires standard RJ-45 network cable to connect paralleling bus. Order SENS p/n 208118-72 (72-inch length) or 208118-180 (180-inch length) <sup>5</sup> Requires that digit 12 of the model number be F <sup>6</sup> Requires that digit 12 of the model number be D, E, or F <sup>7</sup> Models with E as digit 12 of the model number include 2 ea. Form C alarm contacts <sup>8</sup> Models with D or F as digit 12 of the model number include 5 ea. Form C alarm contacts <sup>9</sup> At 65 deg. C and above the LCD display may be unreadable and display life will be reduced <sup>10</sup> Full spec to +55C for 180W and +40C for 450W <sup>11</sup> 300W and 450W models only <sup>12</sup> All chargers equipped with an alarm / display board meet NFPA-110 requirements. For chargers without an alarm / display board to meet NFPA-110, charger volts, amps and charger fail alarm available on the J-1939 port must be announced by the genset control panel.

# MicroGenius S2

15.4 lbs. (7 kg) maximum

Choose **S2** if your DC current requirement is >25A and ≤50A, or if you need circuit breakers, redundant output or dual 25A output



## Specifications for MicroGenius S2: 20A to 50A Output

AC input	VAC, Hz	90-265 <sup>1</sup> VAC, 47-63 Hz
	Protection	Supplementary overcurrent protection fuse, transient protected to EN 61000-4-5 level 4. Optional AC circuit breaker.
	Power factor & efficiency	PF >.95 typical; max efficiency 93-95%; meets CEC Title 20 Efficiency Regulations;
DC output	Volts, amps	12V/24V nom. at 20A, 30A, 40A and 50A
	Charging modes	Multi-stage, including float, boost and two additional HELIX voltages in flooded lead-acid battery program
	Current limit	Factory set at 100% of rating. Field adjustable with keypad or from PC.
	Charging characteristic	Constant voltage, current limited; patented Dynamic Boost control and HELIX (when FLA battery is selected)
	Line & load regulation	±0.5%
	Output ripple	< 30 mVrms with or without battery. Delivers fast-responding, stable, well-filtered DC without battery.
	Battery temp. compensation	Standard. Optional remote battery temperature probe. <sup>3</sup>
	Output protection	Current limit, supplementary overcurrent protection fuse, transient protected. Optional DC circuit breaker.
	Dead battery charge	Starts into, and recharges zero volt battery without user intervention
	Parallel operation	Two or more chargers operate with all modes synchronized for increased current or fault tolerance <sup>4</sup>
	Adjustment & Controls	Charge mode control
Adjustments		12 or 24-volt; battery type program; fine voltage setting; alarm setpoints; alarm relay mapping
Battery type programs		Flooded lead-acid, AGM or Ni-Cd for engine starting; VRLA for reserve power; ultracapacitor
Field voltage adjustment		2 methods: from front panel keypad or from PC <sup>2</sup>
Status display	LEDs	Two multi-color front panel status LEDs
	Metering & status display	Voltmeter accurate to +1%; ammeter to +1%. 20-character display of status & alarm messages.
Alarms	Alarms	Factory set, field reconfigurable, latching or non-latching. Alarm functions announced on the J-1939 and Modbus ports and on the LCD include summary, AC fail, charger fail, high DC volts, low DC volts, low cranking volts, overvoltage shutdown, reverse polarity battery, incompatible battery, invalid settings, I/O bus inactive, thermal fold back, no temperature probe, current limiting, ground fault and low current. Any alarm is assignable to Form C contacts.
	Alarms: Form C contacts	Five Form C contacts, each rated 30V, 2A resistive, assignable. Standard configuration includes summary, AC fail, charger fail, high DC volts, and low cranking volts.
Networking	J-1939 communications	CAN 2.0 extended ID on RJ-45 port
	Modbus communications	Modbus RS-485 on RJ-45 port; Modbus TCP/IP (optional) on RJ-45 port
	SENSbus/USB	Proprietary bus for connection of paralleled chargers, SENS accessories and SENS Setup Utility
Environmental	Operating temperature	-40C to +70C; full spec from -40C to +40C (convection cooled) <sup>5</sup>
	Humidity	5% to 95%, non-condensing
	Ingress protection	IP 20; NEMA 1. Optional drip shield for IP 22/NEMA 3R rating. <sup>6</sup>
	Vibration & shock resistance	Vib: Swept Sine (EN60068-2-6): 4G, 18-500 Hz, 3 axes. Random: 20-500Hz, .01G <sup>2</sup> /Hz. Shock: EN 60068-2-27 (15G)
	Electrical transient	ANSI/IEEE C62.41 & EN 61000-4-12 on power terminals
Abuse protection	Reverse polarity	Charger self-protects without fuse clearing. Indication via LED & LCD.
	Wrong voltage battery	Charger-battery voltage mismatch shuts down charger. Indication via LED & LCD.
	Overvoltage shutdown	Selective; shutdown only operates if charger causes the overvoltage condition
	Overtemperature protection	Gradual output power reduction if heatsink temperature becomes excessive
Regulatory compliance	North America	C-UL Listed for US & Canada: UL 1236 categories BBGQ, BBHH, BBJY and QWIR, CSA 22.2, No. 107.2. Certified to UL 1236 supplements SB (marine), SC (fire pump) and SE (emergency generator).
		NFPA-70, NFPA-110
		FCC Part 15, Class A
		Seismic: Rigid & non-structure wall mount; max S <sub>DS</sub> of 2.5G. IBC 2000-2022, Calif. BC 2007-2022
	American Bureau of Shipping, type approved	
	European Union (CE)	EMC: 2014/30/EU (EN 61000-6-2 & EN 61000-6-4)
LVD: 2014/35/EU (EN 60335-1 & EN 60335-2-29)		
Construction	Housing/configuration	Aluminum with powder coated finish
	Connections	AC & DC terminal blocks: 20 to 2 AWG. J-1939 and Modbus: RJ-45. Form C alarms: 28 to 16 AWG

<sup>1</sup> Below 170 VAC input, 24V-30A model limited to 24A output and 24V-40A model limited to 37A output <sup>2</sup> Requires free SENS software available at [www.sens-usa.com](http://www.sens-usa.com) <sup>3</sup> Remote battery temp sensor is optional. Order SENS p/n 209481 <sup>4</sup> Requires standard RJ-45 network cable to connect paralleling bus. Order SENS p/n 208118-72 (72-inch length) or 208118-180 (180-inch length) <sup>5</sup> At 65 deg. C and above the LCD display may be unreadable and display life will be reduced <sup>6</sup> Drip shield is optional. Order SENS p/n 209291.

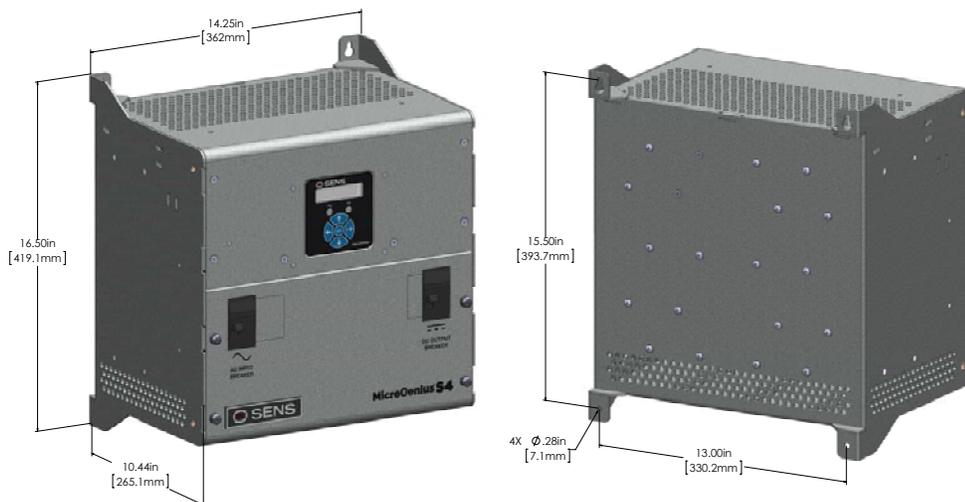
# MicroGenius S4

36.8 lbs (16.7 kg) maximum

Choose **S4** for:

- DC current >50A
- Circuit breakers
- Added surge suppression
- Internal redundancy
- 2 or more battery banks

19 or 23 inch rack mount brackets optional



## Specifications for MicroGenius **S4**: 25A to 100A Output

<b>AC input</b>	VAC, Hz	90-265 <sup>1</sup> VAC, 47-63 Hz
	Protection	Supplementary overcurrent protection fuse, transient protected to EN 61000-4-5 level 4. Optional AC circuit breaker. Optional AC input surge protector with indicator.
	Power factor & efficiency	PF > .95 typical; max efficiency 93-95%; meets CEC Title 20 Efficiency Regulations;
<b>DC output</b>	Volts, amps	12V/24V nom. at 25A, 50A, 75A and 100A
	Charging modes	Multi-stage, including float, boost and two additional HELIX voltages in flooded lead-acid battery program
	Current limit	Factory set at 100% of rating. Field adjustable with keypad or from PC. <sup>2</sup>
	Charging characteristic	Constant voltage, current limited; patented Dynamic Boost control and HELIX (when FLA battery is selected)
	Line & load regulation	±0.5%
	Output ripple	< 30 mVrms with or without battery. Delivers fast-responding, stable, well-filtered DC without battery.
	Battery temp. compensation	Standard. Optional remote battery temperature probe. <sup>3</sup>
	Output protection	Current limit, supplementary overcurrent protection fuse, transient protected. Optional DC circuit breaker. Optional DC output surge protector with indicator.
	Dead battery charge	Starts into, and recharges zero volt battery without user intervention
	Parallel operation	Two or more chargers operate with all modes synchronized for increased current or fault tolerance <sup>4</sup>
<b>Adjustment &amp; Controls</b>	Charge mode control	Fully automatic patented Dynamic Boost system. Manual boost & battery commissioning available from keypad.
	Adjustments	12 or 24-volt; battery type program; fine voltage setting; alarm setpoints; alarm relay mapping
	Battery type programs	Flooded lead-acid, AGM or Ni-Cd for engine starting; VRLA for reserve power; ultracapacitor
	Field voltage adjustment	2 methods: from front panel keypad or from PC <sup>2</sup>
<b>Status display</b>	LEDs	Two multi-color front panel status LEDs
	Metering & status display	Voltmeter accurate to +1%; ammeter to +1%. 20-character display of status & alarm messages.
<b>Alarms</b>	Alarms	Factory set, field reconfigurable, latching or non-latching. Alarm functions announced on the J-1939 and Modbus ports and on the LCD include summary, AC fail, charger fail, high DC volts, low DC volts, low cranking volts, overvoltage shutdown, reverse polarity battery, incompatible battery, invalid settings, I/O bus inactive, thermal fold back, no temperature probe, current limiting, ground fault and low current. Any alarm is assignable to Form C contacts.
	Alarms: Form C contacts	Five Form C contacts, each rated 30V, 2A resistive, assignable. Standard configuration includes summary, AC fail, charger fail, high DC volts, low DC volts and low cranking volts.
<b>Networking</b>	J-1939 communications	CAN 2.0 extended ID on RJ-45 port
	Modbus communications	Modbus RS-485 on RJ-45 port; Modbus TCP/IP (optional) on RJ-45 port
	SENSbus/USB	Proprietary bus for connection of paralleled chargers, SENS accessories and SENS Setup Utility
<b>Environmental</b>	Operating temperature	-40C to +70C; full spec from -40C to +40C (convection cooled) <sup>5</sup>
	Humidity	5% to 95%, non-condensing
	Ingress protection	IP 20; NEMA 1. Optional drip shield for IP 22/NEMA 3R rating. <sup>6</sup>
	Vibration & shock resistance	Vib: Swept Sine (EN60068-2-6): 4G, 18-500 Hz, 3 axes. Random: 20-500Hz, .01G <sup>2</sup> /Hz. Shock: EN 60068-2-27 (15G)
	Electrical transient	ANSI/IEEE C62.41 & EN 61000-4-12 on power terminals
<b>Abuse protection</b>	Reverse polarity	Charger self-protects without output protective device clearing. Indication via LED & LCD.
	Wrong voltage battery	Charger-battery voltage mismatch shuts down charger. Indication via LED & LCD.
	Overvoltage shutdown	Selective; shutdown only operates if charger causes the overvoltage condition
	Overtemperature protection	Gradual output power reduction if heatsink temperature becomes excessive
<b>Regulatory compliance</b>	North America	C-UL Listed for US & Canada: UL 1236 categories BBGQ, BBHH, BBJY and QWIR, CSA 22.2, No. 107.2. Certified to UL 1236 supplements SB (marine), SC (fire pump) and SE (emergency generator).
		NFPA-70, NFPA-110
		FCC Part 15, Class A
	European Union (CE)	Seismic: Rigid & non-structure wall mount; max S <sub>ds</sub> of 2.5G. IBC 2000-2022, Calif. BC 2007-2022
		American Bureau of Shipping, type approved
		EMC: 2014/30/EU (EN 61000-6-2 & EN 61000-6-4) LYD: 2014/35/EU (EN 60335-1 & EN 60335-2-29) RoHS: 2015/863 (EN 63000)
<b>Construction</b>	Housing/configuration	Aluminum with powder coated finish. Rack mount brackets for 19 and 23 inch rack optional.
	Connections	AC & DC terminal blocks: 14 AWG to 2/0. AC & DC breakers, <50A (optional): 14 to 2 AWG. AC & DC breakers, ≥50A (optional): 12 AWG to 2/0. J-1939 and Modbus: RJ-45. Form C alarms: 28 to 16 AWG

<sup>1</sup> 120VAC minimum for 100A units <sup>2</sup> Requires free SENS software available at [www.sens-usa.com](http://www.sens-usa.com) <sup>3</sup> Remote battery temp sensor is optional. Order SENS p/n 209481 <sup>4</sup> Requires standard RJ-45 network cable to connect paralleling bus. Order SENS p/n 208118-72 (72-inch length) or 208118-180 (180-inch length) <sup>5</sup> At 65 deg. C and above the LCD display may be unreadable and display life will be reduced <sup>6</sup> Drip shield is optional. Order SENS p/n 209287.

# How To Order **MicroGenius 2**

Product Type	Power	Output Volts	Output Current	Alms & Comms	Adapter & RTS
<b>M</b>	<b>4</b>	<b>22</b>	<b>1515</b>	<b>F</b>	<b>N</b>

(A) (B) (C) (D) (E) (F)

	Parameter	Code	Value
(A)	Product Family	M	MicroGenius 2
(B)	Power	1 3 4 6 7	180W 300W 450W 600W 750W
(C)	Output Voltage	22	12/24V
(D)	Output Current	1006 1210 1515 2020 2525	10A @ 12V; 6A @ 24V (180W only) 12A @ 12V; 10A @ 24V (300W only) 15A @ 12V; 15A @ 24V (450W only) 20/20A @ 12/24V (600W only) 25/25A @ 12/24V (750W only)
(E)	Alarm & Communication Options	A D E F G	Base model; includes J-1939 & Modbus RS-485 communications Base model + LCD + USB-C + 5 ea. Form C alarm relays Base model + LCD + USB-C + 2 ea. Form C alarm relays Base model + LCD + USB-C + 5 ea. Form C relays + keypad control Base model + LCD + USB-C + 5 ea. Form C relays + keypad control + Modbus TCP/IP
(F)	Adapter Plate & Remote Temperature Sensor Options	F G L N T	FC to MicroGenius 2 adapter plate (enclosed charger only) MicroGenius 150 to MicroGenius 2 adapter plate (enclosed charger only) LC to MicroGenius 2 adapter plate (enclosed charger only) NRG10 to MicroGenius 2 adapter plate (enclosed charger only) Remote Temperature Sensor shipped with charger

# How To Order **MicroGenius S2 & S4**

Product Type	Enclosure	Protect. Options	Comms	Config	Port A Code	Port A Redun.	Port B Code	Port B Redun.	Port C Code	Port C Redun.	Port D Code	Port D Redun.
<b>S</b>	<b>4</b>	<b>C</b>	<b>1</b>	<b>0</b>	<b>H</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

(A) (B) (C) (D) (E) (F)

Contact the factory to configure chargers with multiple outputs or internal redundancy.

	Parameter	Code	Value
(A)	Product Family	S	MicroGenius S
(B)	Enclosure	2 4	S2 chassis S4 chassis
(C)	AC & DC protection configuration	A B C	Standard, no circuit breakers AC and DC circuit breakers AC and DC breakers plus supplementary surge protection (S4 only)
(D)	Communications	0 1 2 3	J-1939 and Modbus RS-485 J-1939 and Modbus TCP/IP J-1939 and Modbus RS-485 with RJ-45 to terminal block adapter J-1939 and Modbus TCP/IP with RJ-45 to terminal block adapter
(E)	Configuration	0 R T	Standard 19" rack mount ears (S4 only) 23" rack mount ears (S4 only)
(F)	Output Current	B S2: D E G C S4: G J K	20A 30A 40A 50A 25A 50A 75A 100A

Contact SENS or your local sales representative for additional specification, engineering and installation information, or visit SENS' website for latest available data. Specification subject to change without notice.

SENS, Stored Energy Systems, the battery/rectifier logo, Dynamic Boost, HELIX and MicroGenius are trademarks of Stored Energy Systems LLC. Patented US 9,270,140; 9,385,556; 9,413,186; 9,509,164; 9,466,995; 9,948,125.

## Contact Information

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