

MicroGenius®

Genset Battery Chargers

12 & 24 Volts, 6 to 60 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 60 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 60 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

State-of-the-art features

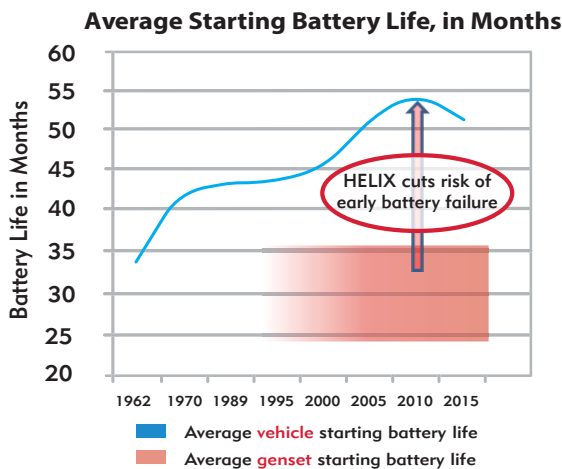
Patented Dynamic Boost™ charging

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



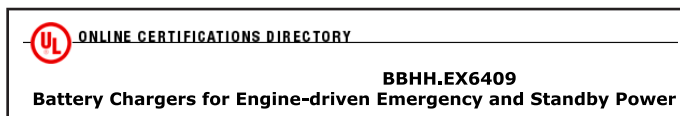
Safer, more reliable battery performance

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 60A output are UL listed to category code BBHH "Emergency & Standby Generators"



Dependable modular architecture

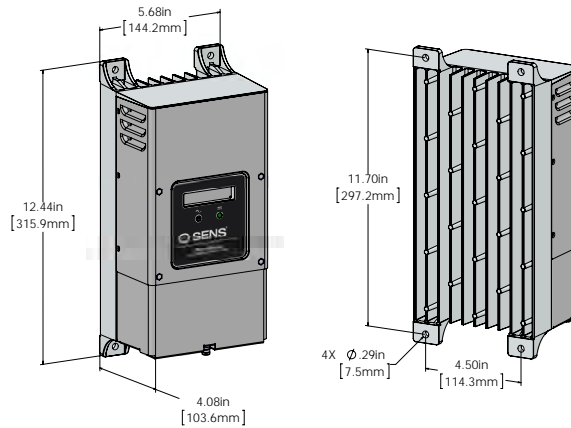
MicroGenius S2 and S4 employ multiple MicroGenius 450 chargers that enable either higher current output, internal redundancy or multiple outputs.



MicroGenius 2

6.0 lbs. (2.8 kg)

Choose **MicroGenius 2** if your DC current requirement is $\leq 15A$



Specifications for MicroGenius 2: 6A to 15A Output

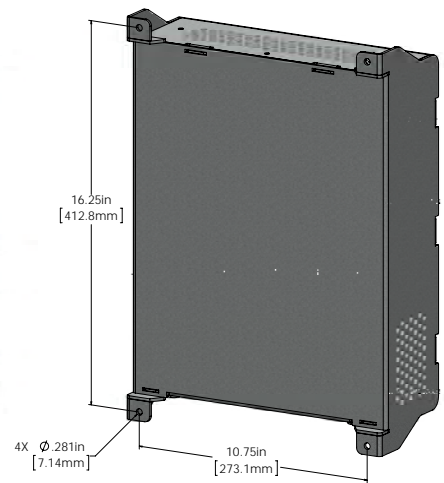
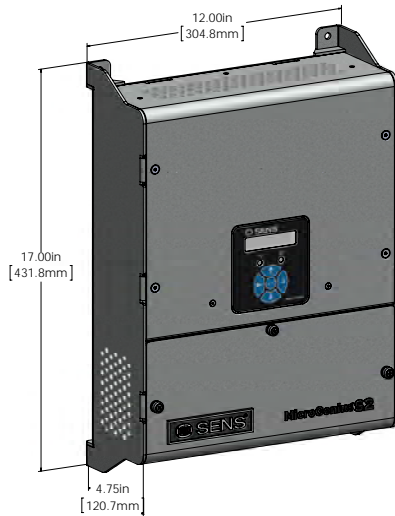
| | | MicroGenius 180 | MicroGenius 300 | MicroGenius 450 |
|-----------------------|--|---|---|--|
| AC input | VAC, Hz | 90-265 ¹ VAC, 47-63 Hz | | |
| | Protection | Supplementary overcurrent protection fuse, transient protected to EN 61000-4-5 level 4 | | |
| | Power factor & efficiency | PF > .95 typical; efficiency to 93%; meets CEC Title 20 Efficiency Regulations; standby AC draw < 3W | | |
| DC output | Volts, amps | 12V/24V nom., 10A/6A | 12V/24V nom., 12A/10A | 12V/24V nom., 15A/15A (24V, 12A max below 170 VAC) |
| | 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. ² | | |
| | Charging characteristic | Constant voltage, current limited; patented Dynamic Boost control and HELIX (when FLA battery is selected) | | |
| | Line & load regulation | $\pm 0.5\%$ | | |
| | 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. ³ | | |
| | 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 ⁴ | | |
| 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. ⁵ | | |
| | 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 | 3 methods: jumper pins, from front panel keypad ⁵ or from PC ² | | |
| Status display | LEDs | Two multi-color front panel status LEDs | | |
| | Metering & status display | Optional. Voltmeter accurate to +2%; ammeter to +5%; 20-character display of status & alarm messages. ⁶ | | |
| Alarms | Alarms | Factory set, field reconfigurable. 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 ⁷ or five ⁸ 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 | Proprietary bus for connection of paralleled chargers and SENS accessories | | |
| Environmental | Operating temperature ⁹ (convection cooled) | -40C to +70C; full spec from -40C to +60C | -40C to +70C; full spec from -40C to +50C | -40C to +70C; full spec from -40C to +40C |
| | Humidity | 5% to 95%, non-condensing | | |
| | Ingress protection | IP 22; NEMA 3R; UL Listed "Rainproof" | | |
| | Vibration & shock resistance | Vib: Swept Sine (EN60068-2-6): 4G, 18-500 Hz, 3 axes. Random: 20-500Hz, .01G ² /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 ¹⁰ ; CSA 22.2, No. 107.2. Certified to UL 1236 supplements SB (marine), SC (fire pump) and SE (emergency generator). | | |
| | | NFPA-70, NFPA-110 ¹¹ | | |
| | | FCC Part 15, Class B | | |
| | European Union (CE) | Seismic: Rigid & non-structure wall mount; max S _{ps} of 2.5G. IBC 2000-2015, Calif. BC 2007-2016 | | |
| | | American Bureau of Shipping, type approved | | |
| 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 | | |

¹ 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 ² Requires optional computer to charger adapter SENS p/n 209254 plus free SENS software available at www.sens-usa.com ³ Remote battery temp sensor is optional. Order SENS p/n 209481 ⁴ 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) ⁵ Requires that digit 12 of the model number be F ⁶ Requires that digit 12 of the model number be D, E, or F ⁷ Models with E as digit 12 of the model number include 2 ea. Form C alarm contacts ⁸ Models with D or F as digit 12 of the model number include 5 ea. Form C alarm contacts ⁹ At 65 deg. C and above the LCD display may be unreadable and display life will be reduced ¹⁰ Except 180W unit in 24V configuration, which is not listed to QWIR ¹¹ 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

13 lbs. (5.9 kg) maximum

Choose **S2** if your DC current requirement is > 15A and ≤ 30A, or if you need redundant or dual 15A output



Specifications for MicroGenius S2: 20A & 30A Output

| | | 20A | 30A |
|-----------------------|------------------------------|--|--|
| AC input | VAC, Hz | 90-265 ¹ VAC, 47-63 Hz | |
| | Protection | Supplementary overcurrent protection fuse, transient protected to EN 61000-4-5 level 4 | |
| | Power factor & efficiency | PF > .95 typical; efficiency to 93%; meets CEC Title 20 Appliance Efficiency Regulations | |
| DC output | Volts, amps | 12V/24V nom., 20A/20A | 12V/24V nom., 30A/30A (24V, 24A max below 170 VAC) |
| | 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. ² | |
| | 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. ³ | |
| | 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 ⁴ | |
| Adjustment & Controls | 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 ² | |
| Status display | LEDs | Two multi-color front panel status LEDs | |
| | Metering & status display | Voltmeter accurate to +2%; ammeter to +5%. 20-character display of status & alarm messages. | |
| Alarms | Alarms | Factory set, field reconfigurable. 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. | |
| 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 | Proprietary bus for connection of paralleled chargers and SENS accessories | |
| Environmental | Operating temperature | -40C to +70C; full spec from -40C to +40C (convection cooled) ⁵ | |
| | Humidity | 5% to 95%, non-condensing | |
| | Ingress protection | IP 20; NEMA 1. Optional drip shield for IP 22/NEMA 3R rating. ⁶ | |
| | Vibration & shock resistance | Vib: Swept Sine (EN60068-2-6): 4G, 18-500 Hz, 3 axes. Random: 20-500Hz, .01G ² /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 _{DS} of 2.5G. IBC 2000-2015, Calif. BC 2007-2016 | |
| | European Union (CE) | 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 2: 2011/65/EU (EN 50581) | |
| 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 | |

¹ When set for 24-volt output, full 30A output available above 170 VAC input, 24A output current max between 100 VAC and 170 VAC input ² Requires optional computer to charger adapter SENS p/n 209254 plus free SENS software available at www.sens-usa.com ³ Remote battery temp sensor is optional. Order SENS p/n 209481 ⁴ 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) ⁵ At 65 deg. C and above the LCD display may be unreadable and display life will be reduced ⁶ Drip shield is optional. Order SENS p/n 209291.

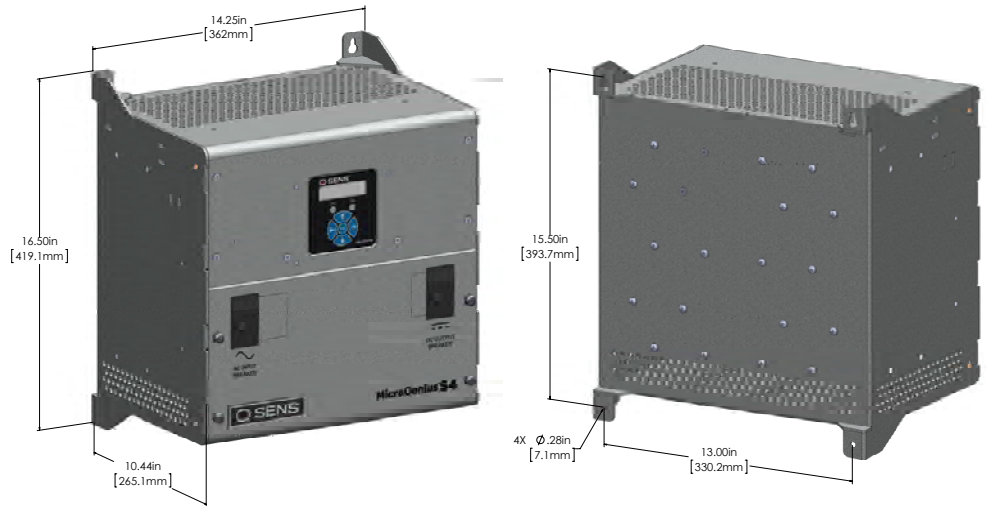
MicroGenius S4

32 lbs (14.5 kg) maximum

Choose S4 for:

- DC current >30A
- Circuit breakers
- Added surge suppression
- Internal redundancy
- 2 or more battery banks

19 or 23 inch rack mount brackets optional



Specifications for MicroGenius S4: 15A to 60A Output

| | | 15A | 30A | 45A | 60A |
|-------------------------------|--|--|-----------------------|-----------------------|-----------------------|
| AC input | VAC, Hz | 90-265 ¹ 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; efficiency to 93%; meets CEC Title 20 Appliance Efficiency Regulations | | | |
| DC output | Volts, amps | 12V/24V nom., 15A/15A | 12V/24V nom., 30A/30A | 12V/24V nom., 45A/45A | 12V/24V nom., 60A/60A |
| | 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. ² | | | |
| | 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. ³ | | | |
| | 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 ⁴ | | | |
| Adjustment & Controls | 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 ² | | | |
| Status display | LEDs | Two multi-color front panel status LEDs | | | |
| | Metering & status display | Voltmeter accurate to +2%; ammeter to +5%. 20-character display of status & alarm messages. | | | |
| Alarms | Alarms | Factory set, field reconfigurable. 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. | | | |
| 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 | Proprietary bus for connection of paralleled chargers and SENS accessories | | | |
| Environmental | Operating temperature | -40C to +70C; full spec from -40C to +40C (convection cooled) ⁵ | | | |
| | Humidity | 5% to 95%, non-condensing | | | |
| | Ingress protection | IP 20; NEMA 1. Optional drip shield for IP 22/NEMA 3R rating. ⁶ | | | |
| | Vibration & shock resistance | Vib: Swept Sine (EN60068-2-6): 4G, 18-500 Hz, 3 axes. Random: 20-500Hz, .01G ² /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 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 | | | |
| 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 _{DS} of 2.5G. IBC 2000-2015, Calif. BC 2007-2016 | | | |
| | 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) | | | |
| RoHS 2: 2011/65/EU (EN 50581) | | | | | |
| Construction | 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 | | | |

¹ When set for 24-volt output, full output available above 170 VAC input, output power reduced by approximately 20% for operation between 100 VAC and 170 VAC input (e.g. 24A for charger rated 30A) ² Requires optional computer to charger adapter SENS p/n 209254 plus free SENS software available at www.sens-usa.com ³ Remote battery temp sensor is optional. Order SENS p/n 209481 ⁴ 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) ⁵ At 65 deg. C and above the LCD display may be unreadable and display life will be reduced ⁶ 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 |
|--------------|----------|--------------|----------------|--------------|---------------|
| M | 4 | 22 | 1515 | F | N |
| (A) | (B) | (C) | (D) | (E) | (F) |

| | Parameter | Code | Value |
|-----|---|-----------------------|--|
| (A) | Product Family | M | MicroGenius 2 |
| (B) | Power | 1 3 4 | 180W 300W 450W |
| (C) | Output Voltage | 22 | 12/24V |
| (D) | Output Current | 1006 1210 1515 | 10A @ 12V; 6A @ 24V (180W only) 12A @ 12V; 10A @ 24V (300W only) 15A @ 12V; 15A @ 24V (450W only) |
| (E) | Alarm & Communication Options | A D E F | Base model; includes J-1939 & Modbus communications Base model + LCD display + 5 ea. Form C alarm relays Base model + LCD display + 2 ea. Form C alarm relays Base model + LCD + 5 ea. Form C relays + keypad control |
| (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. |
|--------------|-----------|------------------|----------|----------|-------------|---|-------------|---------------|-------------|---------------|-------------|---------------|
| S | 4 | C | 1 | 0 | H | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (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 (S4 only) 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 | A B D F H | 15A (S4 only) 20A (S2 only) 30A (S2 or S4) 45A (S4 only) 60A (S4 only) |

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.

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