

MicroGenius®

Industrial Reserve Power Battery Chargers

12 & 24 Volts, 6 to 60 Amps



Small. Powerful. Rugged.

- Hardened switchmode powertrain** - delivers first-class abuse resistance and energy efficiency
- Advanced microprocessor control** - allows advanced digital controls and communications
- Power supply or battery charger** - perfect for sensitive electronics or applications with/without battery
- Two standard battery check systems** - work with both constant and intermittent loads
- Standard Modbus communications** - enable easy integration with building and supervisory systems
- Small, lightweight packages** - enable installation in smaller spaces

Robust reliability. More power in less space.

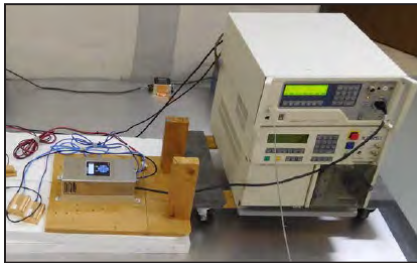
MicroGenius is a family of advanced technology 12- and 24-volt stationary battery chargers that deliver more power in less space. Ruggedized switchmode power conversion technology enables a rich set of standard features that are either unavailable in or add significant cost to competing legacy technology chargers.

MicroGenius is designed and tested to survive extreme electrical transients, temperature and vibration. Employing the field-proven MicroGenius 2 power conversion platform, dependability of S2 and S4 chargers can be further enhanced by specifying internal power converter redundancy.

State-of-the-art features

Mission-critical dependability

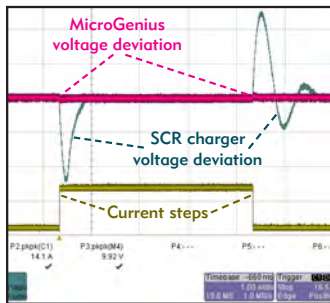
SENS' comprehensive approach to reliability includes expert engineering talent, worst-case analysis design, repeated and ongoing stress testing and highly automated assembly, test and burn-in.



Electrical transient testing MicroGenius 2

Rich standard feature set

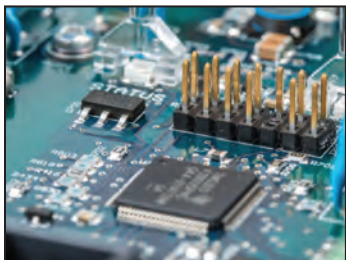
Standard with every charger: ripple-free output, fast dynamic response, Modbus communications, multiple alarm and communications choices, battery health check systems and global standards compliance.



Extremely fast dynamic response

State-of-the-art digital control

- Patented algorithms charge batteries faster & more safely
- Superb energy efficiency exceeds state-mandated regulations
- Comms, load sharing & other features "built-in" to every unit



State-of-the-art digital signal processor control

Dependable modular architecture

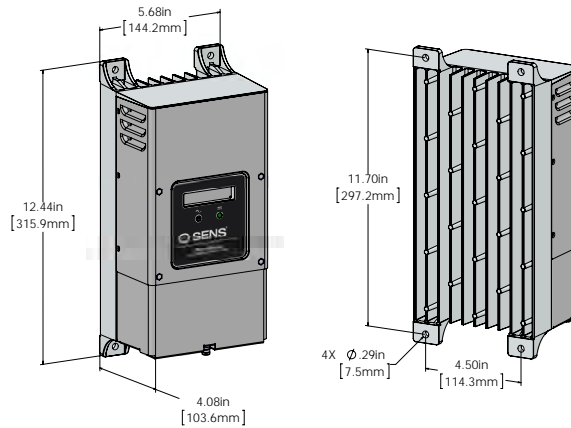
MicroGenius S2 and S4 employ multiple MicroGenius 450 chargers that enable either higher current output, internal redundancy or multiple outputs.



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

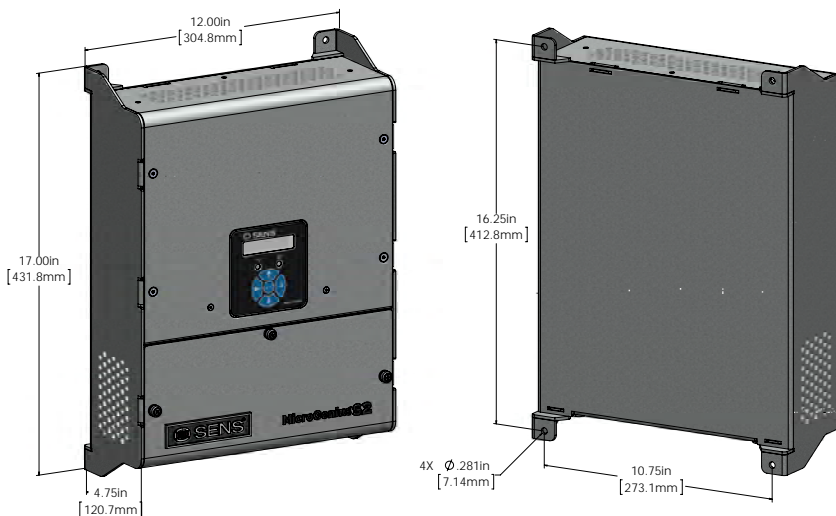
		MicroGenius 180	MicroGenius 300	MicroGenius 450
AC input	VAC, Hz	90-265 ¹ VAC, 47-63 Hz		
	Protection	Supplementary overcurrent protection fuse, transient protected to EN 61000-4-5 level 4		
	Power factor & efficiency	PF > .95 typical; efficiency to 93%; meets CEC Title 20 Efficiency Regulations; standby 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 commissioning charge modes		
	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		
	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. Manually initiated timed boost & commissioning modes available with keypad option		
	Adjustments	12 or 24-volt; battery type program; fine voltage setting; alarm setpoints; alarm relay mapping		
	Battery type programs	Flooded lead-acid, Ni-Cd, VRLA, ultracapacitor, lithium ⁵		
	Field voltage adjustment	3 methods: jumper pins, from front panel keypad ⁶ 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. ⁷		
Alarms	Alarms	Factory set, field reconfigurable. Alarm functions announced on the Modbus port 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 ⁸ or five ⁹ Form C contacts, each rated 30V, 2A resistive, assignable. Standard configuration includes summary, AC fail, charger fail, high DC volts, low DC volts and discharging battery.		
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 ¹⁰ (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 ¹¹ , CSA 22.2, No. 107.2. Certified to UL 1236 supplements SB (marine), SC (fire pump) and SE (emergency generator).		
		NFPA-70, NFPA-110 ¹²		
		FCC Part 15, Class B		
	European Union (CE)	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		
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 Contact factory to determine compatibility with the battery management system (BMS) of your lithium battery. ⁶ Requires that digit 12 of the model number be F ⁷ Requires that digit 12 of the model number be D, E, or F ⁸ Models with E as digit 12 of the model number include 2 ea. Form C alarm contacts ⁹ Models with D or F as digit 12 of the model number include 5 ea. Form C alarm contacts ¹⁰ At 65 deg. C and above the LCD display may be unreadable and display life will be reduced ¹¹ Except 180W unit in 24V configuration, which is not listed to QWIR ¹² 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 commissioning charge modes	
	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	
	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, Ni-Cd, VRLA, VRLA, ultracapacitor, lithium ⁵	
	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 Modbus port 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 discharging battery.	
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) ⁶	
	Humidity	5% to 95%, non-condensing	
	Ingress protection	IP 20; NEMA 1. Optional drip shield for IP 22/NEMA 3R rating. ⁷	
	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 1012 category QQUJ, CSA 22.2, No. 107.2	
		NFPA-70, NFPA-110	
		FCC Part 15, Class A	
	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	
		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 Contact factory to determine compatibility with the battery management system (BMS) of your lithium battery. ⁶ At 65 deg. C and above the LCD display may be unreadable and display life will be reduced ⁷ Drip shield is optional. Order SENS p/n 209291.

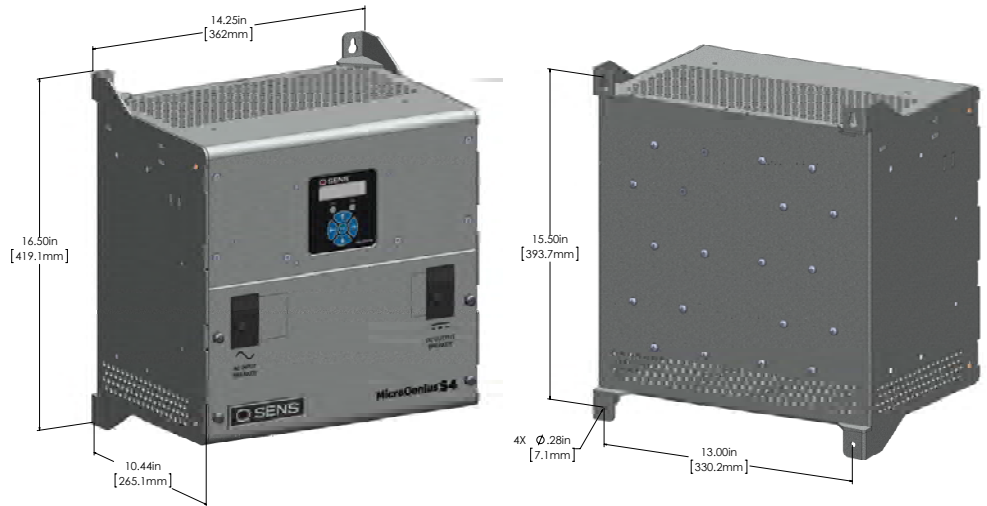
MicroGenius S4

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 commissioning charge modes			
	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			
	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, Ni-Cd, VRLA, ultracapacitor, lithium ⁵			
	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 Modbus port 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 discharging battery.			
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) ⁶			
	Humidity	5% to 95%, non-condensing			
	Ingress protection	IP 20; NEMA 1. Optional drip shield for IP 22/NEMA 3R rating. ⁷			
	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 1012 category QQU, CSA 22.2, No. 107.2			
		NFFPA-70, NFFPA-110			
		FCC Part 15, Class A			
	European Union (CE)	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			
		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 Contact factory to determine compatibility with the battery management system (BMS) of your lithium battery. ⁶ At 65 deg. C and above the LCD display may be unreadable and display life will be reduced ⁷ 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.

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