

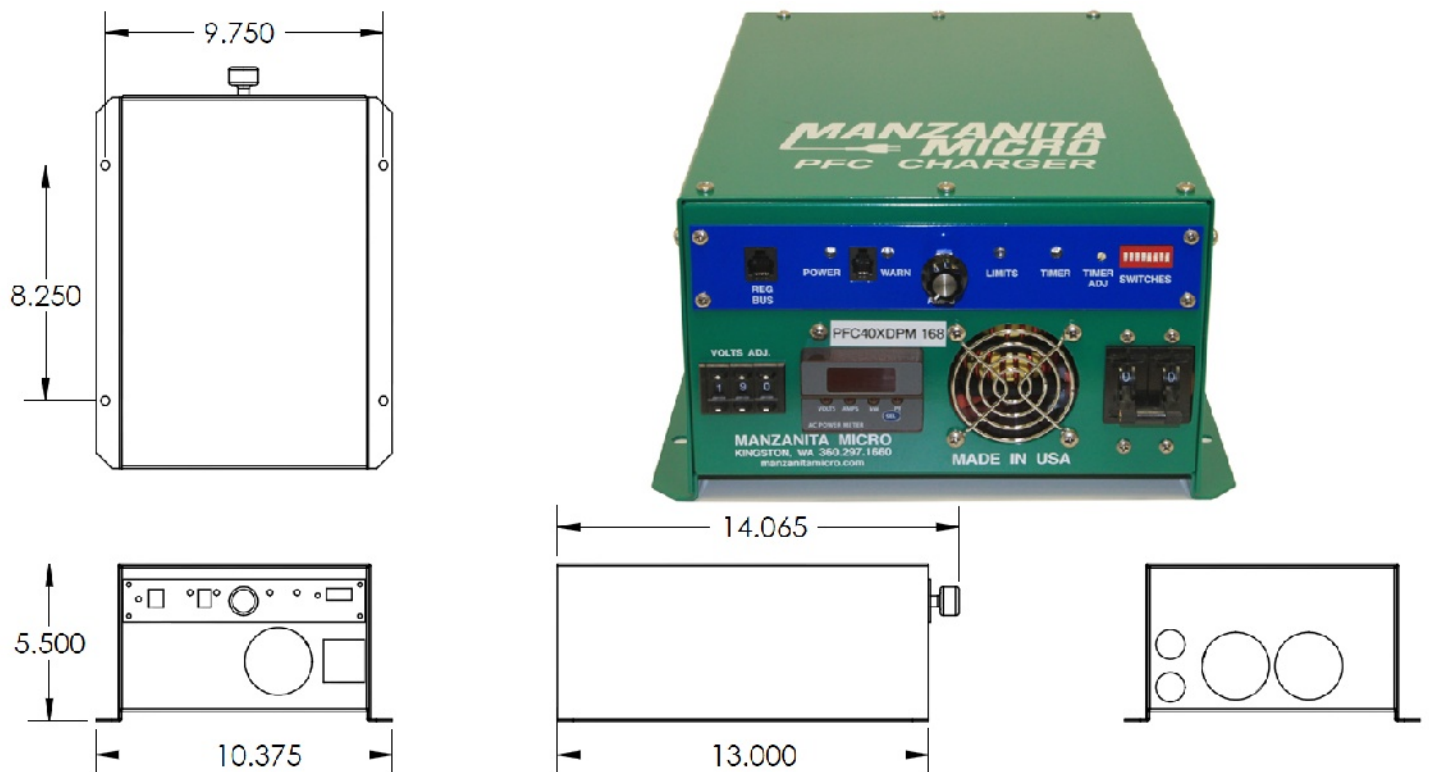


PFC-20/30/40

EV BATTERY
CHARGER

The Manzanita Micro PFC-20, PFC-30 and PFC-40 chargers share the same size enclosure. With a fully adjustable output voltage for battery packs from 12 to 450VDC and power levels of up to 9.6kW we think you'll agree that there are no other EV battery chargers that are this flexible or powerful in such a small footprint.

There are no input voltage settings to change, simply plug into any AC wall outlet from 100 to 250 volts and 40 to 80 hertz. Current is easily adjustable allowing users to fine tune the unit to pull the maximum amount of amps from whatever outlet is available. Starting in 2011 all PFC-30 and PFC-40 chargers come standard with built-in digital input current meters allowing quick and precise amperage adjustments. The small size, flexible input and output ranges and ease of user adjustable features make Manzanita Micro chargers an exceptional on-board charging solution so your electric vehicle should never encounter a single phase outlet it cannot use. It is no wonder Manzanita Micro chargers are used in electric vehicles in countries all across the globe.



The PFC-20, PFC-30 and PFC-40 series chargers weigh in at approximately 18 pounds (8.2 kg)

The maximum outermost dimensions including foot flanges and protrusions are approximately:
14" L x 10.5" W x 5.75" H (358mm x 264mm x 145mm)

Input Voltage Range : 100 to 240VAC 40-80Hz computer grade pure sine wave

Output Voltage Range : 12 to 450VDC (+/- 1 volt)

Operating Temp Range : -20° F to +120° F (-28.8° C to +48.8° C)

Power Consumption : Up to 9.6kW ~ PFC40 / 7.2kW ~ PFC30 / 4.8kW ~ PFC20

The 20, 30 or 40 nomenclature is indicative of how many amps that charger is rated to draw from the AC line. Unlike some other chargers, this is the rated continuous load and all units are thoroughly tested to their rated limits before leaving Manzanita Micro. Chargers can be set up to accept SAE J1772 communication.



PFC-20/30/40

EV BATTERY
CHARGER

| | PFC-20 | PFC-30 | PFC-40 |
|---|---|--------------------------------|--------------------------------|
| Input voltage range | 100-250 Volts AC | | |
| Line frequency | 40-80 Hz | | |
| Output voltage range | 12-450 Volts DC | | |
| Input current range | 0.2 to 20 Amps AC | 0.2 to 30 Amps AC | 0.3 to 40 Amps AC |
| Standard output | 0 to 20 Amps DC | 0 to 40 Amps DC* | 0 to 40 Amps DC |
| Output -buck enhanced | 0 to 30 Amps DC | 0 to 40 Amps DC | 0 to 40 Amps DC |
| Standby current | 0.2 Amps DC | 0.2 Amps DC | 0.3 Amps DC |
| Air cooling path | In the back, out the front | | |
| Cooling fan control | Thermostat controlled variable speed fans are standard features on air cooled units | | |
| Input cable | #10-3 SO Cable | #10-3 SO Cable | #6-4 SO cable |
| Input connector | Unterminated | NEMA 14-30 | NEMA 14-50 |
| Output cable | #10-3 SO Cable | #8-3 SO Cable | #4-3 SO cable |
| Output connector | 50 Amp Andersen Gray | | |
| Input protection | 30 amp 240 volt breaker | 30 amp 240 volt breaker | 50 amp 240 volt breaker |
| Output protection (stock) | 30 amp 450 VDC clip mount fuse | 50 amp 450 VDC stud mount fuse | 60 amp 450 VDC stud mount fuse |
| Output protection (with buck enhancement) | 50 amp 450 VDC stud mount fuse | 50 amp 450 VDC stud mount fuse | 60 amp 450 VDC stud mount fuse |
| Mounting bolt holes | 4 each 5/16 inch | | |
| Charger type | Switch mode PFC | | |
| Topology | Two transistor fly back | | |
| Isolation input to output | None, negative terminal of input bridge rectifier is connected to battery negative | | |
| Charge algorithm | Constant current then constant voltage | | |
| Current adjustment | Front panel knob or optional connection on rear | | |
| Voltage adjustment | Front panel recessed 20 turn trim pot (20 volts per turn) or optional digipot | | |
| Charge timer modes | NO timeout | | |
| | Starts at Constant Current Stage | | |
| | Starts at Constant Voltage Stage | | |
| | Starts when first BMS unit commands it | | |
| Charge timer settings | Zero to 150 minutes in 10 minute increments | | |
| Switching frequency | 50 kHz | | |
| Power factor into 400V | Typically >.99 | | |
| Efficiency into 400V | Typically >90% | | |
| Full power current ripple (peak to peak) | 2X the average DC value | | |

*All PFC-30 & 40 chargers are buck enhanced so a PFC-30 is capable of moving up to 40A into a low voltage pack but a PFC-40 is better for H.V. packs. Maximum power levels are 4.8kW, 7.2kW and 9.6kW for PFC-20, 30 and 40 respectively.