The Power Train PTC1220, 30 and 40 Battery Chargers are designed to effectively charge all automotive and industrial type batteries. Manufactured to the latest design parameters and highest quality levels, they incorporate a unique micro-processor controlled Eight Stage Pulse Charging system, which intelligently assesses battery condition and size, to make battery charging much safer, much more effective - and thus prolong battery life. They are ideal for Automotive, Motorhome and Marine applications, to ensure the correct, safest and BEST method of charging a high capacity 12V battery bank or individual batteries.

**Charging Stages:**

**Stage 1 – “Desulphation”**
- This initial start up stage, a high frequency voltage pulse (0.5 sec) is used to assist in “waking up” a deeply discharged battery. This method of pulse charging can also help to reduce build up of sulphate crystals that may have formed on the battery plates during the time it was discharged. This stage will last as long as it takes the battery to reach approximately 10 volts. If the connected battery is only slightly discharged, this stage may only be activated for a short time before automatically switching to the next “soft start” stage.

**Stage 2 – “Soft Start”**
- After the battery is connected, most conventional “Smart” Battery Chargers will immediately apply a high charging voltage and current output. This creates a large amount of gas and heat from the battery and when the consistency of the battery electrolyte / state of cell charge is uneven - (from time to time the consistency of the battery electrolyte can be uneven from daily use) - a full load charging characteristic can result in a potential of damaging overcharge. The Soft Start function eliminates this situation by starting the charging process slowly and softly, battery electrolyte and cell charge is able to settle back down, thus giving an accurate reading of remaining charge, while charging the battery, the advanced microchip monitoring and controlling the system will also monitor the condition of the battery. This prevents battery plate oxidation; evens the battery type LED indicators and illuminated charge curve diagram amperage and percentage of battery charge (99% flashing when fully charged). When a battery is first connected, voltages will climb well over 12V and may have formed on the battery plates during the time it was discharged. This method of pulse charging can also help to reduce build up of sulphate crystals that may have formed on the battery plates during the time it was discharged. This stage will last as long as it takes the battery to reach approximately 10 volts. If the connected battery is only slightly discharged, this stage may only be activated for a short time before automatically switching to the next “soft start” stage.
- After the Absorption charging stages, the battery charger will start the “Analysis” stage and will stop charging the battery for approximately 2 minutes. At this point, if the battery voltage is sensed at below 12.6V, the battery alarm and faulty battery indicator L.E.D will be tripped (“Faulty Battery” indicator enables only if a faulty battery is detected). When the battery voltage is equal to or above 12.6V, the next Boost charge stage will start.

**Stage 3 – “Boost”**
- This is the main hard charging stage, where the charger will operate at the maximum rated current output (20A, 30A or 40A depending on model), until the battery reaches a voltage of 14.7V (for Lead-acid/AGM), 15.6V (for Calcium) or 14.2V (Gel). Charging time period is determined by the capacity and charge state of the battery.

**Stage 4 – “Absorption”**
- After the Bulk stage, the charger will automatically begin to reduce its current output depending on the charge acceptance into the battery, while maintaining the 14.7V or 14.2V setting. When the current reaches a predetermined threshold level of 5A (PTC20), 6A (PTC30) or 8A (PTC40) – charging will automatically halt, allowing the Analysis stage to be performed.

**Stage 5 – “Analysis” (Testing the battery while charging)**
- After the Absorption charging stages, the battery charger will start the “Analysis” stage and will stop charging the battery for approximately 2 minutes. At this point, if the battery voltage is sensed at below 12.6V, the battery alarm and faulty battery indicator L.E.D will be tripped (“Faulty Battery” indicator enables only if a faulty battery is detected). When the battery voltage is equal to or above 12.6V, the Boost charge stage will start.

**Stage 6 – “Boost”**
- After successfully analyzing the battery condition, the charger will enter the Boost charge stage, which will charge at a higher voltage ensuring the battery attains a 100% full charge. The current output is limited at 25% of the maximum rated charger output. Once the current drops to 3A (PTC20); 4A (PTC30) or 6A (PTC40), the charger will enter the Boost charge stage.

**Stage 7 – “Float”**
- This stage will “even out” the voltage between all cells maintaining a constant voltage with a reduced current, thus prolonging the battery service life charging. The “Lead-acid/AGM” / Calcium or “Gel” selector switch alters the charging stage voltage parameters for the last three critical charging stages, allowing all types of batteries to be effectively charged and ready for optimal use.

**Temperature compensated voltage adjustment automatically adjusts the charging voltage according to the environmental ambient temperature (35mV / °C per battery cell). In summer, this function helps decrease battery heat generated while charging, thus minimizing the loss of battery electrolyte and preventing battery deformation caused by excessive heat during charging cycles. In winter, this function will help to fully charge the battery, preventing battery capacity loss caused by under-charging, and thus helping to extend the battery lifespan.**

**V-Charge function**
- While charging the battery, the advanced microchip monitoring and controlling the system will also monitor the condition of the battery. This prevents battery plate oxidation; evens the battery type LED indicators and illuminated charge curve diagram amperage and percentage of battery charge (99% flashing when fully charged). When a battery is first connected, voltages will climb well over 12V and may have formed on the battery plates during the time it was discharged. This method of pulse charging can also help to reduce build up of sulphate crystals that may have formed on the battery plates during the time it was discharged. This stage will last as long as it takes the battery to reach approximately 10 volts. If the connected battery is only slightly discharged, this stage may only be activated for a short time before automatically switching to the next “soft start” stage.

**Complete Eight Stage Pulse Charging cycle including: desulphation, Deep Cycle and Calcium batteries.**
- The “Lead-acid/AGM” / Calcium or “Gel” selector switch alters the charging stage voltage parameters for the last three critical charging stages, allowing all types of batteries to be effectively charged and ready for optimal use.

**Zero volt minimum start – can charge a completely flat battery.**
- The Power Train PTC1220, 30 and 40 Battery Chargers are designed to effectively charge all automotive and industrial type batteries. Manufactured to the latest design parameters and highest quality levels, they incorporate a unique micro-processor controlled Eight Stage Pulse Charging system, which intelligently assesses battery condition and size, to make battery charging much safer, much more effective - and thus prolong battery life. They are ideal for Automotive, Motorhome and Marine applications, to ensure the correct, safest and BEST method of charging a high capacity 12V battery bank or individual batteries.

**Working Temperature:**
- -15 °C to +40°C

**Chargeable Battery Type:**
- 17AH to 600AH - (12V Lead Acid; Calcium; Gel; AGM types only)

**Built-in automatic Cooling Fan.**
- Battery Testing function while charging (faulty batteries will activate the battery alarm and faulty battery indicator L.E.D will be tripped (“Faulty Battery” indicator enables only if a faulty battery is detected). When the battery voltage is equal to or above 12.6V, the Boost charge stage will start.

**Battery Testing function while charging (faulty batteries will activate the battery alarm and faulty battery indicator L.E.D will be tripped (“Faulty Battery” indicator enables only if a faulty battery is detected). When the battery voltage is equal to or above 12.6V, the Boost charge stage will start.**

**BATTERY CHARGER TECHNICAL SPECIFICATIONS**

- **Input Voltage:** AC 115V / 230V ± 10%
- **Chargable Battery Type:** 17AH to 600AH - (12V Lead Acid; Calcium; Gel; AGM types only)
- **Maximum Output Power:** PTC1220 (278W), PTC1230 (468W), PTC1240 (704W)
- **Battery Temperature Setting: -15°C to +40°C
- **Automatic adjustment of charging voltages according to the environmental ambient temperature.**
- **Overcharge protection: protecting the battery from damage due to overcharging.**
- **Reversal polarity protection: short circuit protection; overload protection; high temperature protection.**
- **Battery type selector button (Gel Batteries require lower charging voltage compared to Lead-acid / AGM & Calcium Batteries).**
- **LED display simultaneously showing charging voltage, charging amperage and percentage of battery charge (99% flashing when fully charged).**
- **Battery type L.E.D indicators and illuminated charge curve diagram (clearly identifying charging stage and sequence to the operator).**
- **Battery Testing function while charging (faulty batteries will activate the Faulty Battery’ indicator L.E.D and the warning alarm).**
- **Built-in automatic Cooling Fan.**

**Advanced Features:**
- **Zero volt minimum start – can charge a completely flat battery.**
- **Automatic adjustment of charging voltages according to the environmental ambient temperature.**
- **Overcharge protection: protecting the battery from damage due to overcharging.**
- **Reversal polarity protection: short circuit protection; overload protection; high temperature protection.**
- **Battery type selector button (Gel Batteries require lower charging voltage compared to Lead-acid / AGM & Calcium Batteries).**
- **LED display simultaneously showing charging voltage, charging amperage and percentage of battery charge (99% flashing when fully charged).**
- **Battery type L.E.D indicators and illuminated charge curve diagram (clearly identifying charging stage and sequence to the operator).**
- **Battery Testing function while charging (faulty batteries will activate the Faulty Battery’ indicator L.E.D and the warning alarm).**
- **Built-in automatic Cooling Fan.**

**Multiple Stage Charging System:**
- The microchip controlled automatic eight stage charging system provides accurate detection, monitoring and control of the charging output voltage and current in turn preventing serious over charge or short charging of the battery. This prevents battery plate oxidation; evens the consistency of the battery electrolyte; minimizes battery temperature rising while charging; recovers the battery capacity faster and extends battery life.

**The “Lead-acid/AGM” / Calcium or “Gel” selector switch alters the charging stage voltage parameters for the last three critical charging stages, allowing all types of batteries to be effectively charged and ready for optimal use.**

**Temperature compensated voltage adjustment automatically adjusts the charging voltage according to the environmental ambient temperature (35mV / °C per battery cell). In summer, this function helps decrease battery heat generated while charging, thus minimizing the loss of battery electrolyte and preventing battery deformation caused by excessive heat during charging cycles. In winter, this function will help to fully charge the battery, preventing battery capacity loss caused by under-charging, and thus helping to extend the battery lifespan.**

While charging the battery, the common is to see the voltage and percentage of remaining charge LED Displays to fluctuate up and down. When a battery is first connected, voltages will climb well over 12V and later drop back down. This will have an effect on the percentage of remaining charge display as the onboard software will calculate this figure based on the battery voltage reading. After the battery charger finishes its bulk and absorption stages, the charge voltages will slowly settle back down, thus giving an accurate reading of remaining charge, so please allow appropriate time to gather an accurate reading of percentage of remaining charge.

**Protection and Warning functions:**
- While charging the battery, the advanced microchip monitoring and controlling the system will also monitor the condition of the battery. This prevents battery plate oxidation; evens the battery type LED indicators and illuminated charge curve diagram amperage and percentage of battery charge (99% flashing when fully charged).