McCulloch 10-Series Electric-Start Battery & Charging Reference

Mac 3-10E | Mac 5-10E | Mac 10-10E | Super 10-10E

Standalone reference compiled from McCulloch factory literature and owner/rebuilder reports

Confirmed common factory system: The four IPLs listed in this guide all show Battery Assembly 66161 and Switch/Regulator Assembly 68145, along with the same battery spacer 66234, two battery straps 65501, battery-to-resistor lead 65541, resistor 65518, battery box cover 65470 and phono charging jack 65567. The McCulloch 10-Series Shop Manual P/N 63084 covers the electric-start system and is the key service source.

1. Factory system - quick reference

Item	Factory information
System	12-volt DC electric start; starter also functions as generator
Original battery	10 nickel-cadmium (NiCd) cells; 1 ampere-hour
Pack arrangement	Five wrapped pairs (10 total cells); three pairs toward the front of the battery box and two pairs toward the handle
Fully charged pack	Above 12 V with no load; above 10 V while cranking
Individual pair check	2.2-2.6 V no-load; 1.8-2.2 V under starter load
Charging begins	Generator function takes over around 4,000-4,500 RPM
Normal charging	At cutting speed, approximately 12-15.4 V and up to 6 A
Regulator check	Voltage should rise to about 14.9-15.4 V, then drop as the regulator cuts out
Fast charge	Original discharged NiCd pack: about 10-13 minutes at 6,000-7,000 RPM
External charger	McCulloch Charger Assembly 67098; original manual allows up to about 24 hours for a fully discharged original NiCd pack

Important diagnostic caution: The shop manual states that an unloaded starter/generator can produce more than 40 V at cutting speed. Use the factory test procedure or a meter with adequate range when testing the generator open-circuit.

2. Battery pack physical layout and wiring

Physical layout in the battery box (from Shop Manual 63084):

Front	Pair 1 (2 cells)	Pair 2 (2 cells)	Pair 3 (2 cells)	Spacer	Pair 4 (2 cells)	Pair 5 (2 cells)
All 10 cells form the 12-V pack. The manual treats them as five wrapped pairs for testing.						

- Large black battery lead -> larger black lead coming through the front grommet of the battery box.
- Large red battery lead -> red lead from the switch/regulator.
- Small red battery lead -> center contact of the phono charging jack.
- Small black battery lead -> side/outer terminal of the phono charging jack.
- The battery spacer sits between the group of three pairs and the group of two pairs.

3. Shared electric-start parts confirmed by the IPLs

P/N	Description	Verified applications
65470	Cover - battery box	3-10E, 5-10E, 10-10E, Super 10-10E
65567	Phono jack	3-10E, 5-10E, 10-10E, Super 10-10E
66234	Spacer - battery	3-10E, 5-10E, 10-10E, Super 10-10E
65501	Strap assembly - battery (2)	3-10E, 5-10E, 10-10E, Super 10-10E
66161	Battery assembly	3-10E, 5-10E, 10-10E, Super 10-10E

65541	Wire assembly - battery to resistor	3-10E, 5-10E, 10-10E, Super 10-10E
65518	Resistor	3-10E, 5-10E, 10-10E, Super 10-10E
68145	Switch / regulator assembly	3-10E, 5-10E, 10-10E, Super 10-10E

Do not assume every electric component is interchangeable. The four saws share the core battery/control parts above, but some supports, braces, field/coil components and other details vary by model and production code. Use the exact IPL for the saw being repaired.

4. Factory publications - hosted copies

All McCulloch factory-document links in this guide point to copies hosted in the McCulloch Reference Library. Third-party links are used only for owner/rebuilder discussions and videos that are not documents hosted in the library.

Mac 3-10E - Master IPL P/N 84481 (May 1970)
Hosted factory PDF. Figure 8 covers the electrical components and identifies Battery Assembly 66161 and Switch/Regulator 68145. Open hosted PDF

Mac 5-10E - Master IPL P/N 86081 (July 1971)
Hosted factory PDF. Figure 6 covers the electrical system. This IPL explicitly lists Shop Manual 63084 and Battery Charger Assembly 67098. Open hosted PDF

Mac 10-10E - IPL P/N 68857 (September 1968)
Hosted factory PDF. Figure 5 covers the electrical system; accessories list Shop Manual 63084 and Charger Assembly 67098. Open hosted PDF

Super 10-10E - IPL P/N 69914 (August 1969)
Hosted factory PDF. Uses Battery Assembly 66161 and Switch/Regulator 68145; accessories list Shop Manual 63084 and Charger Assembly 67098. Open hosted PDF

McCulloch 10-Series Shop Manual - P/N 63084
Hosted factory shop manual. Primary service source for operation, wiring, battery testing, paired-cell testing, regulator checks, starter/generator tests, pack removal/installation and charging. Open hosted Shop Manual 63084

McCulloch Publications Guide
Hosted McCulloch factory publication index useful for confirming which IPL and service manual applies to a given model. Open hosted Publications Guide

5. Practical rebuild information from owners and restorers

These are secondary, owner-generated sources - useful for practical experience, but not factory specifications. Where owner reports conflict with McCulloch literature, use the factory manual as the baseline.

ArboristSite - 3-10E battery-start rebuild thread
Long-running discussion with photos of original packs, confirmation that the five visible sections contain 10 cells, and multiple owner rebuild experiences. Later posts include a Li-ion pack rebuilt by Batteries Plus and charged with a separate Li-ion charger. Open discussion

ArboristSite - page 3 of the 3-10E thread
Contains the 10-cell/five-pair discussion and the 2018 Li-ion replacement report. Useful as an example of a non-original approach, not proof that Li-ion is compatible with the factory charging circuit. Open discussion

ArboristSite - McCulloch Chain Saws, page 598
Owner report of a battery shop making five sets of two cells each; the pack worked in a 3-10E for several years before capacity declined. Open discussion

OPE Forum - 3-10E rebuild/operating report
Owner states that a battery store can build the pack using Sub-C NiCd cells and reports the saw starts and charges normally. The factory manual does not specify the physical cell size, so treat 'Sub-C' as owner experience rather than a McCulloch specification. Open discussion

OPE Forum - 5-10E electrical discussion
Discussion of the 5-10E IPL, wiring diagram and regulator circuitry. Open discussion

OPE Forum - 5-10E regulator/rebuild discussion
Owner working on a damaged regulator discusses using an external modern charger and disabling generator charging as a possible safer modernization path. Open discussion

YouTube - McCulloch 5-10E electric-start system test
Video demonstration of the 5-10E electric-start system. Open video

YouTube - Electric Start McCulloch 5-10E Chainsaw Revival
A more recent 5-10E revival video showing a complete electric-start saw project. Open video

6. Battery chemistry - what is verified and what is not

Verified: The original system is a 10-cell, 1-Ah NiCd pack and the saw's regulator/charger was designed around that pack. McCulloch does not specify the physical cell size in the service text reviewed here.

Sub-C NiCd: Several experienced owners report successful rebuilds with Sub-C NiCd cells. This is practical owner evidence, not a factory cell-size specification.

NiMH compatibility: Community posts disagree about substituting NiMH while retaining the factory charging circuit. I cannot confirm this from McCulloch documentation.

Lithium-ion: At least one owner reports a successful Li-ion pack used with a separate Li-ion charger. The factory on-saw charging system was not designed for lithium chemistry; do not assume a lithium pack is a drop-in replacement for a NiCd pack.

7. Rebuild approach that stays closest to the factory design

- Retain the original battery box, cover, straps, spacer and phono jack when serviceable.
- Use 10 rechargeable NiCd cells connected to reproduce the original 12-V pack, arranged as five wrapped pairs.
- Match the original lead polarity and phono-jack wiring exactly.
- Before relying on the saw to charge the new pack, test the regulator behavior. Stop the engine if pack voltage continues rising above about 15.4 V.
- Check the complete pack and each wrapped pair under load using the factory voltage values before declaring the rebuild complete.
- If changing chemistry, treat it as a redesigned battery/charging system rather than a direct battery replacement; use chemistry-specific protection and charging.

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