

2025 Buyer's Guide: PCB Assembly for Electric Motor Controllers

Your essential sourcing handbook for high-performance, low-MOQ PCB manufacturing

Why This Guide?

Electric motor controllers are the core of automation, EVs, and motion systems — but poor PCB quality, high MOQs, or long lead times can derail a project. This guide empowers engineers and decision-makers with **expert checklists**, **vendor comparisons**, and **actionable sourcing tips**.

Technical Challenges in Motor Controller PCB Assembly

When designing PCBs for motor control, engineers must address:

- **EMI & EMC:** Sensitive analog and digital signal paths
- **High-Current Routing:** Wide traces and copper pours for MOSFETs
- **Thermal Management:** Heat sinks, vias, and aluminum base options
- **Component Tolerances:** Precision matters for sensors and gate drivers
- **Stack-Up Complexity:** 4–8+ layers with isolation zones

These challenges require suppliers with deep technical expertise — not just low cost.

Turnkey PCB Assembly Process Checklist

A reliable vendor will offer this 5-step process:

Step	Description
✓ 1. Design for Manufacturing (DFM) Review	Pre-check for layout flaws, material compatibility
✓ 2. Sourcing & BOM Verification	RoHS/ISO-compliant components
✓ 3. Assembly (SMT & THT)	Automated placement, reflow, selective soldering
✓ 4. Testing & Inspection	AOI, functional testing, BGA X-ray
✓ 5. Packaging & Logistics	ESD-safe, export-compliant, tracked delivery

BONUS: Choose a vendor offering test fixture support for actuator control.

Top 10 Global PCB Assembly Companies in 2025

Rank	Company Name	Region	MOQ	Turnkey	Testing	Specialization
1	TTM Technologies	USA	High	✓	✓	Aerospace, industrial
2	Nippon Mektron	Japan	High	✗	✓	Automotive
3	Viasion	China	Low	✓		Prototyping
4	Compeq	Taiwan	Medium	✓	✓	High-power systems
5	Jabil	USA	High	✓	✓	OEM, industrial
6	Unit Circuits	China	None	✓	✓	Motor controller PCBs
7	PCBWay	China	Low		✓	Low-cost prototyping
8	Sanmina	USA	High	✓	✓	Robotics, industrial
9	FastPrint	China	Medium	✓	✓	High-layer PCBs
10	Unimicron	Taiwan	High	✓	✓	Automotive-grade

✓ PCB Supplier Evaluation Checklist

Print and use this to qualify vendors:

- ☐ No MOQ or low-volume-friendly
- ☐ Functional testing included
- ☐ Engineering support (DFM, DFT, BOM review)
- ☐ IPC-A-610 Class 2/3 standards
- ☐ Compliance: RoHS / ISO9001 / CE
- ☐ Serves motor control / actuator industries
- ☐ Capable of thermal and EMI-sensitive layout

Vendor Comparison Worksheet

Vendor Name	MOQ	Lead Time	Testing	Certs	Notes

Use this page in vendor meetings or RFQ reviews.

Why Choose Unit Circuits?

- **No MOQ** – perfect for R&D and custom builds
- **Fast PCB prototyping** (delivery in 5–7 days)
- **Functional testing & AOI** included
- **motor driver, actuator and smart control PCB assembly**
- Export-ready (RoHS, ISO, CE compliant)

- Project name
- BOM (.xls or .csv)
- Gerber files (.zip)
- Target lead time
- Testing requirements
- Volume (prototyping or production)