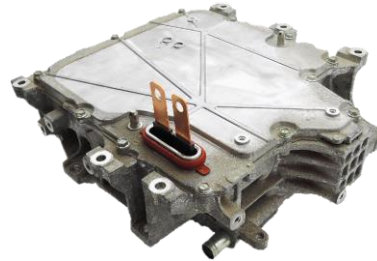


2018 Tesla Model 3



2019 Nissan Leaf



2019 Audi e-tron



2019 Jaguar I-PACE



2020 Tesla Model Y – Front & Rear

*Coming Soon!*

**NEW**

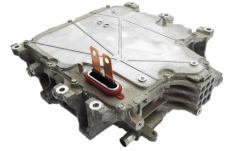
## Inverter Benchmark & Cost Report

**\$24,000 USD**  
*(Model 3 & Nissan Leaf)*

Munro's Inverter Report provides a detailed analysis of Battery Electric Vehicles (BEV) inverters.

The Benchmark Report is highly advantageous for OEMs or suppliers looking to effectively expand and compete in new EV markets.

The report is a comprehensive analysis of each Inverter. This report contains descriptive and pictorial detail on every facet of the inverters dimensional data, manufacturing process, schematics, block diagrams and detailed cost analysis.



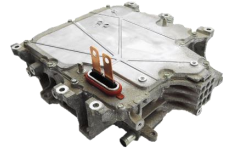
## Inverter Benchmark Report Content

- ❖ Those who purchase the report will receive a single report containing:
  - a. Executive Summary
  - b. Side by Side Summary
  - c. Inverter views, dimensions, mounting approach, cooling strategy
  - d. PCB circuit diagrams, schematics and block diagrams
  - e. PCB bill of material
  - f. Costed Bill of Material

| Component              | Cost    | Weight (kg) |
|------------------------|---------|-------------|
| Tesla Model 3 Inverter | \$ xxxx | 4.81        |
| Nissan Leaf Inverter   | \$ xxxx | 11.14       |
| Jaguar I-Pace Inverter | \$ xxxx | 8.10        |

\* Cost and weights include: Housing, PCBA, IGBT Module & Cooling Structure, DC-link Capacitor, Motor Phase Lead, Connectors, Self-contained structural and connected components.

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## Inverter Costed Bill of Material

- ❖ The costed bill of materials (CBOM) are a consolidated view of the cost information presented in the reports. A CBOM report is included for each inverter analyzed in PDF format.
- ❖ The CBOM and media BOM are an indented format and include:
  - Part Name
  - Part Number
  - Material
  - Total Cost
  - Weight
  - Quantity
  - Total Weight

**Tesla Model 3 Inverter - CBOM**

| Level | Type    | Name   | Number  | Material Name | Total Cost* (Each) | Qty | Total Cost* |
|-------|---------|--|---|---------------|--------------------|-----|-------------|
| 3     | Process | TM3 Plastic Shield 1, Busbar FETs to Cap Bank    | TM3 Plastic Shield 1, Busbar FETs to Cap Bank | _PA66 GF-30   | \$0.06             | 1   | \$0.06      |
| 4     | Process | Process TM3 Plastic Shield 1, Busbar FETs to Cap | ×   | ×             | \$0.06             | 1   | \$0.06      |
| 3     | Process | TM3 Plastic Shield 2, Busbar FETs to Cap Bank    | TM3 Plastic Shield 2, Busbar FETs to Cap Bank | _PA66 GF-30   | \$0.04             | 1   | \$0.04      |
| 4     | Process | Process TM3 Plastic Shield 2, Busbar FETs to Cap | ×   | ×             | \$0.04             | 1   | \$0.04      |
| 3     | Process | Assemble Bus Bar, FETs to Capacitor Bank         | ×   | ×             | \$0.39             | 1   | \$0.39      |
| 2     | Process | TM3 Phase Lead Terminal Assembly                 | TM3 Phase Lead Terminal Assembly              | Multiple      | \$7.63             | 1   | \$7.63      |

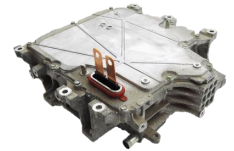
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**Tesla Model 3 Inverter - Media BOM**

| Name   | Number               | Material       | Weight (g) | Quantity |
|--|----------------------|----------------|------------|----------|
| <b>Media:</b><br>Timing Crystal                                    | TM3LPTXL02160R       | Commodity Item | 0.0000     | 1        |
| <b>Media:</b><br>LDO Regulator 8-Pin VSGOP                         | TMG LM2009M-5.0/NOPB | Commodity Item | 0.0000     | 1        |
| <b>Media:</b><br>Precision Monopower Series Voltage Reference, SOT | TMG LM41280-1M3/NOPB | Commodity Item | 0.0000     | 1        |
| <b>Media:</b><br>Quad Operational Amplifier, 14-Pin SOIC           | TMG LMV3442M/NOPB    | Commodity Item | 0.0000     | 1        |
| <b>Media:</b><br>IC Operational Amplifier GP 2.7V/12 RRD-ESD       | TMG LT1494GMSR#F     | Commodity Item | 0.0000     | 1        |
| <b>Media:</b><br>Diode Schottky 40V 1A Automotive 2-Pin SOD-123FL  | TMG MBR145FT35       | Commodity Item | 0.0000     | 1        |
| <b>Media:</b><br>Trans Darlington PNP 100V 8A3 Pin-QT(Hall) DPAK   | TMG MUD1235          | Commodity Item | 0.0000     | 6        |

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**Please Note:** The costed bill of material is provided in pictorial / PDF format and will not be available in Excel.



## Cost Estimates

- ❖ The costs of the inverters include the housings and the internal electrical componentry. Munro used their proprietary software and methodologies to establish a should cost to manufacture the various parts found in each inverter.
- ❖ Cost models are established by disassembling and analyzing the inverter assemblies. The components are documented in detail, capturing the assembly operations and weight. Costs are assigned to materials, purchased parts, and processes.
- ❖ All the inverters are costed with the USA as the country of origin.

Tesla Model 3 Inverter - CBOM

| Level | Type | Name   | Quantity | Material Name              | Total Cost* (Each) | Qty | Total Cost** |
|-------|------|--|----------|----------------------------|--------------------|-----|--------------|
| 3     |      | TM3 Plastic Shield 1, Busbar FETs to Cap Bank    | 1        | FAS6 GF-30                 | \$0.06             | 1   | \$0.06       |
| 4     |      | Process TM3 Plastic Shield 1, Busbar FETs to Cap | 1        |                            | \$0.04             | 1   | \$0.04       |
| 3     |      | TM3 Plastic Shield 2, Busbar FETs to Cap Bank    | 1        | FAS6 GF-30                 | \$0.04             | 1   | \$0.04       |
| 4     |      | Process TM3 Plastic Shield 2, Busbar FETs to Cap | 1        |                            | \$0.04             | 1   | \$0.04       |
| 3     |      | Assemble Bus Bar, FETs to Capacitor Bank         | 1        |                            | \$0.29             | 1   | \$0.29       |
| 2     |      | TM3 Phase Lead Terminal Assembly                 | 1        | Multiple                   | \$7.63             | 1   | \$7.63       |
| 3     |      | TM3 Phase Lead Terminal Overmold                 | 1        | Multiple                   | \$4.36             | 1   | \$4.36       |
| 4     |      | TM3 Phase Lead Terminal 1                        | 1        | Multiple                   | \$2.27             | 1   | \$2.27       |
| 5     |      | TM3 Phase Lead Terminal Out 1                    | 1        | Copper Alloy C11000 - Cold | \$0.96             | 1   | \$0.96       |

### Inverter / Converter

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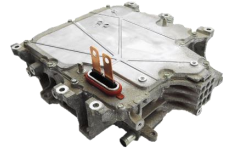
Assembly Summary

|        |  |
|--------|--|
| Zone   | Zone 4: Powertrain & Battery Pack        |
| System | Inverter / Converter                     |
| Part   | Inverter Converter Module Assy, HV Motor |

Disclaimers

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**Technical Disclaimer:** The goal of this analysis is to establish a should cost value for manufacturing the vehicle and its sub-systems. These cost totals do not include tooling, Engineering Research and Development (ER&D), testing and calibration, or logistics.



## FAQ (Frequently Asked Questions)

- ❖ Was Tesla or any other OEM involved in the study?  
***No. Neither the OEMs' proprietary costs nor any supplier's quoted costs were used in this study.***
- ❖ Is there any OEM proprietary (stolen) IP in this report?  
***No. All data was developed through Munro's proven methodologies, analyzing Munro's purchased production Tesla vehicles and other OEMs' components***
- ❖ Are the components costed using USMCA costing centers?  
***Yes, Munro includes labor, factory floor cost, taxes and SG&A for OEM or Tier Suppliers.***
- ❖ Is this a Costing or Pricing report?  
***This is a Costing Report. Pricing has too many variables.***

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- ❖ If there are limited specific questions on the content of report, is it possible for a Munro representative to support phone or e-mail communication?  
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