



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

**Tesla Model 3- In Depth Electronic Analysis**

Inverter Circuit Block Diagram

**Tesla Model 3- In Depth Electronic Analysis**

Schematic Deep Dive

**Tesla Model 3- Inverter Electronic Analysis**

**Tesla Model 3- Inverter Architecture**

**Side-by-Side Comparison**

Battery Electric Vehicles (BEV)- Inverter

**Side-by-Side Comparison**

Electric Drive- PM Motor

Tesla Model 3 Inverter		Nissan Leaf Inverter		Jaguar I-Pace Inverter	
Cost	Weight (kg)	Cost	Weight (kg)	Cost	Weight (kg)
\$ xxxx	4.81	\$ xxxx	11.14	\$ 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*	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 Bank	-	-	\$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 Bank	-	-	\$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 (lb)	Quantity
<b>Media:</b>				
Tuning Crystal	TM3_LXTAL_00167Rev	Connectivity Item	0.0050	1
LOG Regulator & Pn VSSOP	TM3_LX200QWV_65NOPS	Connectivity Item	0.0000	1
<b>Media:</b>				
Precision Monopower Series Voltage Reference, SOT	TM3_UH12802_NFS_3NOPS	Connectivity Item	0.0000	1
<b>Media:</b>				
Quad Operational Amplifier, 14-Pin SOIC	TM3_UV144QWV_NOPS	Connectivity Item	0.0000	1
<b>Media:</b>				
IC Operational Amplifier OP 2.7VHZ R610-E30	TM3_LT1494QWV_NOPS	Connectivity Item	0.0000	1
<b>Media:</b>				
Diode Schottky 40V 1A Automotive 2 Pin SOD-123FL	TM3_MBR145FT35	Connectivity Item	0.0000	1
<b>Media:</b>				
Trans Darlington PNP 100V 6A3 Pin Q-Flat DPAK	TM3_NLD1235	Connectivity Item	0.0000	8

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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	Blindcode	Material Name	Unit Cost* (Each)	Qty	Total Cost*
3	TM3 Plastic Shield 1, Busbar FETs to Cap Bank	TM3 Plastic Shield 1, Busbar FETs to Cap Bank		PAGE GF-30	\$0.06	1	\$0.06
4	Process TM3 Plastic Shield 1, Busbar FETs to Cap				\$0.04	1	\$0.04
3	TM3 Plastic Shield 2, Busbar FETs to Cap Bank	TM3 Plastic Shield 2, Busbar FETs to Cap Bank		PAGE GF-30	\$0.04	1	\$0.04
4	Process TM3 Plastic Shield 2, Busbar FETs to Cap				\$0.04	1	\$0.04
3	Assembly Bus Bar, FETs to Capacitor Bank				\$0.39	1	\$0.39
2	TM3 Phase Lead Terminal Assembly	TM3 Phase Lead Terminal Assembly		Multiple	\$7.63	1	\$7.63
3	TM3 Phase Lead Terminal Overmold	TM3 Phase Lead Terminal Overmold		Multiple	\$6.96	1	\$6.96
4	TM3 Phase Lead Terminal 1	TM3 Phase Lead Terminal 1		Multiple	\$2.27	1	\$2.27
5	TM3 Phase Lead Terminal Out 1	TM3 Phase Lead Terminal Out 1		Copper Alloy C11000 - Cold	\$5.96	1	\$5.96

**Inverter / Converter**



**Assembly Summary**

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

Supplier Name/Code

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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.

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## 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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