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Global PWM-Controlled Electronic Expansion Valve for Electric Vehicles Supply, Demand and Key Producers, 2026-2032

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Abstracts

The global PWM-Controlled Electronic Expansion Valve for Electric Vehicles market size is expected to reach $ 816 million by 2032, rising at a market growth of 10.4% CAGR during the forecast period (2026-2032).

PWM-Controlled Electronic Expansion Valve for Electric Vehicles refers to an electronic expansion valve used in new energy vehicle thermal management systems that receives commands from the vehicle controller or thermal management controller through pulse-width modulation signals and regulates refrigerant flow and throttling status. The product typically consists of a valve body, valve needle or valve core, stepper motor or electromagnetic actuator, drive circuit, PWM signal interface, sealing structure, and connectors. It is mainly used in battery thermal management, cabin air conditioning, heat pump systems, electric drive cooling, and power electronics cooling. PWM control features a relatively mature structure, simple control logic, lower cost, and fast response, making it suitable for electric vehicle thermal management systems with higher cost sensitivity, simplified control architecture, or mature platform-based designs. In 2025, global production of PWM-Controlled Electronic Expansion Valves for Electric Vehicles reached 19.058 million units, with an average selling price of USD 19.47 per unit.

The PWM-Controlled Electronic Expansion Valve for Electric Vehicles industry is a fundamental actuator segment within new energy vehicle thermal management systems. These valves are mainly used for refrigerant throttling, flow regulation, pressure control, and thermal management mode switching. As electric vehicles require more advanced battery temperature control, cabin comfort, heat pump efficiency, and e-drive cooling, electronic expansion valves have become core valve components in

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vehicle thermal management circuits. PWM-controlled products maintain strong adoption in economy, mid-range, and mature platform-based vehicle models due to their mature technology, controllable cost, simple control architecture, and well-established supply chain.

In terms of product structure, PWM-controlled electronic expansion valves mainly include direct-acting, stepper-motor-driven, electromagnetic-actuated, and integrated-drive designs, with stepper-motor-driven products more widely used in passenger vehicle thermal management systems. By system position, these valves are mainly used in cabin air conditioning circuits, battery cooling circuits, auxiliary heat pump circuits, and e-drive or power electronics cooling circuits. By refrigerant compatibility, mainstream products are still mainly based on R134a and R1234yf automotive air-conditioning platforms, while some suppliers are also developing new valve products compatible with CO?/R744 and low-GWP refrigerants.

From the application perspective, passenger vehicles represent the main demand base for PWM-controlled electronic expansion valves, especially in economy electric vehicles, plug-in hybrid vehicles, and mature vehicle platforms. Commercial vehicles, electric buses, and special-purpose vehicles place greater emphasis on durability, vibration resistance, wide-temperature adaptability, and ease of maintenance. Compared with LIN-controlled products, PWM-controlled valves have simpler functions in communication diagnostics, status feedback, and software-level coordination, but they offer clear advantages in cost, reliability, supply stability, and system compatibility. Therefore, they are expected to maintain stable demand in mid- to low-end and high-volume vehicle platforms.

On the manufacturing side, the main production processes include precision machining of valve bodies, valve needle or core forming, actuator assembly, coil or motor assembly, drive circuit soldering, sealing component installation, leak testing, flow calibration, pressure testing, and durability validation. The cost structure is mainly composed of valve bodies and precision mechanical parts, actuating motors or electromagnetic components, sealing materials, connectors, basic drive circuits, automated assembly, and testing processes. A mature automated production line typically has a single-line annual capacity of 1.0–2.5 million units, depending on product standardization, testing cycle time, automation level, and customer qualification requirements. The industry gross margin is generally 20%–30%; platform-based high-volume orders and highly automated production lines can improve manufacturing efficiency, while low-end standardized products face stronger pricing pressure.

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From the value chain and competitive landscape perspective, upstream suppliers provide aluminum alloy or stainless-steel materials, precision machined parts, stepper motors or electromagnetic actuators, magnetic materials, basic driver ICs, PCBs, connectors, rubber seals, and refrigerant-compatible materials. Midstream players are electronic expansion valve and thermal management valve manufacturers, while downstream customers include automakers, automotive air-conditioning system suppliers, thermal management module integrators, and battery thermal management system manufacturers. Competition is mainly based on product consistency, leakage control, durability validation, fast delivery, cost control, and platform supply capability. Looking forward, PWM-controlled products will continue to upgrade toward smaller size, lower noise, lower leakage, higher reliability, and more automated manufacturing, while forming a tiered application pattern with LIN-controlled products in higher-end electric vehicle platforms.

This report studies the global PWM-Controlled Electronic Expansion Valve for Electric Vehicles production, demand, key manufacturers, and key regions.

This report is a detailed and comprehensive analysis of the world market for PWM-Controlled Electronic Expansion Valve for Electric Vehicles and provides market size (US$ million) and Year-over-Year (YoY) Growth, considering 2025 as the base year. This report explores demand trends and competition, as well as details the characteristics of PWM-Controlled Electronic Expansion Valve for Electric Vehicles that contribute to its increasing demand across many markets.

Highlights and key features of the study
Global PWM-Controlled Electronic Expansion Valve for Electric Vehicles total production and demand, 2021-2032, (K Units)
Global PWM-Controlled Electronic Expansion Valve for Electric Vehicles total production value, 2021-2032, (USD Million)
Global PWM-Controlled Electronic Expansion Valve for Electric Vehicles production by region & country, production, value, CAGR, 2021-2032, (USD Million) & (K Units), (based on production site)
Global PWM-Controlled Electronic Expansion Valve for Electric Vehicles consumption by region & country, CAGR, 2021-2032 & (K Units)
U.S. VS China: PWM-Controlled Electronic Expansion Valve for Electric Vehicles domestic production, consumption, key domestic manufacturers and share
Global PWM-Controlled Electronic Expansion Valve for Electric Vehicles production by manufacturer, production, price, value and market share 2021-2026, (USD Million) & (K Units)

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Global PWM-Controlled Electronic Expansion Valve for Electric Vehicles production by Type, production, value, CAGR, 2021-2032, (USD Million) & (K Units)
Global PWM-Controlled Electronic Expansion Valve for Electric Vehicles production by Application, production, value, CAGR, 2021-2032, (USD Million) & (K Units)

This report profiles key players in the global PWM-Controlled Electronic Expansion Valve for Electric Vehicles market based on the following parameters - company overview, production, value, price, gross margin, product portfolio, geographical presence, and key developments. Key companies covered as a part of this study include Zhejiang Sanhua Automotive Components, TGK, Zhejiang Dun'an Artificial Environment, HANON, Egelhof, Fujikoki, Schrader Pacific Advanced Valves (Pacific Industrial), XINJING, Hilite International, Ningbo Tuopu, etc.

This report also provides key insights about market drivers, restraints, opportunities, new product launches or approvals.

Stakeholders would have ease in decision-making through various strategy matrices used in analyzing the World PWM-Controlled Electronic Expansion Valve for Electric Vehicles market

Detailed Segmentation:

Each section contains quantitative market data including market by value (US$ Millions), volume (production, consumption) & (K Units) and average price (US$/Unit) by manufacturer, by Type, and by Application. Data is given for the years 2021-2032 by year with 2025 as the base year, 2026 as the estimate year, and 2027-2032 as the forecast year.

Global PWM-Controlled Electronic Expansion Valve for Electric Vehicles Market, By Region:

United States

China

Europe

Japan

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South Korea

ASEAN

India

Rest of World

Global PWM-Controlled Electronic Expansion Valve for Electric Vehicles Market, Segmentation by Type:

EXV for Air Conditioning Thermal Management

EXV for Battery Thermal Management

Global PWM-Controlled Electronic Expansion Valve for Electric Vehicles Market, Segmentation by Driving Method:

Electromagnetic Type

Electro-electric Type

Global PWM-Controlled Electronic Expansion Valve for Electric Vehicles Market, Segmentation by Sales Channel:

Direct Sales

Distribution

Global PWM-Controlled Electronic Expansion Valve for Electric Vehicles Market, Segmentation by Application:

BEV

PHEV

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Companies Profiled:

Zhejiang Sanhua Automotive Components

TGK

Zhejiang Dun'an Artificial Environment

HANON

Egelhof

Fujikoki

Schrader Pacific Advanced Valves (Pacific Industrial)

XINJING

Hilite International

Ningbo Tuopu

Key Questions Answered:
1. How big is the global PWM-Controlled Electronic Expansion Valve for Electric Vehicles market?
2. What is the demand of the global PWM-Controlled Electronic Expansion Valve for Electric Vehicles market?
3. What is the year over year growth of the global PWM-Controlled Electronic Expansion Valve for Electric Vehicles market?
4. What is the production and production value of the global PWM-Controlled Electronic Expansion Valve for Electric Vehicles market?
5. Who are the key producers in the global PWM-Controlled Electronic Expansion Valve for Electric Vehicles market?
6. What are the growth factors driving the market demand?

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