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Global PWM-Controlled Electronic Expansion Valve for Electric Vehicles Market 2026 by Manufacturers, Regions, Type and Application, Forecast to 2032

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Abstracts

According to our (Global Info Research) latest study, the global PWM-Controlled Electronic Expansion Valve for Electric Vehicles market size was valued at US$ 382 million in 2025 and is forecast to a readjusted size of US$ 816 million by 2032 with a CAGR of 10.4% during review period.

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-

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drive cooling, electronic expansion valves have become core valve components in 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 is a detailed and comprehensive analysis for global PWM-Controlled Electronic Expansion Valve for Electric Vehicles market. Both quantitative and qualitative analyses are presented by manufacturers, by region & country, by Type and by Application. As the market is constantly changing, this report explores the competition, supply and demand trends, as well as key factors that contribute to its changing demands across many markets. Company profiles and product examples of selected competitors, along with market share estimates of some of the selected leaders for the year 2025, are provided.

Key Features:

Global PWM-Controlled Electronic Expansion Valve for Electric Vehicles market size and forecasts, in consumption value ($ Million), sales quantity (K Units), and average selling prices (US$/Unit), 2021-2032

Global PWM-Controlled Electronic Expansion Valve for Electric Vehicles market size and forecasts by region and country, in consumption value ($ Million), sales quantity (K Units), and average selling prices (US$/Unit), 2021-2032

Global PWM-Controlled Electronic Expansion Valve for Electric Vehicles market size and forecasts, by Type and by Application, in consumption value ($ Million), sales quantity (K Units), and average selling prices (US$/Unit), 2021-2032

Global PWM-Controlled Electronic Expansion Valve for Electric Vehicles market shares

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of main players, shipments in revenue ($ Million), sales quantity (K Units), and ASP (US$/Unit), 2021-2026

The Primary Objectives in This Report Are:

To determine the size of the total market opportunity of global and key countries

To assess the growth potential for PWM-Controlled Electronic Expansion Valve for Electric Vehicles

To forecast future growth in each product and end-use market

To assess competitive factors affecting the marketplace

This report profiles key players in the global PWM-Controlled Electronic Expansion Valve for Electric Vehicles market based on the following parameters - company overview, sales quantity, revenue, 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.

Market Segmentation

PWM-Controlled Electronic Expansion Valve for Electric Vehicles market is split by Type and by Application. For the period 2021-2032, the growth among segments provides accurate calculations and forecasts for consumption value by Type, and by Application in terms of volume and value. This analysis can help you expand your business by targeting qualified niche markets.

Market segment by Type

EXV for Air Conditioning Thermal Management

EXV for Battery Thermal Management

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Market segment by Driving Method

- Electromagnetic Type
- Electro-electric Type

Market segment by Sales Channel

- Direct Sales
- Distribution

Market segment by Application

- BEV
- PHEV

Major players covered

- Zhejiang Sanhua Automotive Components
- TGK
- Zhejiang Dun'an Artificial Environment
- HANON
- Egelhof
- Fujikoki
- Schrader Pacific Advanced Valves (Pacific Industrial)

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XINJING

Hilite International

Ningbo Tuopu

Market segment by region, regional analysis covers

North America (United States, Canada, and Mexico)

Europe (Germany, France, United Kingdom, Russia, Italy, and Rest of Europe)

Asia-Pacific (China, Japan, Korea, India, Southeast Asia, and Australia)

South America (Brazil, Argentina, Colombia, and Rest of South America)

Middle East & Africa (Saudi Arabia, UAE, Egypt, South Africa, and Rest of Middle East & Africa)

The content of the study subjects, includes a total of 15 chapters:

Chapter 1, to describe PWM-Controlled Electronic Expansion Valve for Electric Vehicles product scope, market overview, market estimation caveats and base year.

Chapter 2, to profile the top manufacturers of PWM-Controlled Electronic Expansion Valve for Electric Vehicles, with price, sales quantity, revenue, and global market share of PWM-Controlled Electronic Expansion Valve for Electric Vehicles from 2021 to 2026.

Chapter 3, the PWM-Controlled Electronic Expansion Valve for Electric Vehicles competitive situation, sales quantity, revenue, and global market share of top manufacturers are analyzed emphatically by landscape contrast.

Chapter 4, the PWM-Controlled Electronic Expansion Valve for Electric Vehicles breakdown data are shown at the regional level, to show the sales quantity, consumption value, and growth by regions, from 2021 to 2032.

Chapter 5 and 6, to segment the sales by Type and by Application, with sales market

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share and growth rate by Type, by Application, from 2021 to 2032.

Chapter 7, 8, 9, 10 and 11, to break the sales data at the country level, with sales quantity, consumption value, and market share for key countries in the world, from 2021 to 2026.and PWM-Controlled Electronic Expansion Valve for Electric Vehicles market forecast, by regions, by Type, and by Application, with sales and revenue, from 2027 to 2032.

Chapter 12, market dynamics, drivers, restraints, trends, and Porters Five Forces analysis.

Chapter 13, the key raw materials and key suppliers, and industry chain of PWM-Controlled Electronic Expansion Valve for Electric Vehicles.

Chapter 14 and 15, to describe PWM-Controlled Electronic Expansion Valve for Electric Vehicles sales channel, distributors, customers, research findings and conclusion.

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