

What Secures XICHI as a Professional Custom Solid-State Soft Starter Manufacturer for Complex Heavy Loads



Xian, Shaanxi Oct 22, 2026 ([Issuewire.com](https://www.issuewire.com)) - How do modern heavy industrial facilities balance high inertia motor starting requirements against strict grid stability limits? In heavy industrial sectors, starting medium-voltage electric motors powering main mine exhaust fans, steel mill blast furnace blowers, and petrochemical centrifugal compressors presents severe operational demands. Direct-on-line starting can cause voltage sags across local distribution networks, while mechanical shocks risk accelerating component wear in drive shafts, gearboxes, and couplings. While variable frequency drives provide speed control, medium-voltage solid-state motor starting equipment often offers a more direct, economical solution when fixed-speed operation is sufficient. Within this technical niche, [Xi'an XICHI Electric Co., Ltd.](#) has established itself as a dedicated professional custom solid-state soft starter manufacturer, providing engineered medium-voltage starting solutions designed around specific load profiles and site constraints.

Understanding what secures XICHI in this specialized engineering space requires evaluating how medium-voltage equipment addresses operating conditions, component integration, and customized structural configurations.

Q1: What Operational Challenges Do Heavy-Duty Loads Impose on Soft Starters?

Starting high-inertia machinery connected to medium-voltage distribution systems involves managing physical, electrical, and environmental constraints simultaneously. Standard starting parameters rarely accommodate the operational variances encountered across different industrial plants.

1. High Mechanical Inertia and Torque Alignment

Heavy rotating equipment, such as large centrifugal compressors or mine ventilation systems, demands significant starting torque to overcome static inertia without inducing mechanical stress. If a starter supplies insufficient torque, the motor risks stalling and overheating. Conversely, excessive initial torque leads to severe mechanical shocks across transmission components. A custom solid-state soft starter must tailor voltage and current acceleration curves to match the specific resistance profile of the driven machine.

2. Power Grid Capacity and Frequency Limitations

Industrial facilities located in remote mining districts or expanding processing plants frequently operate on weak supply grids with limited transformer capacity. Direct starting currents can reach 6 to 8 times the rated current, triggering upstream protection relays or disrupting adjacent sensitive control systems. Depending on process workflows, equipment may need to handle between 1 and 6 starting operations per hour. The soft starting apparatus must maintain precise current limits, typically between 1.5 and 4.5 times the rated current, to protect grid stability.

3. Environmental Operating Conditions

Heavy industrial equipment often operates in challenging ambient conditions. Equipment designs must function reliably within ambient temperature spans ranging from -20°C to $+50^{\circ}\text{C}$. Furthermore, installations situated at altitudes up to 1,500 meters require thermal and dielectric insulation performance that avoids capacity derating. Operating above 1,500 meters necessitates calculated derating factors to compensate for lower air density.

Q2: How Does the CMV Series Address These Engineering Challenges ?

To meet these demanding operational parameters, Xi'an XICHI Electric Co., Ltd. developed the [CMV series medium-voltage solid-state soft starter](#). The design integrates high-voltage power electronics with digital control circuitry to ensure systematic acceleration and comprehensive protection.

1. Control Architecture and Power Stage Topology

The core control unit of the CMV soft starter relies on a 32-bit ARM core microprocessor platform, which processes system signals and controls phase firing angles in real time. To maintain isolation between high-voltage power circuits and low-voltage control units, XICHI employs fiber-optic driver technology.

The power stage consists of series-connected silicon-controlled rectifiers. Depending on system voltage levels of 3 kV, 6 kV, or 10 kV, the thyristor bridge incorporates 12, 18, or 30 thyristors per phase. Dynamic and static voltage equalization networks are integrated across the thyristor assembly to ensure uniform voltage distribution during switching transitions, preventing individual device overvoltage breakdowns.

2. Thermal Efficiency and Communication Protocols

To minimize continuous operational losses and thermal stress inside the enclosure, the CMV system incorporates a direct-start capacity vacuum bypass contactor and an optimized thermal management design. Once the motor reaches full operating speed, the bypass contactor engages, taking the thyristor stack offline during steady-state run periods to reduce heat generation and improve overall efficiency. In

addition, the CMV series features a patented heatsink design that significantly enhances heat dissipation efficiency, ensuring reliable thyristor operation, reducing thermal stress, and extending the service life of the equipment.

For industrial network integration, XICHI equips the CMV series with Modbus RTU, Modbus TCP, and RS485 communication interfaces. This connectivity permits multi-device networking, allowing a centralized Programmable Logic Controller or Distributed Control System to manage up to 31 individual starters along a single bus line.

3. Comprehensive Protection Functions

Operational safety relies on rapid fault detection and system isolation. The CMV series features eight configurable digital protection parameters, including phase loss detection, overcurrent protection, phase current imbalance monitoring, thermal overload protection, underload or dry run detection, start timeout protection, overvoltage and undervoltage monitoring, and ground fault detection. Operators can adjust protection thresholds directly through the digital control interface based on site-specific motor parameters.

CMV Medium-voltage Soft Starters Project case image

Q3: What Technical Dimensions Shape XICHI's Customization Strategy?

XICHI structures its technical adaptation around the core power control system, where hardware components are configured to meet specific voltage levels, enclosure protection ratings, and heat dissipation requirements. Power switches, thyristor modules, and busbar layouts are modified based on ambient operating temperatures and site installation constraints. This foundation ensures stable electrical performance and thermal management across demanding industrial environments without compromising operational safety.

The other customization dimension focuses on customized cabinet configurations and control system software tailored to specific site conditions and customer requirements. Integrated cabinet solutions can combine switchgear, soft starter cabinets, and bypass cabinets into a unified enclosure, reducing installation space requirements and simplifying field deployment. The control system interface can also be localized and customized according to application needs, improving operational convenience and ensuring efficient interaction for end users.

The final customization dimension focuses on communication protocol integration and fieldbus connectivity across plant automation networks. Interface modules support standard protocols including Modbus, Profibus, and Ethernet-based industrial networks for real-time monitoring and remote diagnostics. System parameters and I/O assignments are structured to integrate directly with existing SCADA or PLC frameworks, minimizing commissioning overhead.

Engineering Customization as an Application-Driven Process

Effective motor protection and soft starting relies on precise engineering alignment rather than simply adding non-standard components. As a solid-state soft starter manufacturer, Xi'an XICHI Electric Co., Ltd. builds its customized solutions on structured modular platforms. By evaluating motor torque curves, grid capacities, and site environment constraints during initial design, XICHI configures medium-voltage starting systems to support stable industrial plant operations.

Engineers and facility managers evaluating starting equipment for heavy motor loads can review technical documentation and submit motor parameter requirements through the official enterprise website: <https://www.xichielectric.com/>



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