L-SERIES MVE SOFT STARTER

The power of medium voltage soft starting

AuCom
MOTOR CONTROL SPECIALISTS

RIGHT FROM THE START
L-Series MVE

IEC TYPE TESTED SOFT STARTER PANELS

The MVE soft starter is a powerful and reliable solution for your medium voltage starting requirements.

Extensive personal safety features, an easy-to-use graphical interface, and comprehensive built-in motor load protection make this a well-balanced solution for your medium voltage needs. MVE brings together sophisticated soft start motor control functionality in a robust yet compact physical configuration.

MVE is available as a fully furnished cabinet, or we can retrofit MVE into your existing system. Turn-key MVE kit-type soft starters can be installed with minimal downtime. In addition to standard packages, we can supply a complete line-up to meet your requirements.

- 2200 mm height for easier transportation
- Disconnecting switch viewing window for safer de-energising (back of enclosure)
- Maintenance friendly design
- Top or bottom cable input and control wiring
- Front panel access with optional rear panel access available
- Corrosion resistant hot-dip galvanised steel sheets
- Optional internal power factor correction including capacitor, vacuum contactor, fuses and inrush current limiter
- A range of switching options (vacuum contactor or vacuum circuit breaker)
- Safe operation with separate galvanically isolated low voltage section via IGBT technology
- Robust hinges and handles for convenient and safe closure
- Built-in locking on all compartment doors as standard

L-SERIES PANEL SPECIFICATIONS

- Rated voltage: 3.3 kV - 17.5 kV
- Rated busbar current: up to 3000 A
- Rated short time withstand current / peak: Up to 40 kA for 1 second / 104 kA
- Internal arc fault IAC classification: AFL 31.5 kA for 1 second
- Partition classification: PM
- Loss of service continuity: LSC1/LSC2/LSC2B
- IP64 protection rating (IP66 optional)
- Altitude: +1000 m (higher with derating)
- Ambient temperature: -10°C - 40°C (above 35°C with derating)
- Colour painting: RAL 7035 (other colours optional)
Powerful and reliable

Every application is different, and selecting the right starter for the job can sometimes seem like a daunting task. Variables such as altitude, ambient temperature, load and starts per hour all affect selection of the ideal motor starting solution. At AuCom, we employ sophisticated engineering tools to help you select the right MVE starter for your site conditions. No matter the application, you can trust our team of experienced motor control professionals to get your motor running smoothly.

Feature Benefit

Quick Application Setup Easy commissioning
Multi-language Ease of use and communication
Graphical Display
Dual Motor Set Allows two different starting and stopping motor data sets
Starting and Stopping Options A range of starting methods including current based torque control make the MVE soft starter suitable for all applications
Simulation Modes Fast and easy testing during installation and commissioning without the need for a mains supply or motor
Real-time Performance Graph Real-time graphs of motor performance and current quickly and clearly illustrate how your motor is performing
Diagnostic Tool Recorded waveforms can help diagnose conditions interfering with operation
LV/MV isolation via IBT Technology AuCom IBT Interface Board Technology isolates the core starter control system and HMI from the MV power section, creating a safer work environment
LV Motor Test Conduct factory testing without the need for a medium voltage motor or supply
Secondary Injection Testing Allows full testing of motor protections via an external system such as Omicron
Complete Motor Protection A wide range of protection features including ground fault protection ensure that your equipment can operate safely even in the most demanding environments
DOL+ Mode Protects your motor even while operating in bypass mode
Advanced Thermal Modelling Intelligent thermal modelling allows the soft starter to dynamically calculate motor temperature and determine whether the motor can start successfully

**TECHNICAL DATA**

- **Motor voltage:** 2.3 - 13.8 kV
- **Control voltage:** 85 - 244 VAC or 10 - 350 VDC
- **Frequency:** 45/60 Hz (460/600 VAC)
- **Starter current:** 70 A - 1700 A
- **Starting time (max):** 1.5 sec - 35.5 sec (180 sec)
- **Ambient temperature:** -10°C to 40°C (above 50°C with derating)
- **Maximum altitude:** 1000 m (higher with derating)
- **IP rating (power assembly):** IP00 (NEMA4X)
- **IP rating (control panel):** IP54 (NEMA12)
- **CT type:** Standard MV CTs (adjustable ratio)
- **VT type:** EPT type
- **LV/MV isolation:** 100% fibre optic connection
- **Digital input:** 3 fixed (start, stop, close), 2 programmable (A, B)
- **Relay output:** 4 fixed (line, bypass, PFC, PAPS), 3 programmable (A, B, C)
- **Analog output:** 1 analog output
- **Communications I/O:** Modbus RTU, Modbus TCP, Profinet, DeviceNet, Ethernet/IP, USB

Rely on MVE
Take control from the start

Medium voltage installations are complex enough without making the starter hard to use as well. MVE is packed with features designed to make your life easier, including real-language feedback messages, so you don’t have to look up codes to know what’s happening.

Built-in monitoring and indicators, and extensive on-board input and output functionality reduce the need for space and avoid the cost of auxiliary equipment, while simplifying installation. Real-time graphs of motor operating performance and current quickly and clearly illustrate exactly how your motor is performing. No fuss, no trouble - a smoother start in every sense.

The MVE controller features simple, plain language feedback on the soft starter’s operation and events – no need for trip code look-ups.

**METERING FUNCTIONALITY:**
- Motor current
- Motor voltage
- Mains frequency
- Motor pf
- Motor kW
- Motor HP
- Motor temperature
- kWh
- Hours run
- Real-time graphs

**Protection functionality**

<table>
<thead>
<tr>
<th>Description</th>
<th>Built-in Protection</th>
<th>Eq. ANSI Code</th>
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<tbody>
<tr>
<td>Maximum start time</td>
<td>Excess start time</td>
<td>48</td>
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<tr>
<td>Too many starts</td>
<td>Restart delay and dynamic thermal model</td>
<td>44</td>
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<tr>
<td>Undervoltage</td>
<td>Undervoltage</td>
<td>27</td>
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<tr>
<td>Overcurrent - jam (Locked rotor, load increase)</td>
<td>Instantaneous/time-delay overcurrent</td>
<td>50/51/51R</td>
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<tr>
<td>Overcurrent - short (short circuit)</td>
<td>Instantaneous/time-delay overcurrent (stage 2)</td>
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<tr>
<td>Checking or interlocking relay</td>
<td>Shorted SCR</td>
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<tr>
<td>Thermal overload</td>
<td>Thermal overload - dynamic model</td>
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<tr>
<td>Current imbalance</td>
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<td>Power loss</td>
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<tr>
<td>Ground fault</td>
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<tr>
<td>Mains frequency</td>
<td>Frequency check, frequency variation</td>
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<tr>
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<td>Communications failure</td>
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<td>Internal communications failure</td>
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<tr>
<td>Ext. fault 1/code - 1</td>
<td>Auxiliary trip A</td>
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<tr>
<td>Ext. fault 2/code - 2</td>
<td>Auxiliary trip B</td>
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<td>Motor overtemperature</td>
<td>Thermistor protection*</td>
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<tr>
<td>Stator winding overtemperature</td>
<td>Thermistor protection*</td>
<td>49</td>
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* RTD Relay is an optional extra.
Arc fault

An arc fault is a high power discharge of electricity between two or more conductors. Such arc events can reach temperatures of over 10,000 °C — hot enough to liquify ceramics, plastics and metal.

During an arc event, the arc fault causes a sudden increase in pressure, followed by an expansion and emission phase and, finally, a thermal phase. This combination of pressure and heat can blast debris and combustible gas outward with extreme force.

The internal pressure against the weakest points of the enclosure (e.g. windows, hinges and joints) can destroy an electrical enclosure and may cause serious or fatal injury to nearby personnel.

Arc faults can occur for a number of reasons including overvoltage, faulty insulation, mechanical failure or failure of a fuse.

Due to the significant risk of serious injury or death that an arc fault presents, responsible specifiers should ensure that they require all switchgear to meet the IEC 62271-200 standard.

L-SERIES ARC FAULT PROTECTION

If an arc event occurs within an AuCom L-Series panel, the arc fault is contained by solid locking doors and heavy double layer compartment panels.

During the emission phase, the pressure is safely released using discharge flaps on the top of the panel (or optional ducts), which direct the explosion upwards or vent it safely outside.

We’ve been producing type tested medium voltage panels for more than 10 years. Put to the test in some of the world’s most demanding applications, you can have confidence in the safety of the L-Series MVE right from the start.

Fully type tested

AuCom L-Series panels are fully type tested according to IEC 62271-200:
- Short time withstand current
- Peak withstand current
- Internal arc fault (IAC classification: AFL 31.5 kA for 1 second)
- Dielectric test on main and auxiliary circuits
- IP rating
- Temperature rise test related to 50 °C ambient temperature and main circuit resistance

Certificates are available from AuCom on request.
Knowledge is power

We don’t just get you started – we’re committed to keeping you running smoothly too. Our dedicated diagnostic tools simplify support and maintenance.

DIAGNOSTICS

The MV Diagnostic Board is a data acquisition and recording board that is provided as standard with all AuCom MV products.

The MV Diagnostic Board records waveforms that can help diagnose problems with the starter’s installation or operation, including:

- Excessive supply impedance (voltage sag and SCR conduction angle)
- Generator set frequency stability at on/off load transitions
- Disconnection of non-conduction fibre optic connections
- A shorted SCR or welded bypass (can be isolated to individual phases)
- Presence or absence of an MV supply
- Supply quality issues (harmonics)
- Gate drive failures

DETAILED EVENT LOG

The 99-place event log records time-stamped details of operation and performance, making it easier than ever to track how your motor is performing.

An eight position trip log records trip states and operating conditions at the time of trip, including:

- Phase currents and voltages
- Mains frequency
- Starter state
- Time & date

AUCOM TECHNICAL DATASHEET

Our medium voltage soft start specialists use advanced proprietary tools to specify the ideal AuCom medium voltage solution for your application. We provide a detailed technical datasheet including calculations for motor starting, heat dissipation, supply capacity, transformer & cable voltage drops, and selection of fuses and power factor correction.

Even safer with IBT technology

AuCom Interface Board Technology (IBT), a unique concept within the medium voltage soft starter market, separates the core starter control system (including the starter’s controller and complex, time critical algorithmic processing) from the medium voltage power section.

100% GALVANIC ISOLATION

The interface board is located in a separate, dedicated section of the internal arc tested medium voltage compartment. Fibre optic wires connect the control and power sections of the starter through the interface board, eliminating the need for any copper wiring and providing complete galvanic isolation of the low voltage compartment.
Panel details

L-Series MVE panels are available in either IP4X or IP54 panels, with options for line and bypass devices, earthing and isolation switches. AuCom can also design and build panels to meet particular specifications, and we offer full application engineering support at all stages of the design process.

For customers who prefer to build their own panels, MVE soft starters can be supplied in IP00 format or as a kit for local assembly. Multi-motor solutions are also available for coordinated control of up to four motors.

Configurations

### Configurations

- **E0**
  - Soft starter only

- **E1**
  - SST + VC
  - SST + VC + Fuse
  - SST + VCB

- **E2**
  - SST + VC
  - SST + VC + Fuse

- **E3**
  - SST + IC + VC + Fuse + PFC
  - SST + IC + VCB + PFC

### LEGEND

- **Controller**
- **F** Controller with MV Fuses
- **MVE** MVE soft starter with voltage sensing
- **K** Vacuum contactor
- **Q** Vacuum circuit breaker
- **Q** Disconnecting switch
- **Q** 3 current transformer
- **L** Inrush current limiter
- **C** Capacitors

### Dimensions

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<th>L-MVE-XXXX-V02</th>
<th>Height (mm)</th>
<th>Width (mm)</th>
<th>Depth (mm)</th>
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<tr>
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</table>
A solution for any application

PANEL TYPE
L = L-Series IEC standard
M = M-Series IEC standard
P = P-Series NEMA standard

CURRENT RATING
NAC50x-63, 1770
0070 = 70 A
0110 = 110 A
0150 = 150 A
0200 = 200 A
0250 = 250 A
0300 = 300 A
0400 = 400 A
0500 = 500 A
0600 = 600 A
0700 = 700 A
0800 = 800 A
0900 = 900 A
1000 = 1000 A
1100 = 1100 A
1200 = 1200 A
1300 = 1300 A
1400 = 1400 A
1500 = 1500 A
1600 = 1600 A
1700 = 1700 A

SHORT CIRCUIT LEVEL
SC07 = 7 kA
SC14 = 14 kA
SC20 = 20 kA
SC25 = 25 kA
SC31 = 31.5 kA
SC40 = 40 kA
SC50 = 50 kA

ENCLOSURE CONFIGURATION
E0 = soft starter in panel only
E1 = soft starter + bypass device
E2 = soft starter + line device + bypass device
E3 = soft starter + disconnector switch + line device + bypass device

INTERNAL PFC
PF0 = Without PFC
PF1 = With PFC

FUSE
F0 = Without fuse
F1 = With fuse

LINE SWITCHING DEVICE
L0 = Without line switching device
L1 = Fixed line vacuum contactor
L2 = Withdrawable line vacuum contactor
L3 = Fixed line vacuum circuit breaker
L4 = Withdrawable line vacuum circuit breaker

SUPPLY VOLTAGE
V02 = 2300 VAC 50/60 Hz
V03 = 3300 VAC 50/60 Hz
V04 = 4160 VAC 50/60 Hz
V06 = 6600 VAC 50/60 Hz
V11 = 11000 VAC 50/60 Hz
V13 = 13800 VAC 50/60 Hz

ByPASS SWITCHING DEVICE
B0 = Without bypass switching device
B1 = Fixed bypass vacuum contactor
B2 = Withdrawable bypass vacuum contactor
B3 = Fixed bypass vacuum circuit breaker
B4 = Withdrawable bypass vacuum circuit breaker

Soft Start Motor Protection Current Range Voltage Range
CSNI ✧ ✧ ✧ 200 A ≤ 675 VAC
EM33 ✧ ✧ ✧ 240 A = 480 VAC
EM4 ✧ ✧ ✧ 870 A = 690 VAC
MYX ✧ ✧ ✧ 680 A = 12 kV

A world of experience

Other solutions

AuCom offers a complete range of soft starters. Whether you need a simple product for starting only, or a comprehensive motor control package, you can trust AuCom to offer a product to match.
The soft start specialists

At AuCom our focus is exclusively on soft starters. We provide a range of industry-leading products utilising the latest technology.

A dedicated medium voltage laboratory with full manufacturing and on-site testing facility provides selectable voltage sources from 2.3 kV to 13.8 kV, pump load, electronically controlled test load and synchronous motor testing capabilities.

TESTING AND VERIFICATION

Our comprehensive MV testing routine is designed to guarantee that our products are safe and reliable. This process involves:

- Functional testing of each individual phase arm
- Functional testing of each 3 phase arm block
- Dielectric testing to ensure safety
- Full testing of all logic controls
- A full operational test

We also offer factory acceptance testing (FAT) and third party test audits on request.

THE PROOF IS IN THE POWER UP

All AuCom MV starters run a motor at rated voltage before they leave the factory so we’re sure that you’re getting the performance we promised.

FULL TRACEABILITY

Automated testing routines verify operational performance and record results so that all necessary information is readily available in the rare event that things don’t go as planned.

THIRD PARTY CALIBRATION

Third party calibration professionals carry out regular calibration of all our equipment including test and measurement fixtures.

We have high standards

AuCom is accredited to ISO9001:2000, with all products designed and tested to international standards. All of our products are thoroughly tested in certified facilities and in the field before release, and every soft starter is tested before leaving the factory.

The AuCom MVE soft starter is designed and manufactured to the following standards:

- **EN 50178:1998** - Electronic equipment for use in power installation
- **IEC 60950** - AC metal-enclosed switchgear (Ovala)
- **IEC 60071-1** - Insulation coordination - Part 1: Definitions, principles and rules
- **IEC 60071-2** - Insulation coordination - Part 2: Application guide
- **IEC 60225-1** - High voltage fuses - Part 1: Current-limiting fuses
- **IEC 60929** - Degrees of protection provided by enclosures (IP Rating and Tests)
- **IEC 61000-6-2** - Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
- **IEC 61000-6-4** - Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments
- **IEC 62271-1** - High-voltage switchgear and control gear - Part 1: Common specifications
- **IEC 62271-100** - High-voltage switchgear and control gear - Part 100: High-voltage alternating-current circuit breakers
- **IEC 62271-102** - High-voltage switchgear and control gear - Part 102: Alternating current disconnectors and earthing switches
- **IEC 62271-105** - High-voltage switchgear and control gear - Part 105: Alternating current switch-fuse combinations
- **IEC 62271-104** - Alternating current contactors, contactor-based controllers and motor-starters
- **IEC 62271-200** - High-voltage switchgear and control gear - Part 200: AC metal-enclosed switchgear and control gear for rated voltages above 1kV and up to and including 52 kV
The future starts with AuCom

We develop motor control products for industrial applications across the world. Our focus on research and development, as well as manufacturing, supply and support, ensures that when you choose to work with AuCom, you’re working with a global leader. Almost 40 years of experience added to our expertise and ability means you can rely on us to get it right from the start.

OUR APPROACH
We start with a challenge or application, working with you to define and develop a solution that’s not only fit for purpose today, but fully supported into tomorrow.

OUR PARTNERS
We choose partners that are experts, not only in soft start and motor control, but in understanding the needs of their industry. We work closely with our partners to ensure customers receive only the best support and advice.

OUR PEOPLE
The power behind our success doesn’t rely on our innovative products alone. Our people play a pivotal role. That's why, with AuCom, it's always personal. Combining dedication and experience with ability and passion, we don't just listen more closely, we draw on the breadth of our expertise to better understand your unique requirements and offer real solutions and ongoing support.

We’ve got you covered
AuCom’s expertise and knowledge extends well beyond the products we make. We’re about helping you achieve efficient and effective control of your machines and processes no matter what the industry or application.
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