Material Handling Machine Control Solutions

Improving your machine and business performance

Schneider Electric

Your Challenges

Urbanization, connectivity everywhere, e-commerce, and mass personalization are reshaping the landscape in manufacturing and logistics material handling equipment and systems.

The supply chain for manufacturers and distributors is facing challenges around increased analytics, multichannel fulfillment, talent shortages, and the use of new technologies such as wireless, mobile, and machine-to-machine (M2M). At the same time, there is continued focus on cost reduction and sustainability.

Whatever your focus — storage and retrieval systems, conveyor systems, picking and sorting, end-of-line equipment, or a fully automated warehouse — you must supply machines and systems that are safer, energy-efficient, and reliable while delivering solutions at a reduced cost and shorter lead-time.

Your customers expect the best service, anytime and anywhere in the world, as well as shortened set-up and commissioning times.

- Warehousing & distribution
- Postal & parcel delivery
- Manufacturing
- Bulk handling
- Airport baggage handling systems

Your choice of control solutions is a determining factor in distinguishing your company. Attention must be given to the design, development, implementation, and maintenance of the machine.

Our Solution

With a comprehensive machine automation solution from Schneider Electric™ called MachineStruxure™, you are able to quickly design cost-effective and energy-efficient material handling machines, while at the same time maximizing their performance throughout the service life of the machine.

The new offer includes three compact logic-based controllers (Modicon™ M221, Modicon M241 and Modicon M251), I/O system (Modicon TM3), and motion controllers (Modicon LMC058/078). This line of innovative PLCs are programmed with the SoMachine™ software. SoMachine, originally developed by engineers for engineers, is a proven intuitive and robust software development environment, with tools and functionality to assist you in getting your material handling machines to market faster with added value and benefits.

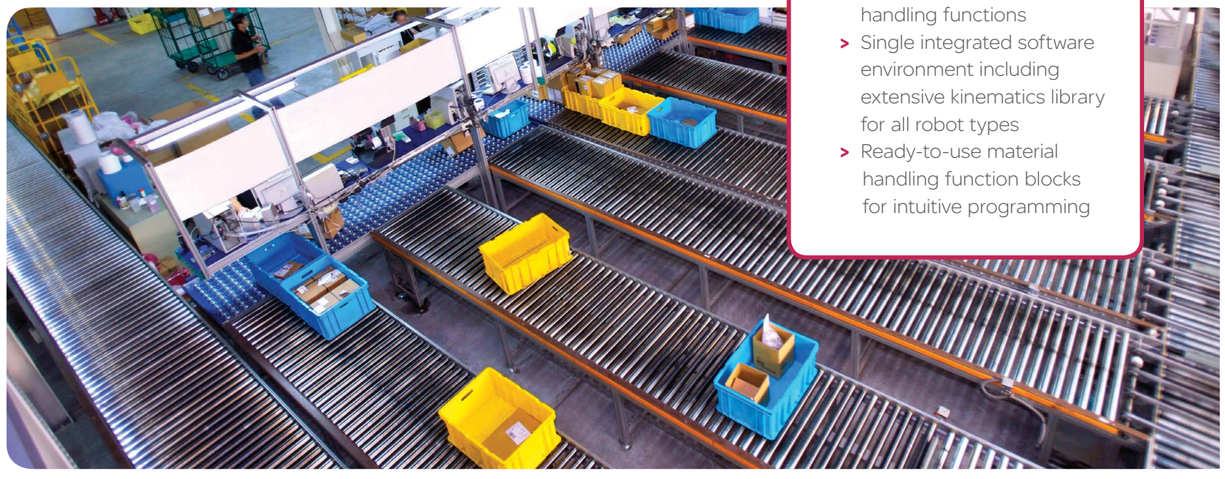
MachineStruxure solution for material handling applications allows you to:

- **Reduce your machine's time-to-market** with predefined "Tested, Validated, and Documented Architectures" and extensive software function libraries all part of our state-of-the-art material handling offer.
- **Increase profitability** with "ready-to-use" software templates and lower costs due to secure remote access to the machine.
- **Improve machine efficiency** with innovative automation technology and dedicated conveying, linear motion, and robotic kinematics libraries, supplemented by advanced drive and servo technology, in order to increase energy efficiency while reducing maintenance costs and improving reliability.
- **Gain a competitive advantage** by simplified integration and optimize the global cost of your machine: from design to maintenance, we are ready to help you wherever you are with our worldwide network of training and solution design engineers, after-sales services, and material handling experts.

With material handling becoming very complex and technically advanced, it is important that you can rely on a trusted partner for your automation, control, and power distribution needs.

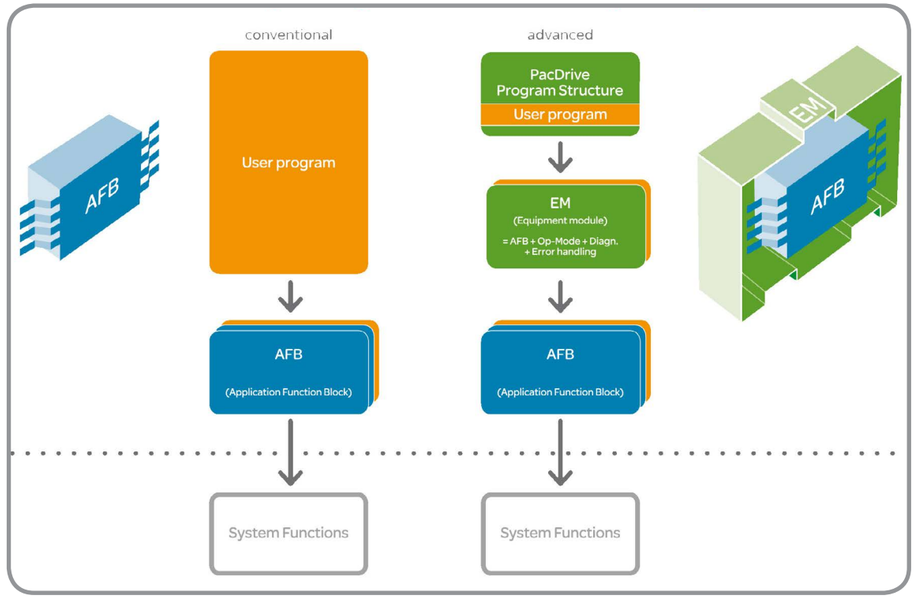
Schneider Electric provides ready-to-use templates, full integration of automated conveying systems, robotics, automated guided vehicles, automated storage and retrieval systems, carousels, and end-of-line packaging all programmable with only ONE software — SoMachine.

With our tested, validated, and documented architectures, addressing your machine requirements becomes simple thanks to energy-efficient components and integrated energy monitoring dashboards.



Discover:

- Extensive software libraries of the key material handling functions
- Single integrated software environment including extensive kinematics library for all robot types
- Ready-to-use material handling function blocks for intuitive programming



Conveying functions:

- Input, output, transfer table, turntable, eccentric roller conveyor, zone control, synchronization, product detection, dual belt, multibelt, grouping, smartInfeed

General motion function:

- Axis Module

Automated storage function:

- Advanced Positioning

Robotic functions:

- Automatic path planning, path generation and optimization, kinematics transformation, belt tracking, synchronization

Optimized high-speed movement profiles with a focus on energy efficiency and easy commissioning.

- Schneider Electric provides global support by material handling experts speaking your language
- Secure VPN remote connections allow the control and monitoring of your machine no matter where you are

Discover a variety of solutions to fit your specific needs

Automated Storage and Retrieval Systems Solutions

- Solution for motion-centric industrial machines up to 8 synchronized axes optional integrated safety/PacDrive3
- Compact/CANopen/Logic Controller M241
- Distributed/Modbus TCP/Logic Controller M251

Robotic Solutions

- Solution for high-performance machines up to 99 synchronized axes or 30 robots with optional integrated safety/PacDrive3
- Distributed/CANmotion/Motion Controller LMC058

Conveying Solutions

- Compact/Modbus SL/HMI Controller HMI SCU
- Compact/Hardwired/Logic Controller M221
- Compact/Hardwired/Logic Controller M241
- Distributed/Modbus TCP/Logic Controller M251

Automated Guided Vehicles Solutions

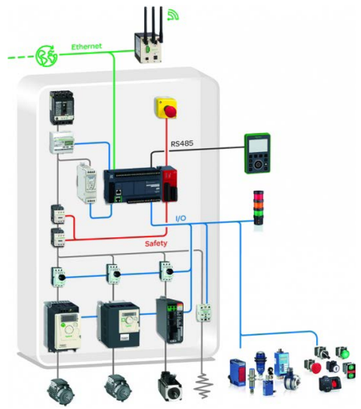
- The most innovative solution for motion-centric industrial machines up to 4 synchronized axes/PacDrive3
- Compact/CANopen/Logic Controller M241

Solution for Compact Industrial Machines/Hardwired/Logic Controller M221

The TVDA **“Compact/Hardwired/Logic Controller M221”** is designed for small to medium control applications. The system supports up to two synchronized axes using PTO control with Lexium 23 servo drives, and includes Altivar™ 12 and Altivar 312, two cost-effective variable speed drives controlled via analog signal. For on-site operation, the cost-effective and compact display that is fully programmable within SoMachine or SoMachine Basic.

Full remote access is supported for programming, as well as for remote operation and monitoring. For machine safety, the system provides a solution for machine emergency stop using an embedded Modicon TM3 safety module.

The TVDA* is designed for other machine types that require a powerful architecture with hardwired motion and up to two synchronized axes.



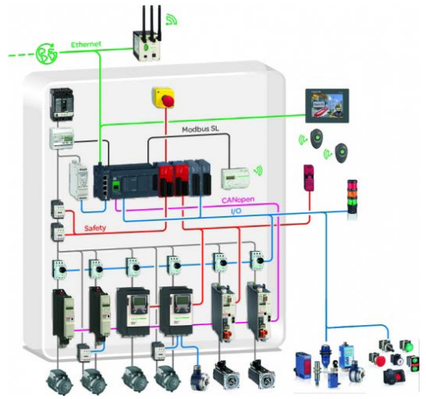
Solution for Compact Industrial Machines/CANopen/Logic Controller M241

The TVDA **“Compact/CANopen/Logic Controller M241”** solution is designed for medium to large control applications requiring coordinated motion with Altivar 32 and Altivar 71 variable speed drives and advanced motion, with Lexium 32 servo drives for torque control or speed/positioning mode.

The system includes safety for emergency stop and device stop, both implemented using embedded Modicon TM3 safety modules. Safe torque off (STO) technology is used for device stop.

The system features full remote access for programming, remote operation, and monitoring. The embedded Ethernet WebVisu functionality allows user-defined web pages to be designed within SoMachine to generate a web-based, platform-neutral HTML 5 visualization that can be used by common web browsers and Smart Devices.

The architecture is also suitable for other machine types that require fast program execution and embedded expandable I/Os. A field bus application in the architecture also allows the addition of field devices such as decentralized I/Os.



*Tested, Validated, Documented Architecture

Solution for Distributed Architecture/Modbus TCP/Logic Controller M251

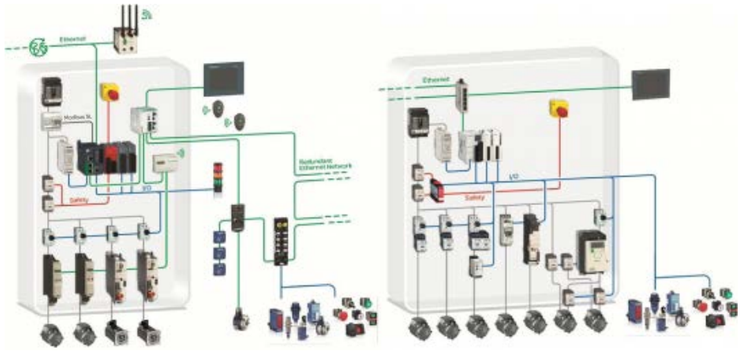
The TVDA **“Distributed/Modbus TCP/Logic Controller M251”** solution is designed for applications that require flexibility, full system transparency, and fast program execution.

This architecture combines a Modicon M251 logic controller, Altivar 32 variable speed drive, Lexium 32 servo drives, Modicon OTB and TM7 modular I/O systems, Ositrack RFID, and Harmony wireless pushbuttons to provide modularity and flexibility for your machine. With the integrated remote station, the system offers distributed enhanced functionality for simple motor control. This Ethernet-based TVDA can be combined with all other TVDAs for decentralized control requirements.

The system features full remote access for programming, as well as remote operation and monitoring. The embedded Ethernet WebVisu functionality allows user-defined web pages to be designed within SoMachine to generate a web-based, platform-neutral HTML 5 visualization that can be used by common web browsers and Smart Devices.

For machine safety, the system provides machine emergency stop and device stop solutions using stand-alone Preventa safety modules. The embedded power meter creates constant transparency for system energy consumption.

The architecture is designed for applications that require performance, modularity, and flexibility.



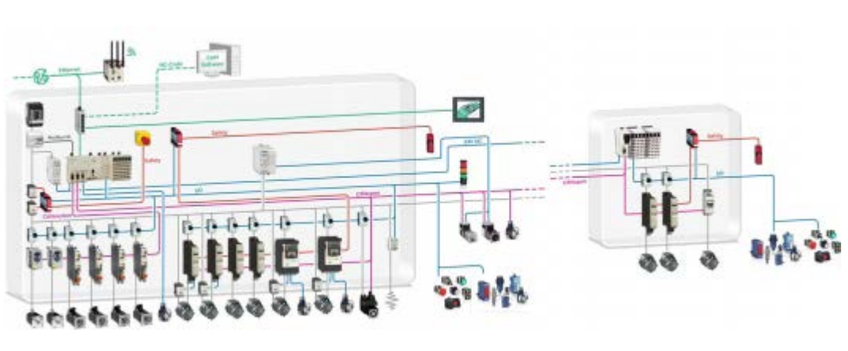
Solution for Distributed Architecture/CANmotion/Motion Controller LMC058

The TVDA **“Distributed/CANmotion/Motion Controller LMC058”** solution is designed for machines that require motion function with synchronization. This architecture combines a Modicon LMC058 motion controller, Altivar 32 and Altivar 71 variable speed drives, TeSys U motor starters, Modicon TM5 and TM7 modular I/O systems, and Lexium ILA/ILE integrated drive on CANopen field bus, Lexium 32 servo drives and Lexium SD328 stepper drives on CANmotion field bus. The TVDA provides modularity and flexibility for your machine thanks to the performance and efficiency of the CANmotion and CANopen field buses.

The system features full remote access for programming, as well as remote operation and monitoring. The embedded Ethernet WebVisu functionality allows user-defined web pages to be designed within SoMachine to generate a web-based, platform-neutral HTML 5 visualization that can be used by common web browsers and Smart Devices.

For machine safety, the system provides machine emergency stop and device stop solutions using stand-alone Preventa safety modules. The embedded power meter creates constant transparency for system energy consumption.

The architecture is also suitable for other applications requiring synchronized axis, fast program execution, and NC code processing capabilities.



Solution for high-performance machines up to 99 synchronized axes or 30 robots with optional integrated safety

System offer

PacDrive 3 is the future of high-performance motion-centric machine automation. PacDrive 3 unifies Logic controller and motion control functionalities on a single hardware platform designed to reduce complexity. This allows creating fully integrated software structures that enable modular machine designs and less time-to-market.

PacDrive is a complete hardware system associated with powerful engineering software SoMachine and related tools. One of the major advantages of centralized controller designs is unified software.

SoMachine Motion

This is the software development environment for the complete PacDrive 3 engineering process and includes multiuser design, all project data are stored in a central data pool. The programming tool EPAS is CoDeSys V3 based.

Application Software

PacDrive Libraries consist of IEC 61131-3 compliant AFBs, which map a variety of motion, PLC, visualization, basic IT, and mechatronic functions in pre-programmed software objects & additional open Source code for HMI, robotics, and more. Plus PLC open library.

Controllers

Motion logic controller **LMC300C - 400C - 600C** from 8 to 99 synchronized axes or 30 robots, with integrated digital and analog inputs and outputs. Controllers include both standard inputs and high-speed inputs (16) that allow significantly faster responses to events. Users can increase the number of high-speed inputs by adding external expansion modules with a high-speed communication connection. The number of standard I/O and encoder connections can also be increased with a field bus.

Communication

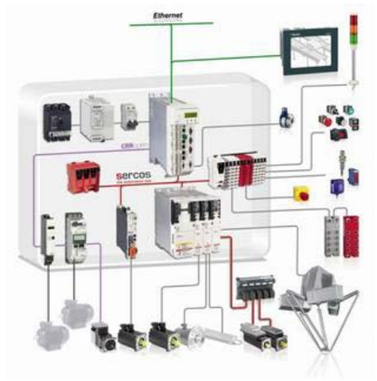
LMC.controllers have a **sercos III** interface, Ethernet 10/100T, CAN, PROFIBUS DP, Ethernet IP, and Profinet interface.

Servo Drive Options

Multiaxis solution **Lexium LXM 62**: single drives (1 axis) and double drives (2 axes) of the same size, as well as shared power supplies with different output. Peak current from 6 to 125 A.

Multiaxis solution **Lexium ILM 62**: Integrated servo motors with shared power supplies (identical to LXM 62 power supplies) for consistent modular machine building. ILM62 are available with different dimensions, peak torques of up to 55 Nm.

Stand-alone solution **Lexium LXM 52**: Well-suited for economical configuration of servo drive solutions with self-contained single axes, peak current from 6 to 72 A.



HMI

Magelis™ HMI systems in display sizes ranging from 3.8” to 19”. An ARTI protocol driver is the basis for high-speed communications between the HMI panel and the controller, with access to the runtime system variables.

Extended functions

Safety functions modular

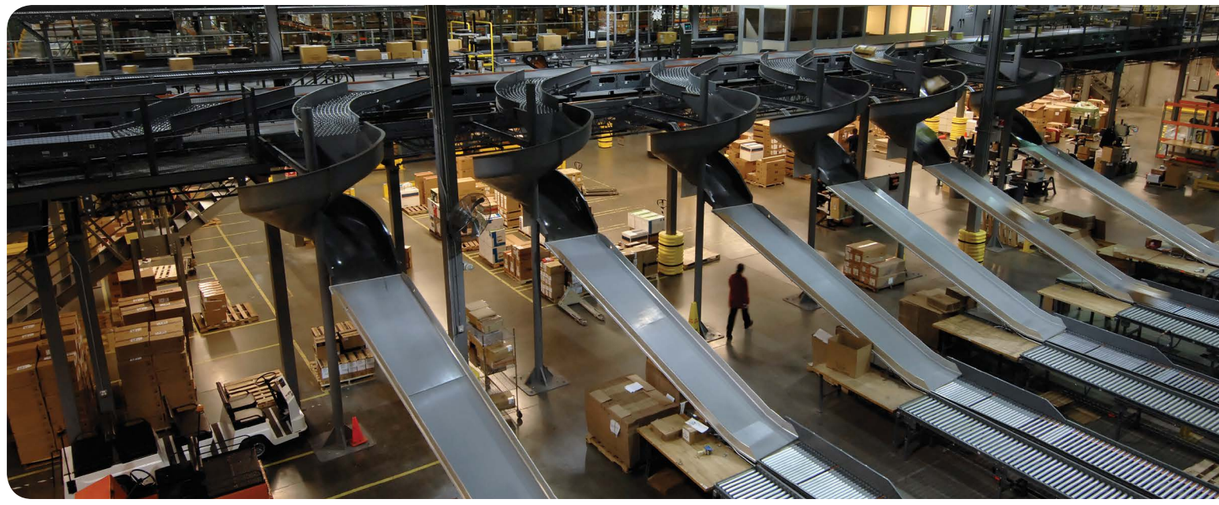
- Preventa controllers for conventional hardwired solutions
- **Integrated safety can be used in safety applications**
- Safety functions according to EN ISO 13849 PLe, IEC 61508 SIL3 are realizable
- **Modicon Safe Logic Controller SLC x00 and Modicon TM5/TM7 safe I/Os for integrated solutions with safety protocol via sercos III**

Robotic Solutions

Robot mechanics, servo systems, and the robotics library provide a ready-to-use solution. The P4 delta3 robot, IP 65 rated wash down configuration, is a full stainless steel construction designed for pick & place applications. The modular Linear Motion system consists of basic elements and complete solutions, for example the MAX-P linear positioner or the MAX-R portal robot. Appropriate transformation modules incorporate all typical 2 to 6-axis kinematics into the controller program, whether it involves PacDrive robotics or customized kinematics.

Distributed I/O

The Modicon TM5/TM7 system provides a flexible and modular I/O solution for sercos III. TM5 offers a variety of modules for creating IP20 I/O islands. Such TM5 islands provide the basis for connecting TM5 remote I/O islands and TM7 IP67 I/O.

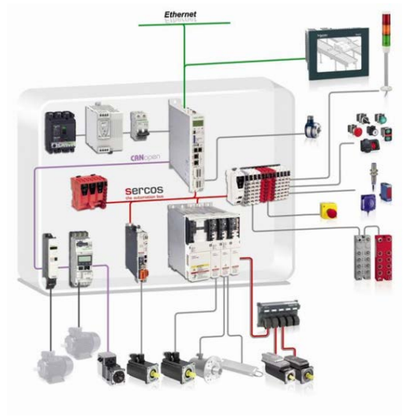


Innovative solution for motion-centric industrial machines up to 4 synchronized axes

Solution for motion-centric industrial machines up to 8 synchronized axes optional (integrated safety)

Optional Controllers

Motion logic controller **LMC101C - LMC201C** from 2 to 8 synchronized axes, with integrated digital and analog inputs and outputs. Controllers include both standard inputs and high-speed inputs (4) that allow significantly faster responses to events. Users can increase the number of high-speed I/O by adding external high-speed communication connection expansion modules. The number of standard I/O and encoder connections can also be increased via a field bus.



Choose the right machine safety solution that fits your needs

The family of Preventa machine safety solutions, such as emergency stops, perimeter guarding, guard monitoring, enabling movement, speed monitoring, and more, are compliant with international standards, designed to provide the most comprehensive protection for personnel and equipment.

To help you reduce time-to-market of your machine, Schneider Electric has developed **safety chain solutions, application training,** and **co-engineering support.**

Safety chain solutions are ready-to-use and simple-to-adapt, certified architectures provided with calculation and certification. Our safety application training, as well as co-engineering support, helps offer integration and certification of the machine. Preventa and safety chain solutions are part of MachineStruxure the NEXT generation.

Discover the rest of the Schneider Electric products and solutions for material handling applications

> Contactors and Starters

> PLCs

> Motion Controls

> Drives and Soft Starters

> Human Machine Interface

> Distributed and Modular I/O

> Machine Safety

> Sensors

> Tower Lights and Beacons

> Push Buttons

> Power Supplies

> Power and Energy Monitoring

> Circuit Breakers

> Networks

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