SMLC System Overview

Integrated Control Hardware

ServoDrives

I/O Solutions

Controller

FireWire-Based ServoDrive Networking

IEC 61131-3 programming and high performance motion for up to 16 axes in a simple, cost-effective package.

Motion and Logic. All in one. You can combine the best of both worlds with IEC 61131-3 programming tools and powerful motion control software for up to 16 axes of network drives & 48 axes of XD-Indexers.

ORMEC's ServoWire Motion & Logic Controller (**SMLC**) product family provides integrated, cost-effective control that leverages industry-standard hardware and software solutions.

Reduce your software development and support costs by using the common "look and feel" of our CoDeSys software solution for programming applications using sequential function chart, relay ladder logic, function block diagrams, instruction list and structured text. Use the PLCopen motion control library, Application Specific Function Blocks and powerful ORMEC extensions for electronic gearing, camming, registration control, superimposed motion and coordinated, for multi-axis applications.

Check out our line-up of FireWire-based digital drives and servo motors, and solutions for machine I/O, Servo Indexers, factory networking and HMI.

IEC 61131-3 programming and high performance motion for up to 64 axes in a single package.

- Up to 16 network servos can be daisy-chained and interfaced to the SMLC using standard IEEE-1394b network interfacing and cabling.
- Up to 48 XD-Indexers can be interfaced to the SMLC using standard Ethernet
- Machine I/O solutions include Ethernet or Profibus DP.
- Quality AC brushless servomotors offer continuous stall torques from 3 to 845 lb-in (0.32-95 N-m).

Fully Integrated Total System Solutions...

Integrated Control Hardware

The ServoWire® Motion and Logic Controller

The SMLC is a cost-effective control platform offering rugged, industrial hardware, a proven RTOS and industry standard networking, programmed using standard IEC 61131-3 languages. An SMLC system offers low cost, compact, proven and reliable components.

- Featuring 32-bit, x86 processors.
- Two built-in Ethernet ports, two or three FireWire ports* (with screw downs), two to four serial ports*.
- Compact Flash program storage (eliminates hard disk) and 32k battery-backed SRAM data storage.
- Reliable, QNX real-time operating system.

    *Model Dependent

FireWire motion networking reduces cost & complexity

- For tightly coupled motion, control one to 16 networked servo drives directly from one controller without specialized motion control hardware.
- Control an additional one to 48 servo Indexers via Ethernet
- ServoWire® S2D drives and XD-Indexers are available in 200V and 400V series. Fourteen models provide continuous output power from 600 watts to 24 kilowatts,

Conveniently interface a variety of Servo Motors

- Mix and match servo technologies (DC brushless rotary, linear, DC brush-type or voice coil motors) in the same drive hardware.
- Continuous stall torques from 3 to 845 lb-in (0.32-95 N-m).

Solutions for I/O Needs

Conserve panel space by utilizing Modbus/TCP (Ethernet) or Profibus DP to connect up to 512 I/O per bus coupler and thousands of I/O points.

HMI Touchscreens

Standalone touchscreen HMIs utilize Modbus RTU (Serial) or Modbus/TCP (Ethernet) communications. Or you can utilize Windows-based HMIs such as Wonderware InTouch, Rockwell Automation RS View, Intellution iFIX, CiTect or GE Cimplicity that communicate with the SMLC using an OPC Server.

CoDeSys Development Software
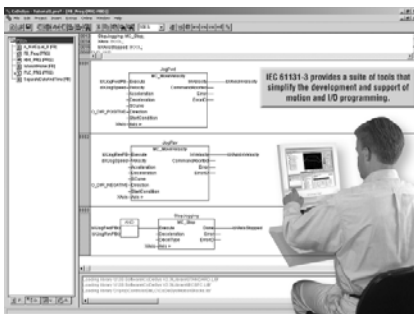
Using industry-standard IEC 61131-3, you can develop a motion and I/O program using standard tools that streamline development and create application solutions that are both more effective and easier to support in the field. There are no software costs when using the ORMEC SMLC in your application.

- Select among text-based and graphical languages to pick the right one for the job -- Relay Ladder Logic, Function Block Diagram, Structured Text, Instruction List or Sequential Function Chart programming.
- Program motion control and logic using standard IEC 61131-3 tools.
- Suite of programming languages and diagnostic tools streamlines development and simplifies support.
- PLCopen standard Motion Control Library, plus powerful ORMEC extensions, bring new levels of motion performance for electronic gearing, camming, registration control and coordinated, multi-axis applications
- Application Specific Function Blocks are provided for many common motion control applications.

ServoWire® Motion & Logic Controller

Models 30, 80 & 160

ORMEC's ServoWire Motion & Logic Controller (SMLC) is at the center of a complete machine control solution that can meet all of your motion, I/O and networking needs. By combining x86 processors, IEEE 1394b FireWire drive networking and Ethernet connectivity, the SMLC is a system that can control your entire machine. This allows you to focus on your application instead of integrating control components.

The SMLC, ServoWire Drive Network, XD Indexers, Modbus/TCP and Ethernet IP provide state-of-the-art I/O and motion control (for up to 64 axes), all programmed using any of the five IEC 61131-3 standard languages including relay ladder logic.

SMLC Family of Controllers

The ServoWire Motion & Logic Controller (SMLC) family features high performance computing capability combined with a true real-time operating system (RTOS). Using the industry standard family of x86 32-bit processors running the QNX RTOS provides plenty of cost effective, robust computing power for even the most demanding multi-axis motion control and machine control applications.

Machine I/O

The SMLC provides a multi-tiered, flexible approach to meeting machine I/O requirements. It has the ability to interface high-speed drive based I/O for microsecond position capture and single servo update response to sensor signals. It also provides sub-millisecond programmable limit switch outputs that are tightly coupled to the motion control.

General purpose I/O options are fully supported using WAGO 750 Series Ethernet I/O as well as optional Profibus DP Master support. For both options, a wide variety of analog and digital I/O modules can be cost effectively connected to and controlled by the SMLC.

SMLC

1. Processor Options
- 128 Mbytes DRAM
- 128 Mbytes of FLASH memory for program storage
- 32 Kbytes SRAM (battery packed) for non-volatile data storage

2. Communication Ports
- Two or three IEEE 1394b ServoWire (FireWire) Ports
- Two Ethernet Communication Ports.
- Three RS-232 Communication Connectors.

3. Input Power
- 115/230 VAC input power (auto-ranging), 50/60 Hz

4. Status LEDs
- Eight status LEDs on the face for indicating system status.

ServoWire Drive Network

ORMEC's AC brushless servomotors and ServoWire digital ServoDrives offer tested and guaranteed performance with the SMLC. The result is maximum performance from a tightly integrated, pre-engineered package that simplifies everything from system integration to maintenance.

Fully digital control offers compelling benefits eliminating manual ServoDrive setup and providing real-time software access to all parameters. In an SMLC system, the position, velocity and torque loops are all closed by the digital signal processors (DSPs) in the ServoWire Drives. Position update commands are sent from the SMLC. Velocity observer software eliminates the need for analog tachometers, and potentiometers are eliminated since all gain and compensation parameters are set in software.

All loop adjustments are automatically computed when a motor and its load

inertia are specified in ServoWire Pro greatly simplifying servo system tuning.

SMLC — At a Glance

- **Powerful and Robust:** 32-bit processors running the QNX RTOS.
- **IEC 61131-3 Application Programming**: International programming standard for PLCs.
- **PLCopen Motion Blocks:** Standard compliant motion blocks, powerful ORMEC enhancements.
- **ServoWire:** High-bandwidth, synchronous, all-digital ServoDrive network based on IEEE 1394b.
- **Networking Options:** Modbus/TCP, OPC Server and Ethernet IP.
- **I/O Options include:** High speed, integrated drive, WAGO 750 Series
- **Size**: Models 30 and 80 are 2.75" x 7.2" x 9" (w x d x h) and Model 160 is 4.25" x 7.2" x 9"

Specifications

General Specifications

- Input Voltage: 115/230 VAC, 1.0/0.5A (+15%, -20%), 50/60 Hz

- Operating Temperature: 0 to 50°C

- Relative Humidity: 10 to 95% @ 40C (non-condensing)

- Weight: Approx. 3.1/3.5 lbs

- Dimensions: Models 30 & 80 are 2.75" x 7.2" x 9.0" (69.9 x 182.9 x 228.6 mm), and Model 160 is 4.25" x 7.2" x 9.0" (108 x 182.9 x 228.6 mm) (w x d x h)

Memory

- DRAM: 128 Mbytes

- Program Memory: 128 Mbytes (Removable Compact Flash)

- Non-Volatile Memory: 32 Kbytes (battery backed).
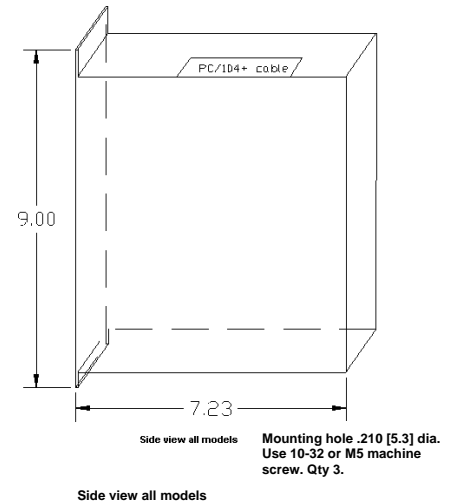
Motion Control

- All-digital control algorithms featuring velocity and acceleration feed-forward for optimal performance.

- High-speed sensor inputs to initiate motion within one position command update.

- High-speed hardware position capture is <1 µsec, ideal for use in high-speed registration applications.

- Software controlled position, speed and current (torque) limits.

- Drive fault protection circuits, watchdog timers and integrated diagnostics for fail-safe operation.

- Full 32-bit position count or modulo position in user units.

- Network S2D drives
  - SMLC Model 30 - 3 axes
  - SMLC Model 80 - 8 axes
  - SMLC Model 160 - 16 axes Equal number of 'virtual' axes for each model.
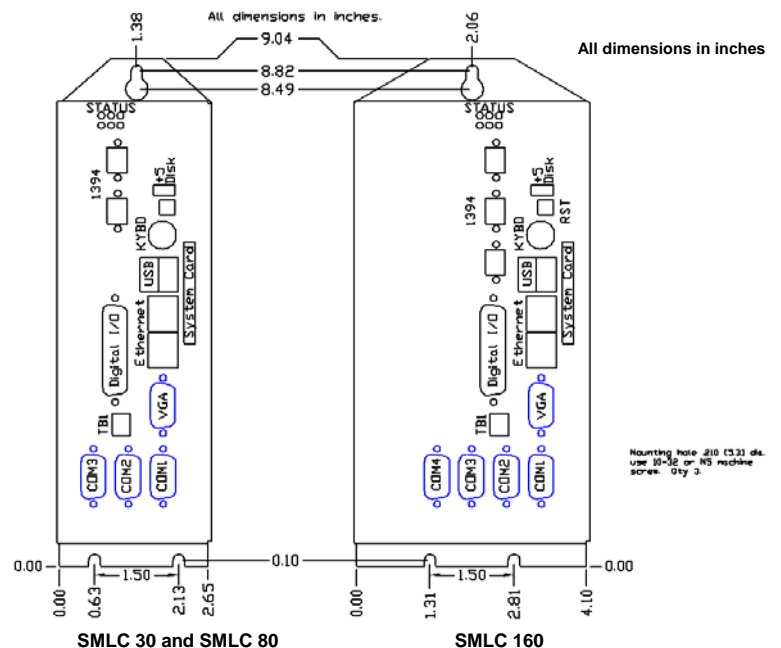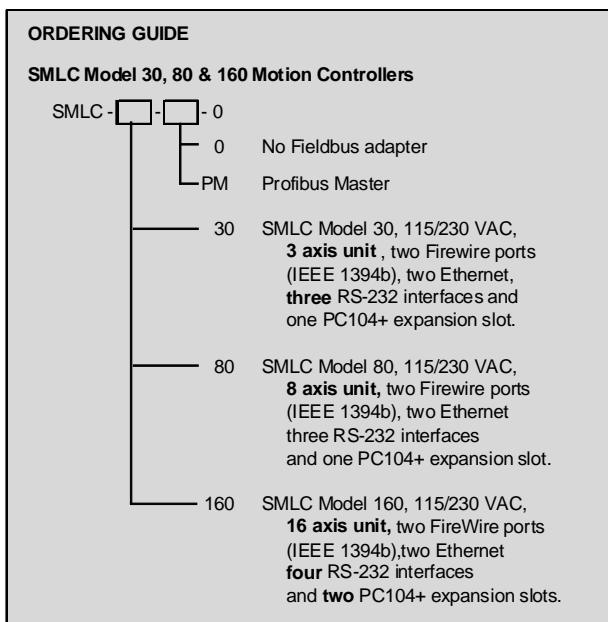 - Integrated support for up to 48 XD-Indexer axes.

Inputs/Outputs

- SMLC I/O: 8 inputs, 8 outputs, 1 analog in, 1 analog out.

- General I/O: 64 modules per WAGO 750 Series bus coupler, up to 512 I/O points connected via Ethernet (Modbus/TCP). Multiple bus couplers can be used for additional I/O.

- Profibus DP Master (optional) supports up to 126 I/O nodes.

Communications

- Standard RS-232 serial ports

- Standard Ethernet ports support Modbus TCP/IP or Ethernet/IP.

PC/104+ cable

9.00

7.23

Side view all models

Mounting hole .210 [5.3] dia. Use 10-32 or M5 machine screw. Qty 3.

SMLC Mounting Diagrams

Side view all models

All dimensions in inches

All dimensions in inches.

9.04
8.82
8.49

1.38
2.06

STATUS

1394 KYBD USB Ethernet Digital I/O System Card VGA TBI COM3 COM2 COM1

+5 Disk RST

0.00   0.63   1.50   2.13   2.65   0.10   0.00   1.31   1.50   2.81   4.10   0.00

Mounting hole .210 [5.3] dia. use 10-32 or M5 machine screw. Qty 3.

SMLC 30 and SMLC 80   **SMLC 160**

ORDERING GUIDE

SMLC Model 30, 80 & 160 Motion Controllers

SMLC - ☐ - ☐ - 0

- 0   No Fieldbus adapter
- PM   Profibus Master

- 30   SMLC Model 30, 115/230 VAC, **3 axis unit** , two Firewire ports (IEEE 1394b), two Ethernet, **three** RS-232 interfaces and one PC104+ expansion slot.

- 80   SMLC Model 80, 115/230 VAC, **8 axis unit,** two Firewire ports (IEEE 1394b), two Ethernet three RS-232 interfaces and one PC104+ expansion slot.

- 160 SMLC Model 160, 115/230 VAC, **16 axis unit,** two FireWire ports (IEEE 1394b),two Ethernet **four** RS-232 interfaces and **two** PC104+ expansion slots.

ServoWire® Motion & Logic Controller

Model 15

ORMEC's ServoWire Motion & Logic Controller (SMLC) 15 is optimized for cost effective motion and machine control in small systems or machines not requiring many axes of highly coordinated motion.

This model can control a single S2D Series network servo drive, one virtual axis and up to 48 XD- Indexers. ORMEC XD-Indexers are stand-alone servo controllers used for single axis motion control. When connected to an SMLC 15, the independent Indexers are easily controlled.

Machine Control

As every machine is different, so are the control requirements. Varying from a nearly independent axis, to limited machine control, operator interface and loosely coupled motion to a fully coordinated synchronous motion machine ORMEC has a system to meet your needs. The SMLC 15 is designed for the middle machine case. An SMLC 15 solution offers PLC-like overall machine control and coordinated motion control. An HMI and machine I/O are easily connected. Recipe selection can be easily programmed and made.

Motion Control

The SMLC-15 has integrated control for ORMEC XD- Indexers and S2D network servo drives.

The SMLC 15 can control a single S2D network drive for highly integrated motion. XD-Indexer drives may also be added to meet additional motion requirements.

For XD-Indexer, control function blocks in the SMLC read status, monitor and control I/O, define and initiate motions.

SMLC

1. Application Memory
- 128 Mbytes of FLASH memory for program storage
- 32 Kbytes SRAM (battery packed) for non-volatile data storage

2. Communication Ports
- Two IEEE 1394b ServoWire (FireWire) ports
- Two Ethernet Communication ports
- Two RS-232 Serial ports

3. Input Power
- 90-264 VAC input power (auto-ranging) or 24 VDC

4. Status LEDs
- Eight status LEDs on the face for indicating system status.

Machine I/O

The cost effective SMLC 15 duplicates all the I/O capabilities of the larger multi-axis SMLC models.

A multi-tiered, flexible approach to machine I/O requirements is used:

- High-speed drive based I/O is used for microsecond position capture and single servo update response to sensor signals. Sub-millisecond programmable limit switch outputs are available in the attached drives.
- Integrated digital I/O includes 8 inputs and 8 outputs, 1 analog input and output. The I/O is updated at the SMLC scan rate. This is ideal for small machines configurations and eliminates added I/O costs.
- General purpose WAGO 750 Series Ethernet I/O modules provide access to a wide variety of analog and digital I/O types.
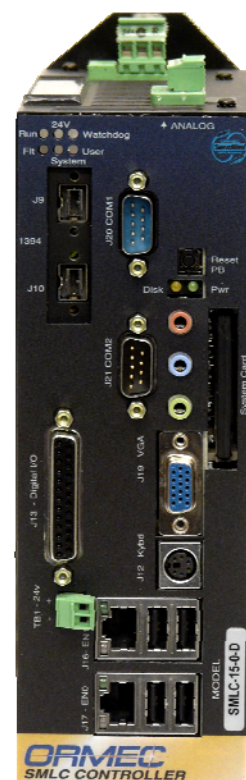
SMLC — At a Glance

- **Powerful and Robust:** 32-bit x86 processors running QNX RTOS.

- **IEC 61131-3 Application Programming**: International programming standard for PLCs.

- **PLCopen Motion Blocks:** Standard compliant motion blocks with powerful ORMEC enhancements.

- **ServoWire:** High-bandwidth, synchronous, all-digital ServoDrive network based on IEEE 1394b.

- **Networking Options:** Modbus/TCP, OPC Server and Ethernet IP.

- **I/O Options include:** High speed drive resident, local resident and WAGO 750 Series

- **Size**: 2.75" x 7.2" x 9" (w x d x h)

Specifications

General Specifications

- Input Voltage: 115/230 VAC, 1.0/0.5A (+15%, -20%), 50/60 Hz or 24 VDC, 1A

- Operating Temperature: 0 to 50°C

- Relative Humidity: 10 to 95% @ 40C   (non-condensing)

- Weight: Approx. 3.2 lbs

- Dimensions: Model 15 is 2.75" x 7.2" x 9.0" (69.9 x 182.9 x 228.6 mm)

Memory

- DRAM: 128 Mbytes

- Program Memory: 128 Mbytes (Removable Compact Flash)

- Non-Volatile Memory: 32 Kbytes (battery backed).
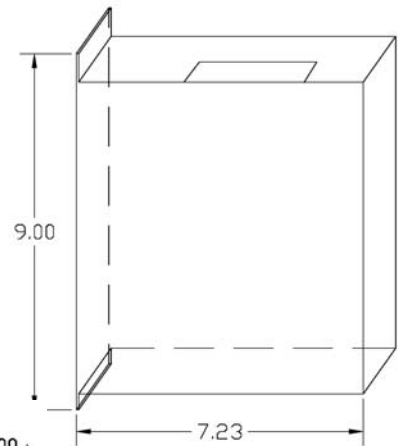
Motion Control

- All-digital control algorithms featuring velocity and acceleration feed-forward for optimal performance.

- High-speed sensor inputs to initiate motion within one position command update.

- High-speed hardware position capture is <1 µsec, ideal for use in high-speed registration applications.

- Software controlled position, speed and current (torque) limits.

- Drive fault protection circuits, watchdog timers and integrated diagnostics for fail-safe operation.

- Full 32-bit position count or modulo position in user units.

- Network S2D drives - 1 1/2 axes

- Integrated support for up to 48 XD-Indexers.

Inputs/Outputs

- SMLC I/O: 8 inputs, 8 outputs, 1 analog in, 1 analog out.

- General I/O: 64 modules per WAGO 750 Series bus coupler, up to 512 I/O points connected via Ethernet (Modbus/TCP). Multiple bus couplers can be used for additional I/O.
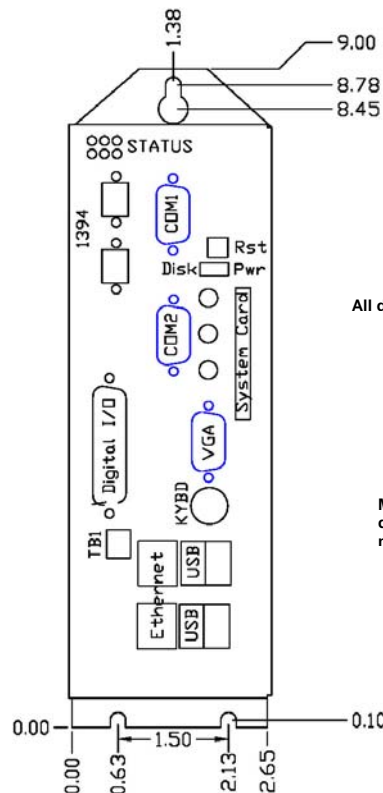
Communications

- Standard RS-232 serial ports

- Standard Ethernet ports support Modbus TCP/IP or Ethernet/IP.

SMLC Mounting Diagrams

Side view.

Mounting hole .210 [5.3] dia. Use 10-32 or M5 machine screw. Qty 3.

All dimensions in inches

Mounting hole .210 [5.3] dia. Use 10-32 or M5 machine screw. Qty 3.

SMLC-15 Mounting dimensions

ORDERING GUIDE

SMLC Model 15 Motion Controllers

SMLC - 15 - 0 - [ ]

- **0**   **AC input power, 115-240 VAC**
- **D**   **DC input power, 24 VDC**

- **0**   No Fieldbus adapter

- **15**   SMLC Model 15
  1 1/2 axis unit , two Firewire ports (IEEE 1394b), two Ethernet and **two** RS-232 interfaces

ORMEC-MKT-2000-01