Ovation™ Micro Controller Model OMC100

Features

- Supports 32 embedded, software-defined I/O channels in a compact design.

- Provides secure, reliable control for remotely located plants or processes.

- Eight of the 32 channels can be configured for Highway Addressable Remote Transducer (HART) protocol.

- Provides an independent user interface that allows all 32 I/O channels to be configured independently.

- Offers a modular I/O base design for flexible placement within space-constrained areas.

- Uses standard Ovation engineering tools for configuration and maintenance.

- Allows expanded operating temperature.

- Supports low power requirements.

- Offers an optional configuration as a standalone system using an Ovation remote station.

- Includes wide area network communication capability that tolerates low bandwidth or intermittent networks.

- Embedded communication protocol drivers provide connectivity with third-party devices without the need for extra hardware.

- Compatible with all Ovation I/O modules including specialty versions for excitation control and machinery health monitoring as well as high-density modules with increased channel capacity.

- Provides a multiprotocol serial communications port for communicating with devices that support RS232, RS485, or CAN Bus.

- Offers built in diagnostics and alert features.

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Introduction

The newest member of the Ovation compact controller series, the Ovation Micro Controller, Model OMC100, integrates all the precision field controls of an Ovation Controller with 32 embedded, software-defined I/O channels, all in one condensed package. Like its OCR and OCC counterparts, the OMC100 provides the same outstanding performance and mission-critical operations for the power and water/wastewater industries, but with a flexible and scalable footprint.

The embedded, configurable I/O channels consist of the following:

- Analog Output – Voltage range from 0 to 10V out.
- Analog Output – Current range 4-20mA with/without HART
- Analog Input – Voltage range 0 to 10 V Input
- Analog Input – Current range 4-20mA with/without HART
- Digital Output – 24 Volt DC
- Digital Input – 24 Volt DC Contact Input
- Thermocouple
- RTD – 2 and 3 wire RTD measurements.

In addition, the OMC100 is equipped with two 9-pin Dsub connectors. One connector allows you to add one branch of Ovation I/O. The I/O branch supports the full range of Ovation analog, digital, turbine, high density, interface, excitation, and machinery health monitor I/O modules, all configured in the Ovation Developer Studio. The other 9-pin Dsub connector allows the OMC100 to communicate with field devices that support RS232, RS485, or Controller Area Network (CAN) bus connections. CAN bus is a standard that allows microcontrollers and devices to communicate with each other's applications without a host computer.

The OMC100 can be used in space-constrained settings without disrupting the existing infrastructure. With its compact size and extended temperature ranges, the OMC100 allows equipment to be placed in environmentally challenged locations. Placing an Ovation OMC100 Controller close to field devices significantly lowers cost associated with field wiring, terminations, and circuit checking compared to traditional Controllers located in a control room.

The Emerson Communication Protocol Suite (CPS), built into the OMC100, enables direct interface to third-party I/O or other devices, such as programmable logic controllers (PLCs), programmable automation controllers (PACs) and real-time automation controllers (RTACs), without the need for extra hardware.

In addition to standard Ovation local area network connections, the OMC100 can also communicate through a wide area network. This option allows an Ovation Controller node to be placed in an area that cannot easily access an Ovation network. Starting with Ovation 3.8 and above, all compact controllers can initiate a secure Virtual Private Network (VPN) connection locally from a Controller. This eliminates the need for routers at the ends and results in a cost savings.

The Controller communicates securely through an internet protocol (IP) connection using a wide variety of wired and wireless media options. Process control continues even if the connection to the host system is lost.

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OMC100 supports local historical data recording for deployments on a Wide Area Network (WAN) where the Ovation Process Historian (OPH) Scanners are on the main Ovation Network, and the OMC100 is on the remote WAN. In this configuration, the amount of network traffic between the WAN and OPH is greatly reduced. The OMC100 scanner can buffer up to one million samples of process data without data loss in situations where the network connectivity between the WAN and OPH is interrupted.

When paired with an Ovation remote station, the OMC100 can operate as a standalone control system.

Process Applications

Like the other members of the Ovation Controller family, the OMC100 Micro Controller is designed to meet the demanding requirements of a broad range of process applications, which include:

- Continuous PID (proportional–integral–derivative) control
- Sequential function chart control
- Boolean logic
- Advanced control
- Model Predictive Control
- Fuzzy logic
- Neural Network
- Special logic and timing functions
- Data acquisition
- Sequence of events processing
- Process point sensor/limit checking
- Process point alarm processing
- Process point conversion to engineering units
- Process point database storage
- Local and remote I/O interface
- Process point tagout

Standard Functions

Control Execution

Like the OCC100 Compact Controller, the OMC100 Micro Controller executes simple to complex modulating, discrete, and sequential control strategies, and performs data acquisition and monitoring functions. The Micro Controller can update the values of up to 10,000 points.

The OMC100 Controller supports up to three control tasks at loop speeds ranging from 10 milliseconds to 300 seconds. Each control task is comprised of the I/O process point input scan, control scheme execution, and an output scan. All three control tasks have user-selectable loop speeds.

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Control Scheme

OMC100 functionality is defined by control sheets created from an extensive library of standard and advanced Ovation algorithms specifically designed for the power, water, and wastewater industries. Control sheets provide the basis for executing, documenting, and automatically creating control tuning diagrams used during commissioning and when adjusting control schemes. On average, the OMC100 Controller can execute more than 1,000 control sheets.

Sequence-of-Events

Integral sequence of events processing capability is provided using Ovation I/O (from a total of 32 channels, a maximum of 4 channels are available at a time) and standard Controller software. With a resolution of one millisecond, the sequence of events subsystem records the sequence in which a set of user-defined digital input indications change state, providing a valuable troubleshooting and diagnostic tool for high-speed electrical systems. In addition to the higher resolution time tags, sequence-of-events points may be used in control schemes like any other I/O point, including limit checking and alarming.

Alarm Processing

The OMC100 processes limits and alarms based on each process point's database definition. These functions are performed regardless of whether the point is scanned for input to a control loop or for data acquisition/monitoring, separate from control functions. The alarm status of each point in the Controller is updated with each scan.

The status may indicate whether a point value has:

- Exceeded the range of the sensor
- Exceeded the user-defined limits
- Changed state (discrete points)
- Passed an incremental limit

Alarm reporting can be delayed on a per-point basis for a user-specified period. The OMC100 generates alarms upon exceedance of:

- Five user-specified high limit values
- Highest limit value plus an integer time incremental value
- Five user-specified low limit values
- Lowest limit value less an integer times an incremental value

Compact Size

The OMC100's modular architecture provides cost-effective and scalable footprints for space-constrained areas.
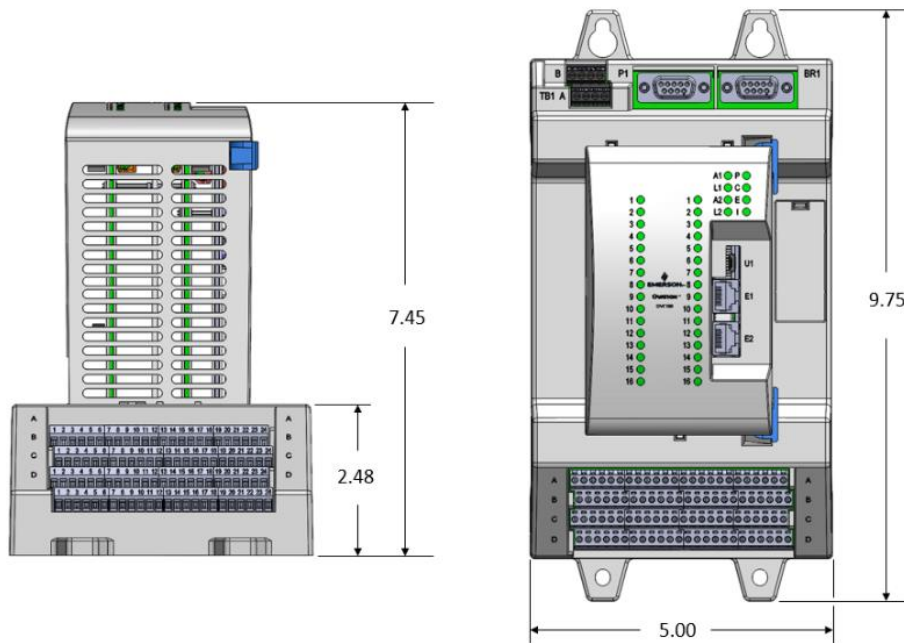
Connectivity

The OMC100 includes embedded Ethernet link protocol drivers for communicating with intelligent electronic devices (IEDs) and other third-party devices equipped with embedded Controllers such as smart inverters, weather stations, protective relaying systems, or motor control centers.

The scalable Controller performs data acquisition functions by communicating with Ethernet-capable I/O systems available from numerous vendors and various types of PLCs, PACs, and RTACs using the on-board communication protocol drivers. The OMC100 can acquire smart field device information for archiving to the Historian, displaying on a workstation connected to the Ovation network, or for use with asset management functions through Emerson's AMS Suite technologies or Ovation machine works software.

Network Options

The Ovation Micro Controller uses two methods to communicate with the Ovation network. The first method is through a direct, local area network. Optionally, the OMC100 can communicate over a wide area network, allowing an Ovation drop to operate in an area not accessible to the Ovation network. In this case, the OMC100 uses an Ethernet connection, such as a Virtual Private Network or cellular network, to communicate with the host Ovation network. This method allows the control processes to continue at the remote location even if the connection to the host Ovation system is lost.

Every OMC100 includes two network interfaces that support Ethernet communications per the IEEE 802.3-2008 standard.

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OMC100 Specifications

Ovation Micro Controller Model OMC100 - Specifications	
Item	**Capability**
Controller module	• Xilinx Zynq Ultrascale System on a Chip (Soc) quad core ARM Cortex A53 processors. • 1 GB LPDDR4 SDRAM. • 1GB flash drive with on-board clear and format capability • 256 MB QSPI NOR flash • 2 Ethernet MACs • USB capability • Hot swappable • Integrated module temperature monitoring (SOC)
Controller base	• Two configurable 9-pin Dsub connectors: • One that supports one full branch (8 I/O modules) of I/O. • One that supports multiprotocol serial communications. • Four rows of I/O terminations that are brought out to 96 pins located at the bottom of the Controller base. • 2 x 4 terminal for 24V input power as well as providing pass through connections to daisy-chain to Horizontal I/O bases.
Originated points	Up to 10,000 points
Process control tasks	Up to three, each with a different loop execution rate
Control task loop execution time	All three tasks are user definable, with each task individually defined to execute at a rate between 10 milliseconds and 300 seconds in increments of 10 milliseconds in up to three control task areas.
Ethernet ports	2 Ethernet ports per controller module - 2 independent MACs on the OMC100 Controller,10/100/1000 Base T, RJ45 connectors
Remote Node Interface	Supports up to 16 Ovation remote node interface nodes; each node supports up to 64 Ovation I/O modules
Operating Temperature	-20°C to +70°C (-4°F to 158°F)
Controller electronics module +24V main power	• 9.6W Typical (Controller only – no I/O) • 25.5W Maximum (Controller and I/O with typical configuration)

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Ovation Micro Controller Model OMC100 - Specifications	
Item	**Capability**

Smart device capability	• Supports Foundation™ fieldbus, PROFIBUS and DeviceNet communications.
	• Supports interfaces through TCP/IP-based protocols:
	   • Allen-Bradley DF1 Client
	   • Allen-Bradley CSP/PCCC Client
	   • Allen-Bradley EIP/PCCC Client
	   • EIP Explicit Client (Allen-Bradley EIP/Native)
	   • EIP Implicit I/O Client
	   • EIP Explicit Server
	   • EIP Implicit I/O Server
	   • DNP3 Client/DNP3 Server
	   • DNP3 Server
	   • GE Ethernet Global Data
	   • GE Mark GSM Client
	   • GE Mark IV Client
	   • International Electrotechnical Commission (IEC) 60870-5-101 Controlling/ IEC 60870-5-101 Controlled
	   • IEC 60870-5-104 Controlling/ IEC 60870-5-104 Controlled
	   • IEC 61850 MMS Client
	   • IEC 61850 GOOSE Client (*Note: this is only for OCC100 and ELC data sheets. Not for SCADA data sheet)
	   • Modbus Client/Modbus Server
	   • Turbine Control Interface Client
	   • Motorola ACE IP Gateway Client
	   • LoggerNet PC Client
	   • Openness, Productivity, and Connectivity Unified Architecture (OPC UA) Client/ OPC UA Server
	   • Winteligence Server
	   • IEC 60870-5-103 Controlling/IEC 60870-5-103 Controlled
	   • Inter-Control Center Communications Protocol (ICCP) Client/ICCP Server/ ICCP Bidirectional
	   • Building Automation Controls network (BACnet) Client/BACnet Server
	   • Optomux Client

Certifications	IEC61131-2, CE Mark, and KC Mark

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