

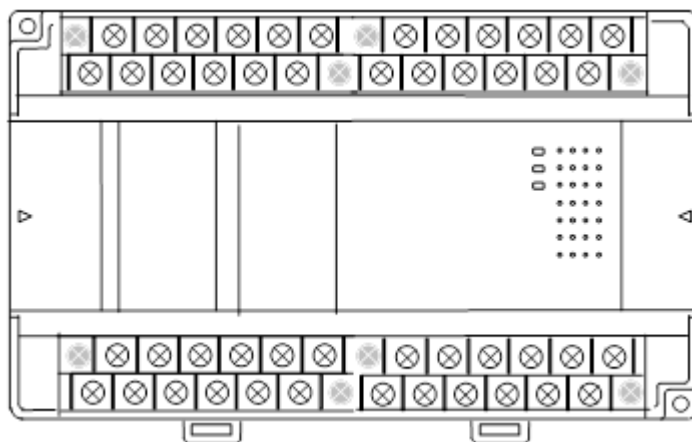
Chapter 6: VersaMax 28-Point Micro PLCs

This chapter describes the features, specifications, and field wiring of these VersaMax Micro PLCs:

IC200UAA007	28 Point Micro PLC, (16) 120Vac In, (12) 120Vac Out, 120/240Vac Power Supply
IC200UAR028	28 Point Micro PLC, (16) 120Vac In, (2) Relay Out at 10 Amps, (10) Relay Out at 2 Amps, 120/240Vac Power Supply
IC200UDD110	28 Point Micro PLC, (16) 24Vdc In, (12) 24Vdc Out, 24Vdc Power Supply
IC200UDD120	28 Point Micro PLC, (16) 24Vdc In, (12) 24Vdc Out with ESCP, 24Vdc Power Supply
IC200UDD212	28 Point Micro PLC, (16) 12Vdc In, (12) 12Vdc Out, 12Vdc Power Supply
IC200UDR005	28 Point Micro PLC, (16) 24Vdc In, (1) 24Vdc Out, (11) Relay Out, 120/240Vac Power Supply
IC200UDR006	28 Point Micro PLC, (16) 12Vdc In, (12) Relay Out, 12Vdc Power Supply
IC200UDR010	28 Point Micro PLC, (16) 24Vdc In, (1) 24Vdc Out, (11) Relay Out, 24Vdc Power Supply
IC200UDR228	28 Point Micro PLC, (16) 24Vdc In, (1) 24Vdc Out, (11) Relay Out, 12/24Vdc Power Supply

6.1 Features of VersaMax 28-Point Micro PLCs

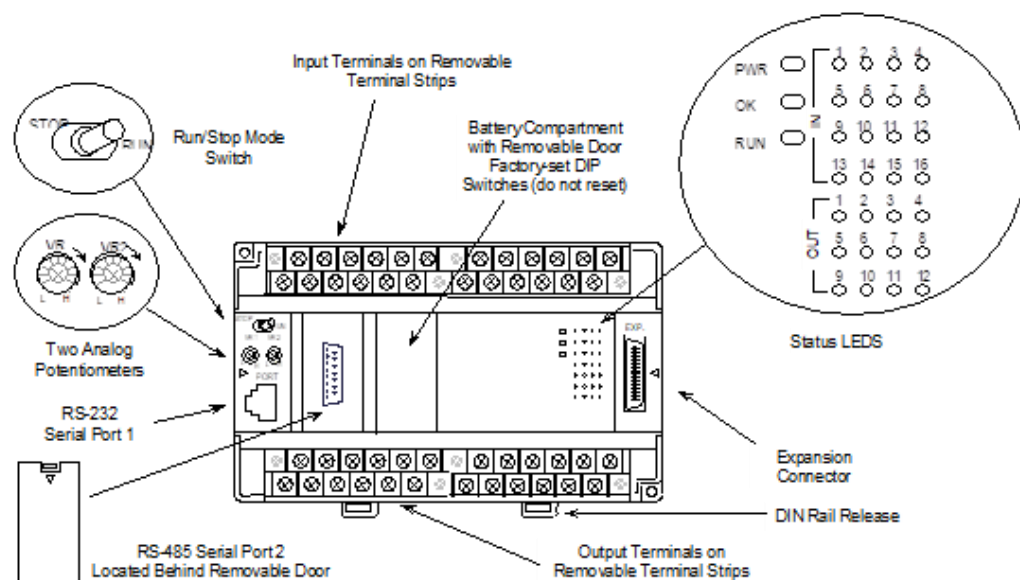
Figure 35



- Supports up to four Expansion Units in any combination.
- Four removable screw-down “barrier-style” terminal strips with protective covers.
- Two Serial communications ports. Port 1 (RS-232) supports SNP/SNPX slave protocols. Port 2 (RS-485) supports SNP/ SNPX master and slave, RTU master and slave protocol, and Serial I/O.
- Run/Stop mode switch that can be configured as a run/stop switch, a memory protect switch, and also used for clearing faults when a fatal fault exists.
- Time-of-Day Clock.
- Two analog potentiometers.

- Full-featured programming Instruction Set with floating point math. The application program can be either Ladder Diagram (LD) or Instruction List (IL) format.
- 9K words of program memory, 2048 words of registers.
- Flash memory (ROM) for non-volatile program storage and for system firmware
- Configurable to read configuration at power-up from either RAM or flash memory (ROM). Can also be configured to read application program from flash at power-up.
- Capacitor backs up RAM and the Time-of-Day clock for at least 30 minutes.
- Optional lithium battery backup for RAM and real-time clock.

Figure 36



6.1.1 Run/Stop Switch

The Run/Stop switch can be configured as a run/stop switch, a memory protect switch, and used for clearing faults when a fatal fault exists.

6.1.2 Serial Ports

Port 1 is an RS-232 serial port with an RJ-45 connector. Port 2, located behind a removable door, is an RS-485 serial port with a standard DB-15 connector. Both ports can be used for programming. Only one port can be used at a time for programming, but both ports can be used for monitoring at the same time. Port 1 uses SNP slave protocol. Port 2 is software-configurable for SNP master/slave or RTU slave operation. CPUs with firmware version 2.02 or later support Modbus RTU Master on port 2. 4-wire and 2-wire RTU are supported. If Port 2 is being used for RTU, it automatically switches to SNP slave mode if necessary. Port 2 defaults to SNP slave and automatically reverts to SNP slave when the CPU is in Stop mode, if configured for Serial I/O.

Either port can be software-configured to set up communications between the CPU and various serial devices. An external device can obtain power from both ports if it requires 100mA or less at 5Vdc.

6.1.3 Analog Potentiometers

The two potentiometers on the front of a Micro PLC can be used to adjust the values in analog registers %AI016 and %AI017. An example use for the potentiometers would be to set threshold values for use in logical relationships with other inputs/outputs.

6.1.4 Removable Terminal Strips

The removable terminal assemblies are protected by hinged covers. After turning off power to the Micro PLC, a terminal assembly and attached field wiring can be separated from the Micro PLC by removing two screws.

6.1.5 Status LEDs

LEDs on the Micro PLC provide quick visual verification of operating status. In addition to LEDs for Power, OK, and Run mode, there is an LED for each I/O point.

6.1.6 Backup Battery

The Micro PLC uses a large value capacitor to provide memory retention current to the System/User RAM and the Time-of-Day clock when the power supply is either not present or not powered up. The capacitor retains memory contents for at least 30 minutes.

To maintain memory for longer than this, a replaceable battery assembly can be installed in the battery holder, as described in Chapter 14:. The Micro PLC reports the battery state to the PLC Fault Table and also uses Status Bits %SA011 and %S0014 to indicate the battery state.

6.2 General Specifications for 28-Point VersaMax Micro PLCs

Module Dimensions	Height: 90mm (3.6 inches) Depth: 76mm (3.0 inches) Width: 150mm (6.0 inches)
Typical Scan Rate	1.1 ms/K for Boolean logic (see Appendix A:)
Real Time Clock accuracy (for Timer contacts and Timer function blocks)	±0.5%
Time of Day Clock accuracy	±5 sec/day @10°C, ±5 sec/day @25°C, and ±11 sec/day @55°C or across full temp. range
Maximum number of slave devices per network	8 (can be increased with a repeater)
+5Vdc output of Serial Ports	Serial Port 1, pin 7: 100mA maximum ⁴ Serial Port 2, pin 5: 100mA maximum ⁴
Lithium battery (IC200ACC403): shelf life installed	Up to 5 years typical at 30 °C, Up to 3 years typical at 55 °C 4 months battery backup time (powered down) minimum at 55 °C

6.3 High-Speed Counters

VersaMax Micro PLCs with DC inputs can be configured to provide built-in high-speed counter and pulse operation.

When configured for High-Speed Counter operation, inputs I1 to I8 can be set up as:

- Up to four Type A Counters or
- One Type A and one Type B Counter.

Each counter provides direct processing of rapid pulse signals up to 10kHz for industrial control applications such as meter proving, turbine flowmeter, velocity measurement, material handling, motion control, and process control.

Each counter can be enabled independently. Type A counters can be configured for up or down counting (default is up) and for positive or negative edge detection (default is positive). The Type B counter provides an A Quad B counting function.

Models with DC outputs can be configured to provide up to a total of four counter, Pulse Train, or PWM outputs. Relay outputs cannot be used as Pulse Train or PWM outputs.

⁴ Combined port 1 and port 2 total not to exceed 100mA max.

6.4 IC200UAA007

28-Point Micro PLC, (16) 120Vac In, (12) 120Vac Out, 120/240Vac Power Supply

VersaMax Micro PLC model IC200UAA007 accepts sixteen AC inputs and provides twelve AC outputs. It uses 100Vac to 240Vac nominal input power for PLC operation.

This module does not provide High-Speed Counter, PWM or Pulse Train operation.

6.4.1 Inputs

The sixteen 120Vac input circuits are reactive (resistor/capacitor) inputs. The input circuits require an AC power source: they cannot be used with a DC power source.

Inputs are compatible with a wide range of input devices, such as pushbuttons, limit switches, and electronic proximity switches. Power to operate the field devices must be supplied.

6.4.2 AC Outputs

The 120/240Vac, 0.5 Amp triac outputs are provided in isolated groups. The commons are not tied together inside the module. This allows each group to be used on different phases of the AC supply or to be powered from the same supply. Each group is protected with a replaceable 3.15 amp fuse for its common. Also, an RC snubber is provided for each output to protect against transient electrical noise on the power line.

AC power to operate loads connected to outputs must be supplied from an external source.

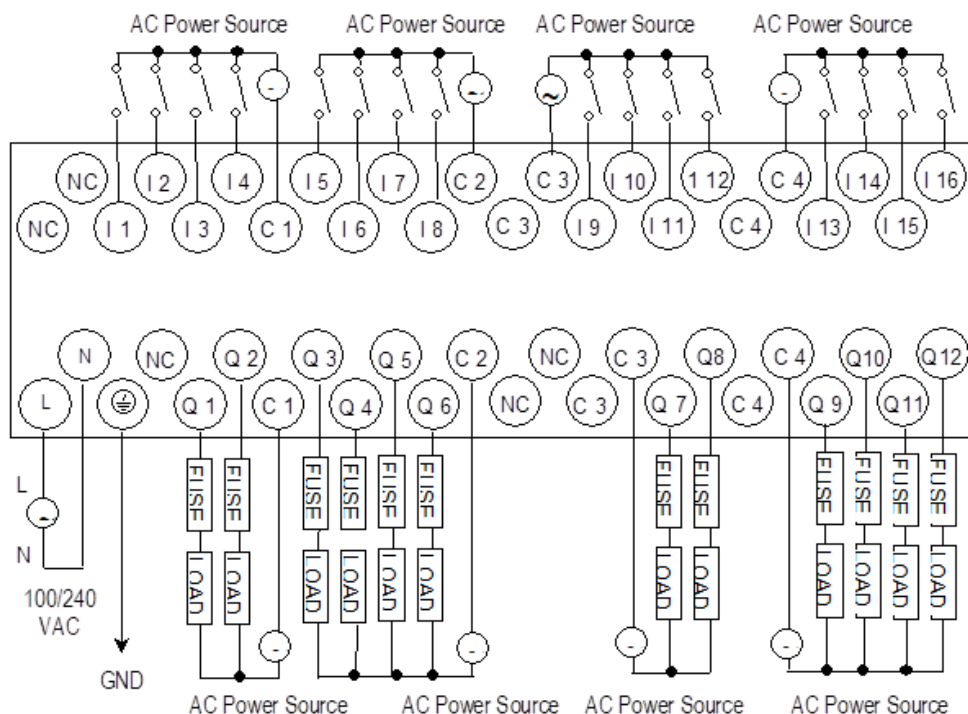
This module provides a high degree of inrush current (10x the rated current) which makes the outputs suitable for controlling many types of inductive and incandescent loads.

6.4.3 Micro PLC IC200UAA007 Specifications

Item	Description
Weight	600 grams (1.32 lbs.)
Inputs	16 AC inputs
Outputs	12 AC outputs
High-Speed Counters	None
AC Power Specifications	
Range	100 -15% to 240 +10%Vac
Frequency	50 -5% to 60 +5% Hz
Hold-up	10mS at 85-100Vac, 20mS at 100-264Vac
Inrush Time	2mS for 40 Amp
Inrush Current	30 Amp maximum at 200Vac, 40 Amp maximum at 265Vac
Input Current	0.10 Amp typical at 100Vac, 0.06 Amp typical at 200Vac
Input Power Supply Rating	16 VA
AC Input Specifications	
Points/Common	4 (I1-I4) and (I5-I8)
Rated Load Voltage	85-132Vac, 50 -5% to 60 +5% Hz
Maximum Input Voltage	132V rms, 50/60 Hz
Input Current	8 mA rms (100Vac, 60 Hz)
Voltage	ON: minimum 80V rms, 4.5 mA rms, OFF: maximum 30V rms, 2 mA rms
Response Time	OFF to ON: maximum 25 ms, ON to OFF: maximum 30 ms
Isolation	1500V rms field side to logic side, 500V rms between groups
AC Output Specifications	
Rated Load Voltage	100 -15% to 240 +10%Vac, 50 -5% to 60 +5% Hz
Maximum Resistive Load Current	0.5 Amp per point
Maximum UL Pilot Duty Rating	0.5 Amp per point at 240Vac 0.6 Amp maximum on C1 and C3 1.2 Amps maximum on C2 and C4
Maximum Inrush Current	5A (1 period)/point, 10A (1 period)/common
Maximum voltage drop when ON	1.5 V RMS
Maximum leak current when OFF	1.8 mA RMS (115Vac), 3.5 mA RMS (230Vac)
Response Time (Maximum)	OFF to ON: 1ms, ON to OFF: 1/2 cycle + 1 ms
Isolation	1500V RMS field side to logic side, 500V RMS between groups

6.4.4 Wiring Diagram IC200UAA007

Figure 37



6.5 IC200UAR028 28-Point Micro PLC, (16) 120Vac In, (2/10) Relay Out, 120/240Vac Power Supply

VersaMax Micro PLC model IC200UAR028 accepts sixteen AC inputs and provides two relay outputs at 10 Amps and ten relay outputs at 2 Amps. It uses 100Vac to 240Vac nominal input power for PLC operation.

This module does not provide High-Speed Counter, PWM or Pulse Train operation.

6.5.1 Inputs

The sixteen 120Vac input circuits are reactive (resistor/capacitor) inputs. The input circuits require an AC power source: they cannot be used with a DC power source.

Inputs are compatible with a wide range of input devices, such as pushbuttons, limit switches, and electronic proximity switches. Power to operate the field devices must be supplied.

6.5.2 Relay Outputs

The Micro PLC relay outputs can control a wide range of load devices such as motor starters, solenoids, and indicators. The switching capacity of each of these circuits is 2 amps. An external source of AC or DC power must be supplied to operate field devices.