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Chapter 6

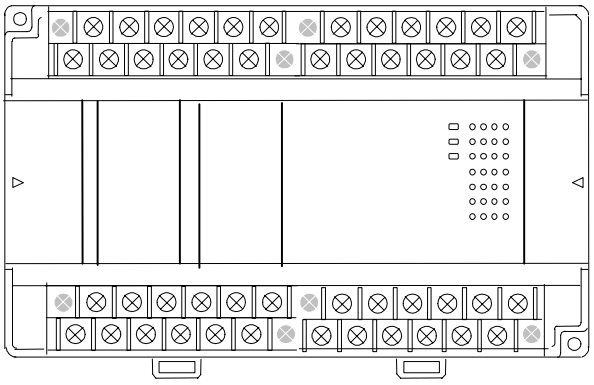
VersaMax 28-Point Micro PLCs

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

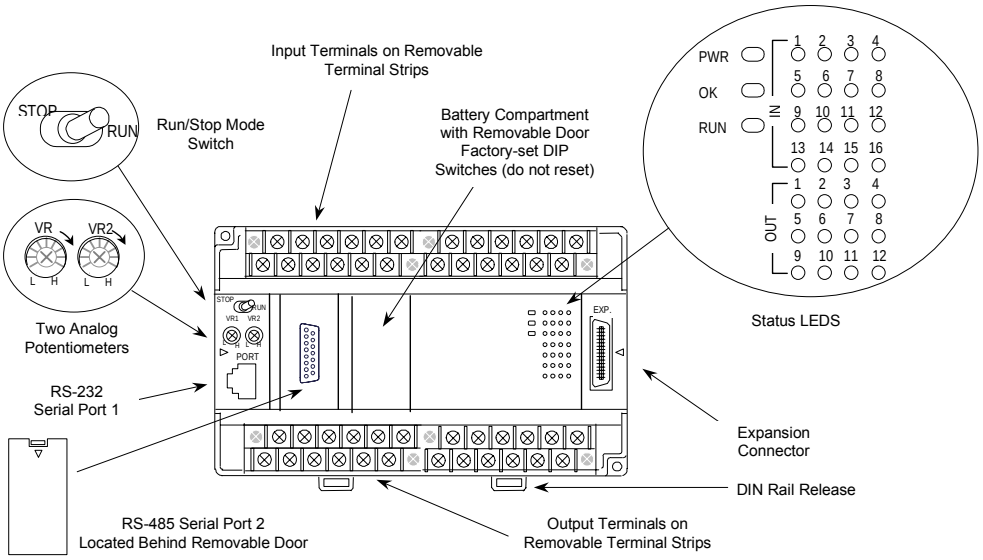
- IC200UAA007 28 Point Micro PLC, (16) 120VAC In, (12) 120VAC Out, 120/240VAC Power Supply
- IC200UAR028 28 Point Micro PLC, (16) 120VAC In, (2) Relay Out at 10 Amps, (10) Relay Out at 2 Amps, 120/240VAC Power Supply
- IC200UDD110 28 Point Micro PLC, (16) 24VDC In, (12) 24VDC Out, 24VDC Power Supply
- 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

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Features of VersaMax 28-Point Micro PLCs



- 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 powerup from either RAM or flash memory (ROM). Can also be configured to read application program from flash at powerup.
- 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.



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.

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.

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.

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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.

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.

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.

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 @10degC, +/-5 sec/day @25degC, and +/-11 sec/day @55degC or across full temp. range
Maximum number of slave devices per network	8 (can be increased with a repeater)
+5 VDC output of Serial Ports	Serial Port 1, pin 7: 100mA maximum* Serial Port 2, pin 5: 100mA maximum* *Combined port 1 and port 2 total not to exceed 100mA max
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

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.

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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.

Inputs

The sixteen 120 VAC 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.

AC Outputs

The 120/240 VAC, 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.

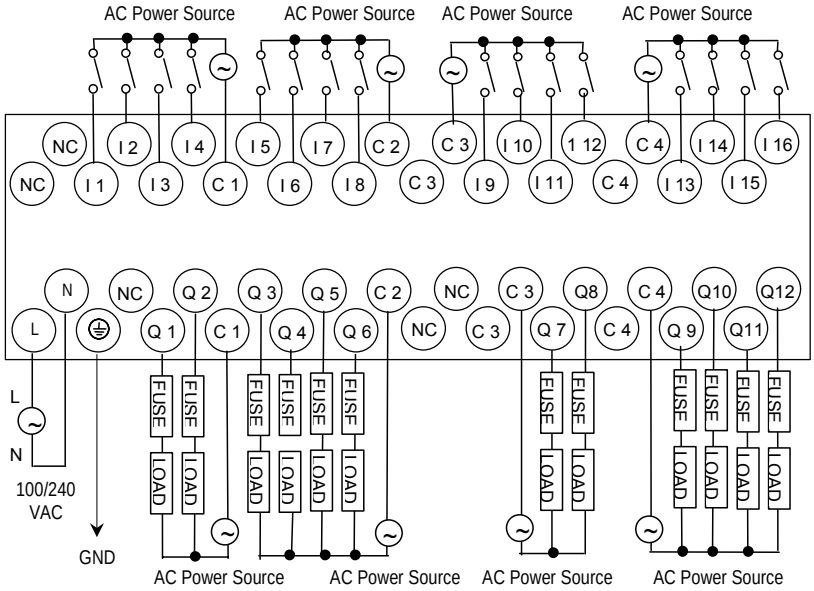
This module provides a high degree of inrush current (10x the rated current) which makes the outputs suitable for controlling many types of inductive and incandescent loads.

Micro PLC IC200UAA007 Specifications

Weight	600 grams (1.32 lb)
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 85-100 VAC, 20mS at 100-264 VAC
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	85–132 VAC, 50 -5% to 60 +5% Hz
Maximum Input Voltage	132V rms, 50/60 Hz
Input Current	8 mA rms (100 VAC, 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 240 VAC 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 (115 VAC), 3.5 mA RMS (230 VAC)
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

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Wiring Diagram IC200UAA007



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.

Inputs

The sixteen 120 VAC 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.

Relay Outputs

The Micro PLC's 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.

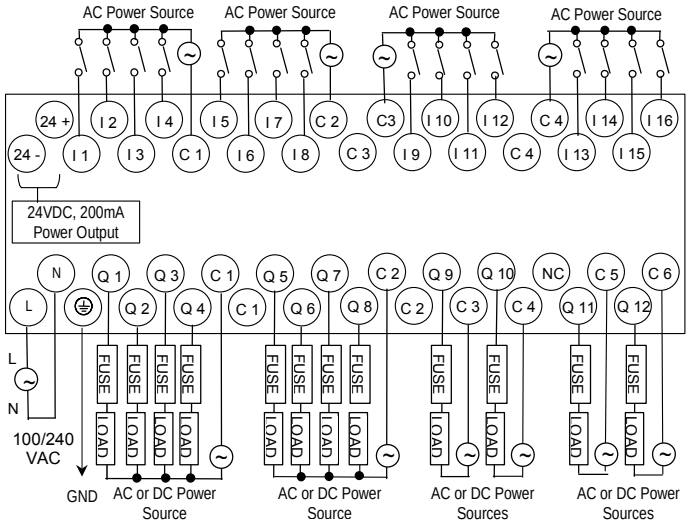
Micro PLC IC200UAR028 Specifications

Weight	600 grams (1.32 lb)
Inputs	16 AC inputs
Outputs	2 relay outputs at 10 Amps and 10 relay outputs at 2 Amps
High-speed Counters	None
+24 VDC Output Power Supply	200mA maximum (for input circuits and user devices)
AC Power Specifications	
Range	100 -15% to 240 +10% VAC
Frequency	50 -5% to 60 +5% Hz
Hold-up	10mS at 85-100 VAC, 20mS at 100-264 VAC
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

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AC Input Specifications			
Points/Common	4 (I1–I4) and (I5–I8)		
Rated Load Voltage	85–132 VAC, 50 -5% to 60 +5% Hz		
Maximum Input Voltage	132V rms, 50/60 Hz		
Input Current	8 mA rms (100 VAC, 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		
Relay Output Specifications			
Operating Voltage	5 to 30 VDC or 5 to 250 VAC		
Isolation	1500 V RMS between field side and logic side, 500 V RMS between groups		
Leakage Current	15 mA at 240 VAC maximum		
Maximum UL Pilot Duty Rating	2 amps at 24VDC and 240VAC	10 amps at 24VDC and 240VAC	
Maximum Resistive Load Rating	2 amps at 24VDC and 240VAC	10 amps at24 VDC and 240VAC	
Minimum Load	10 mA		
Maximum Inrush	5 amps per half cycle	14 amps per half cycle	
Response Time	ON: 15 ms maximum, OFF: 15 ms maximum		
Contact Life: Mechanical	20 x 10^6 mechanical operations		
Contact Life: Electrical Voltage	Current: Resistive 2.0A 10.0A 4.0A	Current: Lamp and Solenoid 0.6A 4.0A 1.0A	Typical Operations 100,000 100,000 200,000

Wiring Diagram IC200UAR028



Outputs Q 1 – Q 10 are rated at 2.0 Amps each. Outputs Q 11 and Q 12 are rated at 10.0 Amps each.

IC200UDD110
28 Point Micro PLC, (16) 24VDC In, (12) 24VDC Out, 24VDC Power Supply

VersaMax Micro PLC model IC200UDD110 accepts sixteen DC inputs and provides twelve 24VDC outputs. It uses +24VDC nominal input power for PLC operation.

DC Power

If configured to disable power-up diagnostics, the PLC begins logic solution 100ms after the voltage level of the power supply input reaches and maintains 24VDC. The 24VDC power source for the PLC must have enough transient current capability to support the inrush current of the power supply and to maintain a 24VDC voltage level (see power supply specifications for inrush requirements).

DC Inputs

The module has sixteen configurable DC inputs that can be used as positive or negative logic standard inputs. As standard inputs, they are compatible with a wide range of input devices, such as pushbuttons, limit switches, and electronic proximity switches. Eight of the inputs can be used for High-speed Counter inputs.

The Micro PLC's +24 VDC supply can be used for input devices and to power the DC input circuits at about 7.5 mA per input. The combination of input circuit current and external device current must not exceed 200 mA..

Transistor Outputs

The module provides twelve transistor output circuits that can be used to switch devices like valves, lamps or contactors. External fusing should be provided to protect the outputs. Fast fuses are recommended.

The outputs can be configured as regular outputs or as outputs controlled by the High Speed Counters. Some outputs can be used as pulse train or pulse width modulation (PWM) outputs.

All outputs are isolated between field and logic and are switching positive voltage. The outputs have one common incoming supply (VC) and one common ground (COM). The outputs are able to drive high inrush currents (8 times the rated current) and are protected against negative voltage pulses. This makes it possible to switch lamps and inductive loads.

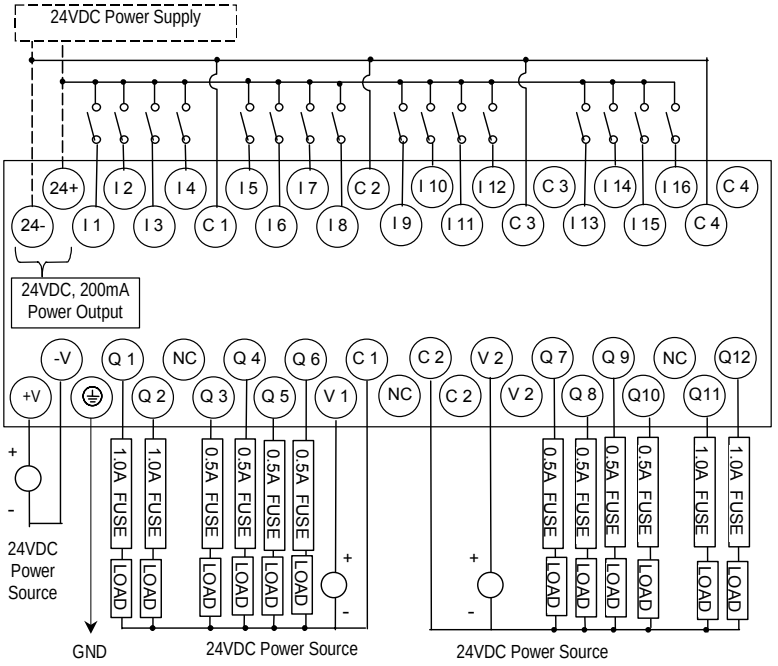
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Micro PLC IC200UDD110 Specifications

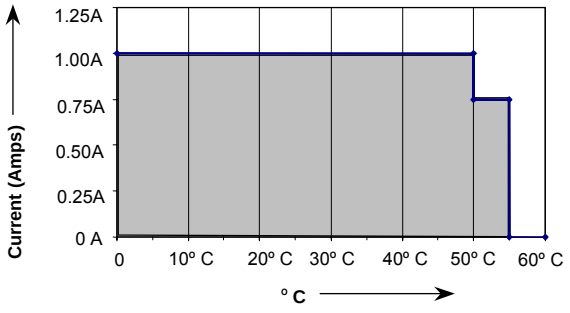
Weight	460 grams (1.01 lb)
Inputs	Sixteen 24 VDC positive logic inputs in four groups of four
Outputs	Twelve transistor outputs, 24 VDC. Outputs are grouped in two groups with separated incoming supply. Each group contains 4 outputs with a maximum load of 0.5A and 2 outputs with a maximum load of 1A.
High-speed Counters	Up to four Type A or one Type A and one Type B
+24 VDC Output Power Supply	200mA maximum (for input circuits and user devices)
DC Power Specifications	
Range	19.2VDC to 30VDC
Hold-up	10mS at 19.2 VDC
Inrush Current	1 Amp maximum at 30VDC
Inrush Time	10mS for 1 Amp
Input Current	0.20 Amp typical at 24VDC
Input Power Supply Rating	5W
DC Input Specifications	
Rated Input Voltage	24 volts DC
Input Voltage Range	0 to 30 volts DC
Input Current	7.5mA typical
Input Resistance	2.8 Kohms
Input Threshold Voltage	ON: 15VDC minimum, OFF: 5VDC maximum
Input Threshold Current	ON: 4.5mA maximum, OFF: 1.5mA minimum
Response Time	0.5 to 20ms configurable as regular input; 100µs as HSC input
Isolation Voltage	1500V RMS field side to logic side, 500V RMS between groups
Output Specifications	
Voltage Range	12VDC/24VDC (24VDC +10% / -43% input at V1,C1)
Maximum Load Current	1.0A per point (Q1, Q2, Q11, Q12) at 24VDC at 100% ON duration 0.75A per point (Q3 - Q10) at 24VDC at 100 % ON duration 0.5A per point (Q3 - Q10) at 12VDC at 100 % ON duration
Maximum Inrush Current	Q1,Q2,Q15,Q16: 1A, Q3-Q13: 0.7A
Output Voltage Drop	0.3V maximum
OFF state leakage current	100µA maximum
Response Time	OFF to ON, ON to OFF 0.1ms maximum (24 VDC, 0.2A)
Isolation Voltage	1500V RMS between field side and logic side, 500V RMS between groups
Fuse	Outputs should be fused externally. Otherwise, a load short can damage the module output transistor, which is not user replaceable.

High-speed Counter Input / PWM and Pulse Train Output Specifications	
Maximum Counter Frequency	10kHz
Input Voltage	ON : 15V, OFF: 5V
Count Pulse Width	20% to 80% duty cycle at 10kHz
Count Registers	16bits
Outputs	
Load Voltage	Q1-Q4: 12/24VDC
Maximum Pulse/PWM Frequency	5kHz
Types available	Up to four HSC, PT, and/or PWM outputs

Wiring Diagram IC200UDD110



The maximum current that can be used for output points Q1, Q2, Q11 and Q12 is lower for ambient temperatures above 50 degrees C



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IC200UDD120
28 Point Micro PLC, (16) 24VDC In, (12) 24VDC Out with ESCP, 24VDC Power Supply

VersaMax Micro PLC model IC220UDD120 accepts sixteen DC inputs and provide twelve 24VDC outputs. The outputs have electronic short-circuit protection. The module uses +24VDC nominal input power for PLC operation.

DC Power

If configured to disable power-up diagnostics, the PLC begins logic solution 100ms after the voltage level of the power supply input reaches and maintains 24VDC. The 24VDC power source for the PLC must have enough transient current capability to support the inrush current of the power supply and to maintain a 24VDC voltage level (see power supply specifications for inrush requirements).

DC Inputs

The module's sixteen configurable DC inputs can be used as positive or negative logic standard inputs. Eight of these inputs can be used for High-speed Counter inputs.

When used as standard inputs, they are compatible with a wide range of input devices, such as pushbuttons, limit switches, and electronic proximity switches.

The Micro PLC's +24 VDC supply can be used for input devices and to power the DC input circuits at about 7.5 mA per input. The combination of input circuit current and external device current must not exceed 200 mA..

Transistor Outputs

The twelve transistor outputs can be configured as regular outputs or as outputs controlled by the High Speed Counters. Some outputs can be used as pulse train or pulse width modulation (PWM) outputs.

The output circuits can be used to switch devices like valves, lamps or contactors.

Outputs require no fusing, they provide electronic short-circuit protection.

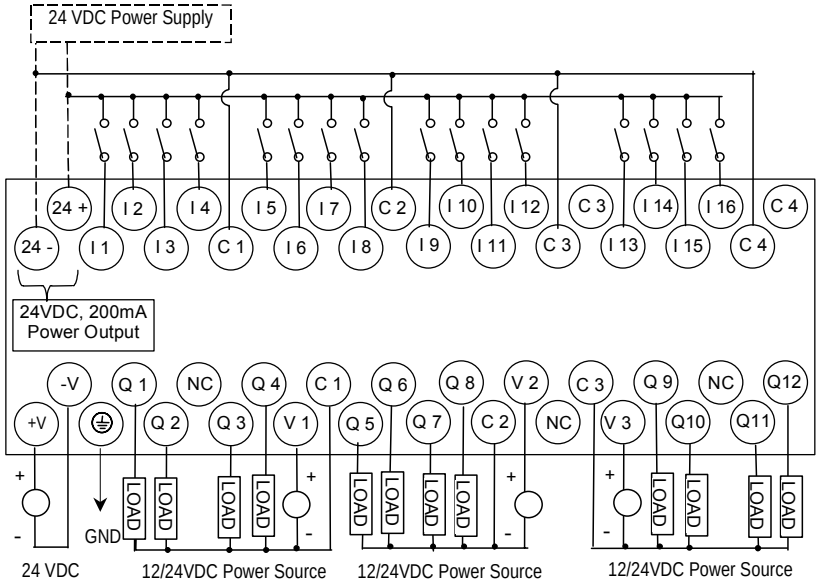
Micro PLC IC200UDD120 Specifications

Weight	460 grams (1.01 lb)
Inputs	Sixteen 24 VDC positive logic inputs in four groups of four
Outputs	Twelve transistor outputs, 24 VDC. Outputs are grouped in two groups with separated incoming supply. Each group contains 4 outputs with a maximum load of 0.5A and 2 outputs with a maximum load of 1A.
High Speed Counters	Four Type A or One Type A and One Type B
+24 VDC Output Power Supply	200mA maximum (for input circuits and user devices)
DC Power Specifications	
Range	19.2VDC to 30VDC
Hold-up	10mS at 19.2 VDC
Inrush Current	1 Amp maximum at 30VDC
Inrush Time	10mS for 1 Amp
Input Current	0.20 Amp typical at 24VDC
Input Power Supply Rating	5W
DC Input Specifications	
Rated Input Voltage	24 volts DC
Input Voltage Range	0 to 30 volts DC
Input Current	7.5mA typical
Input Resistance	2.8 Kohms
Input Threshold Voltage	ON: 15VDC minimum, OFF: 5VDC maximum
Input Threshold Current	ON: 4.5mA maximum, OFF: 1.5mA minimum
Response Time	0.5 to 20ms configurable as regular input; 100µs as HSC input
Isolation Voltage	1500V RMS field side to logic side, 500V RMS between groups
DC Output Specifications	
Voltage Range	Q1 – Q12: 12/24VDC +10%, -15%
External Power Supply (for supplying power to the V terminal)	12/24V -10%, +20%
Maximum Load Current	Q1 and Q2: 1A per point, Q3 - Q12: 0.7A per point
Minimum Switching Current	10mA
Maximum Inrush Current	Q1,Q2,Q11,Q12: 8A for 20ms, 1 pulse, Q3-Q10: 4A for 20ms, 1 pulse
Output Voltage Drop	Q1– Q12: 0.3V maximum
OFF state leakage current	0.1mA
Response Time	OFF to ON, ON to OFF: 0.05mS maximum @ 24VDC
Isolation Voltage	1500V RMS between field side and logic side, 500V RMS between groups
Fuse	Not required
Undervoltage shutdown	Q1 - Q12: 5V minimum, 8V maximum
DC short circuit current	Q1 – Q12: 0.7A minimum, 2A maximum
Peak short circuit current	4A maximum
Delay time of peak short circuit current	100µS
Delay time of current limit	100µS

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High-speed Counter Input / PWM and Pulse Train Output Specifications	
Maximum Counter Frequency	10kHz
Input Voltage	ON : 15V, OFF: 5V
Count Pulse Width	20% to 80% duty cycle at 10kHz
Count Registers	16bits
Outputs	
Load Voltage	Q1-Q4: 12/24VDC
Maximum Pulse/PWM Frequency	5kHz
Types available	Up to four HSC, PT, and/or PWM outputs

Wiring Diagram IC200UDD120



IC200UDD212
28 Point Micro PLC, (16) 12VDC In, (12) 12VDC Out, 12VDC Power Supply

VersaMax Micro PLC model IC200UDD212 accepts sixteen 12VDC inputs and provides twelve DC transistor outputs. It uses +12VDC nominal input power for PLC operation.

DC Power

If configured to disable power-up diagnostics, the PLC begins logic solution 100ms after the voltage level of the power supply input reaches and maintains 12VDC. The 12VDC power source for the PLC must have enough transient current capability to support the inrush current of the power supply and to maintain a 12VDC voltage level (see power supply specifications for inrush requirements).

DC Inputs

Sixteen configurable DC inputs can be used as positive or negative logic standard inputs. Eight of the inputs can be configured as four Type A Counters or one Type A and one Type B Counter. When used as standard inputs, they are compatible with a wide range of input devices, such as pushbuttons, limit switches, and electronic proximity switches.

The Micro PLC's +12 VDC supply can be used for input devices and to power the DC input circuits at about 7.5 mA per input. The combination of input circuit current and external device current must not exceed 200 mA.

Transistor Outputs

Micro PLC IC200UDD212 has twelve transistor outputs (Q1 to Q12) with maximum output load of 0.7A per output.

All outputs are isolated between field and logic and are switching positive voltage.

The output circuits can be used to switch devices like valves, lamps or contactors. External fusing should be provided to protect the outputs. Fast fuses are recommended.

The outputs can be configured as regular outputs or as outputs controlled by the High Speed Counters. Some outputs can be used as pulse train or pulse width modulation (PWM) outputs.

Each group of 6 outputs has one common incoming supply (V1, V2) and one common ground (C1, C2). The outputs are able to drive high inrush currents (8 times the rated current) and are protected against negative voltage pulses. This makes it possible to switch lamps and inductive loads.

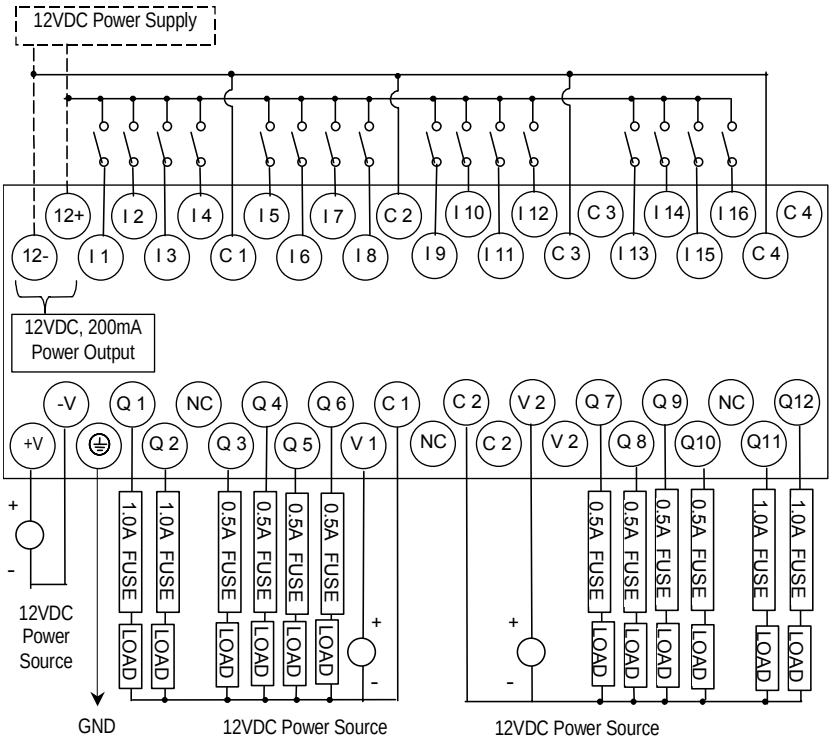
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Micro PLC IC200UDD212 Specifications

Weight	460 grams (1.01 lb)
Inputs	Sixteen 12VDC positive logic inputs in four groups of four
Outputs	Twelve transistor outputs, 12 VDC. Outputs are grouped in two groups with separated incoming supply. Each group contains 4 outputs with a maximum load of 0.5A and 2 outputs with a maximum load of 1A.
High-speed Counters	Up to four Type A or one Type A and one Type B
+12 VDC Output Power Supply)	200mA maximum (for input circuits and user devices
DC Power Specifications	
Range	9.6VDC to 15 VDC
Hold-up	3.0mS
Inrush Current	9.6A typical at 12 VDC
Inrush Time	200mS typical
Input Current	480mA typical at 12 VDC
Input Power Supply Rating	8W
DC Input Specifications	
Number of Inputs	16
Rated Input Voltage	12 volts DC
Input Voltage Range	0 to 15 volts DC
Input Current	9.0mA typical
Input Resistance	1.3 kOhms
Input Threshold Voltage	ON: 9.5VDC minimum, OFF: 2.5VDC maximum
Input Threshold Current	ON: 6.5mA maximum, OFF: 1.6mA minimum
Response Time	0.5 to 20ms (user configurable) as regular input; 100µs as HSC input
Isolation Voltage	1500V RMS field side to logic side, 500V RMS between groups
DC Output Specifications	
Voltage Range	12VDC (+20%, -20%)
Maximum Load	0.7A per point (Q1 - Q12) at 24VDC at 100 % ON duration, 4A per common
Maximum Inrush Current	4A for 20mS
Output Voltage Drop	0.3V maximum
OFF state leakage	0.1mA maximum
Response	OFF to ON: 0.1mS maximum (12 VDC), ON to OFF 0.1mS maximum (12 VDC)
Isolation Voltage	1500V RMS between field side and logic side, 500V RMS between groups
Fuse	Outputs should be fused externally. Otherwise, a load short can damage the module output transistor, which is not user replaceable.

High-speed Counter Input / PWM & Pulse-Train Output Specifications	
Maximum Counter Frequency	10kHz
Input Voltage	ON: 9V, OFF: 2.5V
Count Pulse Width	20% to 80% duty cycle at 10kHz
Count Registers	16bits
Outputs	
Load Voltage	Q1-Q4: 12VDC
Maximum Pulse/PWM Frequency	5kHz
Types available	Up to four HSC, PT, and/or PWM outputs

Wiring Diagram IC200UDD212



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IC200UDR005
28 Point Micro PLC, (16) 24VDC In,
(1) 24VDC Out, (11) Relay Out, 120/240VAC Power Supply

VersaMax Micro PLC IC200UDR005 accepts sixteen DC inputs and provides one 24VDC output and eleven normally-open 2 Amp relay outputs. It uses 100VAC to 240VAC nominal input power for PLC operation.

DC Inputs

The sixteen configurable DC inputs can be used as positive or negative logic standard inputs, including up to four High-speed Counter inputs. Inputs are compatible with a wide range of devices, such as pushbuttons, limit switches, and electronic proximity switches. The module provides +24VDC output power for field devices, up to 200mA maximum.

DC Output (Q1)

The DC output circuit (Q1) can be configured to be a standard, High Speed Counter, pulse train, or PWM output.

Relay Outputs (Q2 – Q12)

The module has eleven Form A relay outputs (SPST-single pole single throw). The normally-open 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.

The relay outputs can be configured as up to three High-speed Counter outputs. Relay outputs cannot be used as Pulse Train or PWM outputs.

Micro PLC IC200UDR005 Specifications

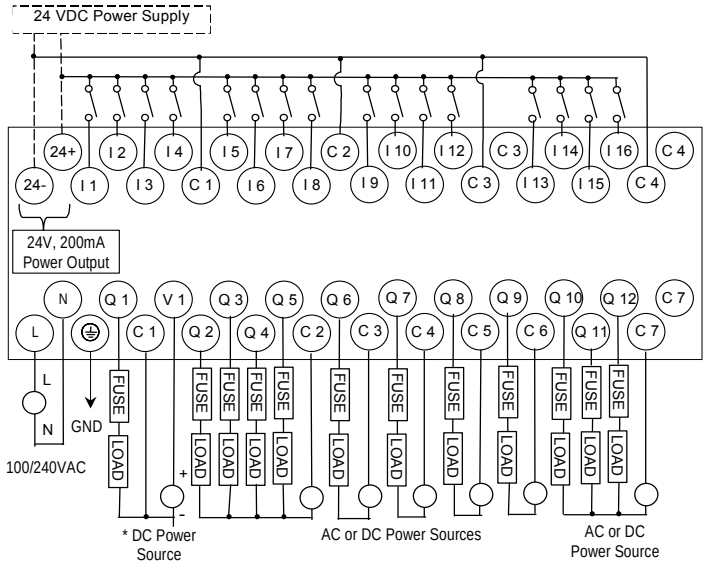
Weight	580 grams (1.28lbs)
Inputs	Sixteen 24 VDC positive/negative logic input circuits
Outputs	Eleven normally open 2 amp relay circuits and One DC Output (Q1)
High Speed Counters	Up to four Type A or one Type A and one Type B
+24 VDC Output Power Supply	200mA maximum (for input circuits and user devices)

AC Power Specifications	
Range	100 -15% to 240 +10% VAC
Frequency	50 -5% to 60 +5% Hz
Hold-up	10mS at 85 to 100VAC, 20mS at 100 to 265VAC
Inrush Current	30 Amp maximum at 200 VAC, 40 Amp maximum at 265 VAC
Inrush Time	2 ms for 40Amp
Input Current	0.20 Amp typical at 200 VAC, 0.10 Amp typical at 100 VAC
Input Power Supply Rating	26 VA
DC Input Specifications	
Number of Inputs	16
Rated Input Voltage	24 volts DC
Input Voltage Range	0 to 30 volts DC
Input Current	7.5mA typical
Input Resistance	2.8 Kohms
Input Threshold Voltage	ON: 15VDC minimum, OFF: 5VDC maximum
Input Threshold Current	ON: 4.5mA maximum, OFF: 1.5mA minimum
Response Time	0.5 to 20ms configurable as regular input; 100µs as HSC input
Isolation Voltage	1500V RMS field side to logic side, 500V RMS between groups
DC Output Specifications	
Output logic	Positive Logic
Operating Voltage	24VDC / 12VDC / 5VDC
Voltage Range	24 VDC, +20%, -80%
Maximum UL Pilot Duty Rating	0.75A at 24 VDC
Maximum Resistive Load Rating	0.75A at 24 VDC 0.5A at 12 VDC 0.25A at 5 VDC
Output Voltage Drop	0.3 VDC maximum
Response	ON: 0.1ms maximum (24 VDC, 0.2A), OFF: 0.1ms maximum (24 VDC, 0.2A)
OFF state leakage	0.1mA maximum
Isolation	1500 VAC between field side and logic side, 500 VAC between groups
Fuse	Output should be fused externally. Otherwise, a load short can damage the module output transistor, which is not user replaceable.

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Relay Output Specifications			
Operating Voltage	5 to 30 VDC or 5 to 250 VAC		
Isolation	1500 V RMS between field side and logic side, 500 V RMS between groups		
Leakage Current	15 mA at 240 VAC maximum		
Maximum UL Pilot Duty Rating	2 amps at 24 VDC and 240 VAC		
Maximum Resistive Load Rating	2 amps at 24 VDC and 240 VAC		
Minimum Load	10 mA		
Maximum Inrush	5 amps per half cycle		
Response Time	ON: 15 ms maximum, OFF: 15 ms maximum		
Contact Life: Mechanical	20 x 10^6 mechanical operations		
Contact Life: Electrical Voltage 240VAC, 120VAC, 24VDC	Current: Resistive 2.0A	Current: Lamp and Solenoid 0.6A	Typical Operations 200,000
High-speed Counter / PWM and Pulse Train Output Specifications			
Maximum Counter Frequency	10kHz		
Input Voltage	ON: 15V, OFF: 5V		
Count Pulse Width	20% to 80% duty cycle at 10kHz		
Count Registers	16bits		
Outputs			
Type available	Up to four HSC outputs or three HSC outputs plus one PT or PWM output.		
Load Voltage	Q1: 5/12/24V, Q2-Q4: See relay output specifications		
Maximum Pulse/PWM Frequency	5kHz (Q1 only)		

Wiring Diagram IC200UDR005



IC200UDR006
28 Point Micro PLC, (16) 12VDC In, (12) Relay Out, 12VDC Power Supply

VersaMax Micro PLC IC200UDR006 accepts sixteen 12VDC inputs and provides twelve normally-open 2 Amp relay outputs. It uses +12VDC nominal input power.

DC Power

The DC power supply requires more current at startup voltage (approximately 4 VDC) than at rated input voltage. A minimum of 2.0 A is required to start up the DC power supply.

If configured to disable power-up diagnostics, the PLC begins logic solution 100ms after the voltage level of the power supply input reaches and maintains 12VDC. The 12VDC power source for the PLC must have enough transient current capability to support the inrush current of the power supply and to maintain a 12VDC voltage level (see power supply specifications for inrush requirements).

Inputs

The sixteen configurable 12VDC inputs can be used as positive or negative logic standard inputs or High-speed Counter inputs. Inputs are compatible with a wide range of devices such as pushbuttons, limit switches, and electronic proximity switches.

The Micro PLC's +12 VDC supply can be used for input devices and to power the DC input circuits at about 7.5 mA per input. The combination of input circuit current and external device current must not exceed 200 mA.

Relay Outputs (Q1 – Q12)

The module's twelve Form A relay outputs (SPST-single pole single throw) can be configured as normal or High-speed Counter outputs. Relay outputs cannot be used as Pulse Train or PWM outputs. The 12 normally-open relay outputs can control many types of 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 for field devices.

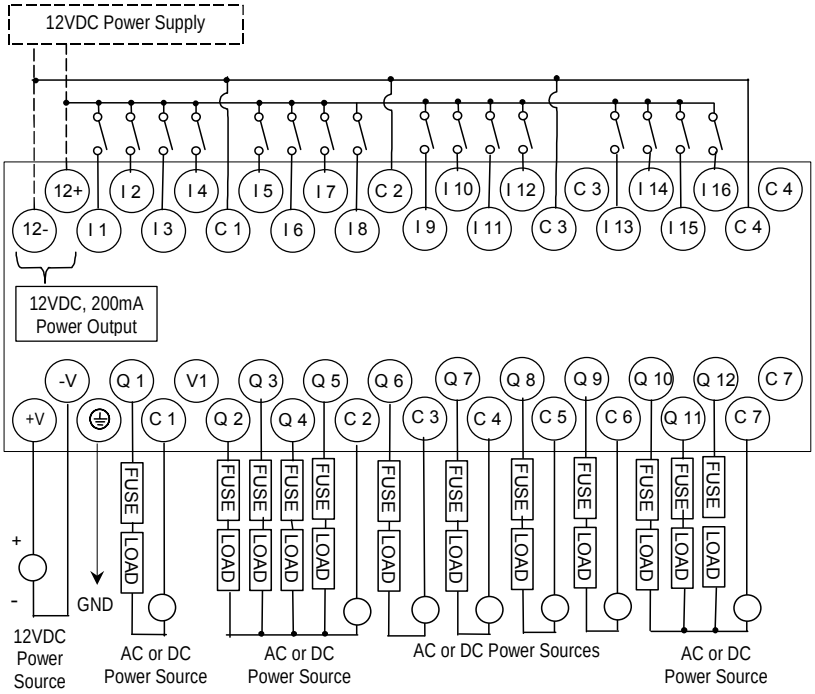
Micro PLC IC200UDR006 Specifications

Weight	500 grams (1.10 lb)
Inputs	Sixteen 12 VDC positive/negative logic input circuits
Outputs	Twelve normally open 2 amp relay circuits
High-speed Counters	Up to four Type A or one Type A and one Type B
+12 VDC Output Power Supply	200mA maximum (for input circuits and user devices)

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DC Power Specifications			
Range	9.6VDC - 15VDC		
Hold-up	3.0mS		
Inrush Current	9.6A typical at 12 VDC		
Inrush Time	200mS typical		
Input Current	480mA typical at 12 VDC		
Input Power Supply Rating	8W		
DC Input Specifications			
Number of Inputs	16		
Rated Input Voltage	12 volts DC		
Input Voltage Range	0 to 15 volts DC		
Input Current	9.0mA typical		
Input Impedance	1.3 kOhms		
Input Threshold Voltage	ON: 9.5VDC minimum, OFF: 2.5VDC maximum		
Input Threshold Current	ON: 6.5mA maximum, OFF: 1.6mA minimum		
Response Time	0.5 to 20ms (user configurable) as regular input; 100µs as HSC input		
Isolation Voltage	1500V RMS field side to logic side, 500V RMS between groups		
Relay Output Specifications			
Operating Voltage	5 to 30 VDC or 5 to 250 VAC		
Isolation	1500 V RMS between field side and logic side, 500 V RMS between groups		
Leakage Current	15 mA maximum		
Maximum UL Pilot Duty Rating	2 amps at 24 VDC and 240 VAC		
Maximum Resistive Load Rating	2 amps at 24 VDC and 240 VAC		
Minimum Load	1 mA		
Maximum Inrush	5 amps per half cycle		
Response Time	ON: 15 ms maximum, OFF: 15 ms maximum		
Contact Life: Mechanical	20×10^6 mechanical operations		
Contact Life: Electrical Voltage	Current: Resistive 2A	Current: Lamp and Solenoid 0.6A	Typical Operations 200,000
High-speed Counter Input / PWM and Pulse Train Output Specifications			
Maximum Counter Frequency	10kHz		
Input Voltage	ON: 9V, OFF: 2.5V		
Count Pulse Width	20% to 80% duty cycle at 10kHz		
Count Registers	16 bits		
Outputs			
Available Pulse Outputs	None		
Load Voltage	Refer to relay specifications		

Wiring Diagram IC200UDR006



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IC200UDR010
28 Point Micro PLC, (16) 24VDC In, (1) 24VDC Out, (11) Relay Out, 24VDC PS
IC200UDR228
28 Point Micro PLC, (16) 24 VC In, (1) 24VDC Out, (11) Relay Out, 12/24 VDC PS

VersaMax Micro PLCs IC200UDR010 and IC200UDR228 accept sixteen DC inputs and provides one DC output and eleven normally-open 2 Amp relay outputs. The only differences between these modules are their power supplies and the output current rating of their Q1 DC output. Micro-28 IC200UDR010 uses +24VDC nominal input power, and provides a 450mA, 24VDC output. Micro-28 IC200UDR228 uses +12/24VDC nominal input power, and provides a 100mA, 24VDC output.

DC Power

The DC power supply requires more current at startup voltage (approximately 4 VDC) than at rated input voltage. A minimum of 2.0 A is required to start up the DC power supply.

If configured to disable power-up diagnostics, the PLC begins logic solution 100ms after the voltage level of the power supply input reaches and maintains nominal DC power. The power source for the PLC must have enough transient current capability to support the inrush current of the power supply and to maintain an adequate VDC voltage level (see specifications for inrush requirements).

DC Inputs

The sixteen configurable DC inputs can be used as positive or negative logic standard inputs or up to three High-speed Counter inputs. Inputs are compatible with a wide range of input devices, such as pushbuttons, limit switches, and electronic proximity switches.

The Micro PLC's +24 VDC supply can be used for input devices and to power the DC input circuits at about 7.5 mA per input. The combination of input circuit current and external device current must not exceed 200 mA.

DC Output (Q1)

The DC output circuit (Q1) can be configured to be a standard, High Speed Counter, pulse train, or PWM output.

Relay Outputs (Q2 – Q12)

Eleven Form A relay outputs (SPST-single pole single throw) 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. Relay outputs cannot be used as Pulse Train or PWM outputs.

Micro PLC IC200UDR010, IC200UDR228 Specifications

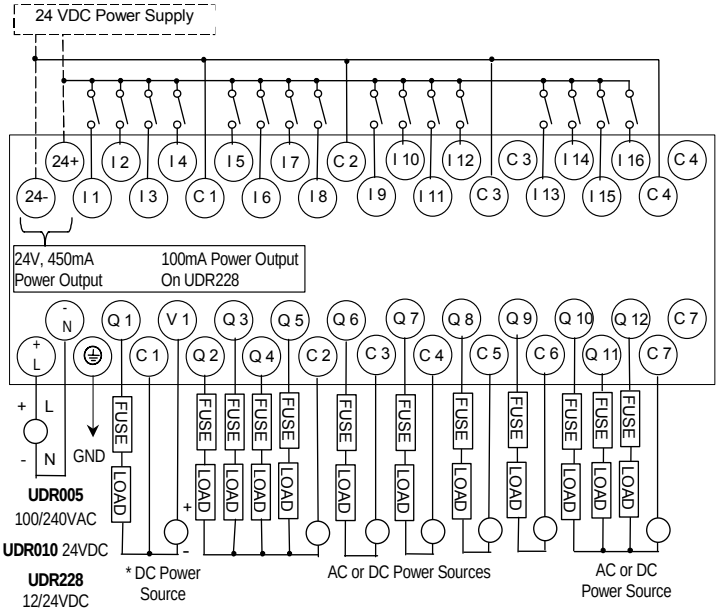
Weight	500 grams (1.10 lb)
Inputs	Sixteen 24 VDC positive/negative logic input circuits
Outputs	Eleven normally-open 2 amp relay circuits and One DC Output (Q1)
High-speed Counters	Up to four Type A or one Type A and one Type B
+24 VDC Output Power Supply	200mA maximum (for input circuits and user devices)
Thermal Derating	IC200UDR010: none. IC200UDR228: no derating to 45 degrees C. Above 45 degrees C, number of points on at the same time must not exceed 50%.
DC Power Specifications	
Range	IC200UDR010: 24VDC -20%, +25% IC200UDR228: 9.2 to 30 VDC
Hold-up	IC200UDR010: 10ms at 19.2 VDC IC200UDR028: 5ms
Inrush Current	IC200UDR010: 1 Amp maximum at 30VDC IC200UDR228: 13 Amps at 12VDC, 27 Amps at 24VDC
Inrush Time	10mS for 1 A
Input Current	IC200UDR010: 0.30 Amp typical at 24VDC IC200URD228: 1.1 Amp typical at 12VDC; 0.55 Amp typical at 24VDC
Input Power Supply Rating	8W
DC Input Specifications	
Number of Inputs	16
Rated Input Voltage	24 volts DC
Input Voltage Range	0 to 30 volts DC
Input Current	7.5mA typical
Input Resistance	2.8 Kohms
Input Threshold Voltage	ON: 15VDC minimum, OFF: 5VDC maximum
Input Threshold Current	ON: 4.5mA maximum, OFF: 1.5mA minimum
Response Time	0.5 to 20ms configurable as regular input; 100µs as HSC input
Isolation Voltage	1500V RMS field side to logic side, 500V RMS between groups
DC Output Specifications	
Output logic	Positive Logic
Operating Voltage	IC200UDR010: 24VDC / 12VDC / 5VDC; IC200UDR228: 24VDC / 12VDC
Voltage Range	IC200UDR010: 24 VDC, +20%, -80%; IC200UDR228: 23.5 - 24.5VDC
Output Current	IC200UDR010: 450mA; IC200UDR228: 100mA
Maximum UL Pilot Duty Rating	0.75A at 24 VDC
Maximum Resistive Load Rating	0.75A at 24 VDC; 0.5A at 12 VDC; 0.25A at 5 VDC
Output Voltage Drop	0.3 VDC maximum
Response	ON: 0.1ms maximum (24 VDC, 0.2A), OFF: 0.1ms maximum (24 VDC, 0.2A)
OFF state leakage	0.1mA maximum
Isolation	1500 VAC between field side and logic side, 500 VAC between groups
Fuse	Output should be fused externally. Otherwise, a load short can damage the module output transistor, which is not user replaceable.

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Relay Output Specifications			
Operating Voltage	5 to 30 VDC or 5 to 250 VAC		
Isolation	1500 V RMS between field side and logic side, 500 V RMS between groups		
Leakage Current	15 mA at 240 VAC maximum		
Maximum UL Pilot Duty Rating	2 amps at 24 VDC and 240 VAC		
Maximum Resistive Load Rating	2 amps at 24 VDC and 240 VAC		
Minimum Load	1 mA		
Maximum Inrush	5 amps per half cycle		
Response Time	ON: 15 ms maximum, OFF: 15 ms maximum		
Contact Life: Mechanical	20 x 10^6 mechanical operations		
Contact Life: Electrical Voltage 240VAC, 120VAC, 24VDC	Current: Resistive 2A	Current: Lamp and Solenoid 0.6A	Typical Operations 200,000

High-speed Counter Input / PWM and Pulse-Train Output Specifications	
Maximum Counter Frequency	10kHz
Input Voltage	ON: 15V, OFF: 5V
Count Pulse Width	20% to 80% duty cycle at 10kHz
Count Registers	16bits
Outputs	
Load Voltage	Q1: IC200UDR010 = 5/12/24V; IC200UDR228 = 12/24V Q2-Q4: See Relay output specifications
Maximum Pulse/PWM Frequency	(Q1 only) 5kHz
Types available	Up to four HSC outputs or three HSC outputs plus one PT/PWM output.

Wiring Diagram IC200UDR010, IC200UDR228



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