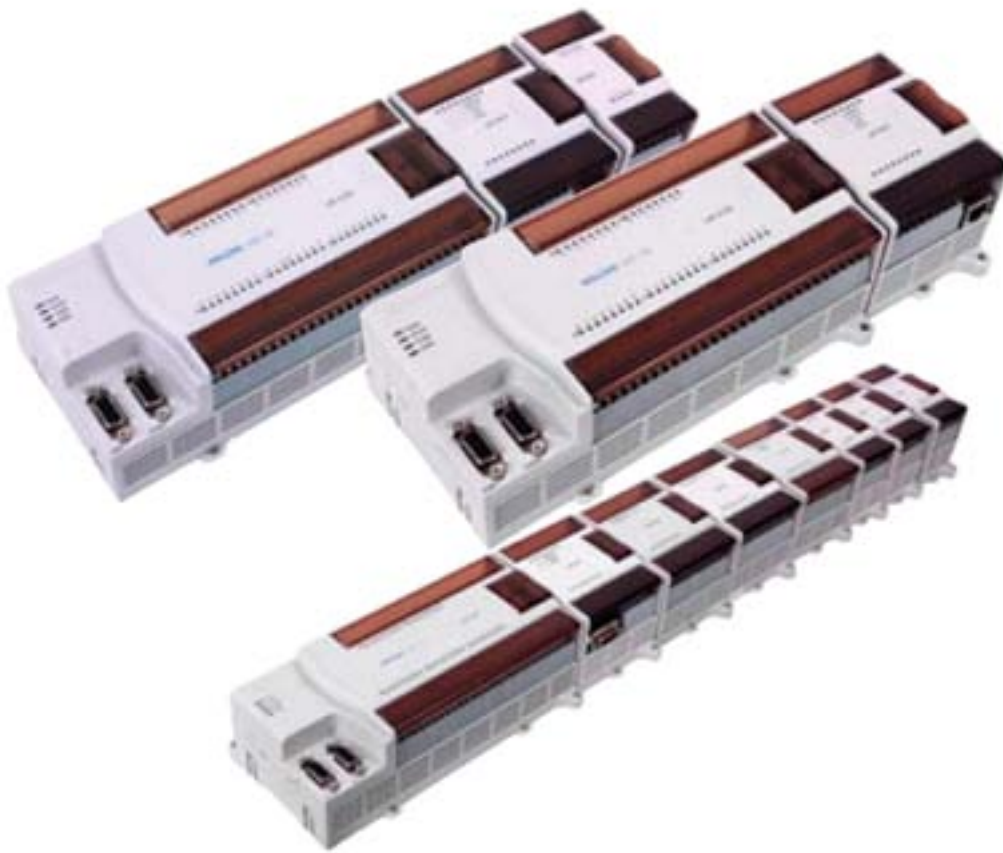


LM MICRO SERIES PLC



OVERVIEW



Highlight Features

Powerful CPU and Analogue Processing

The CPU calculation speed for a single boolean instruction is 0.37µs. It can simultaneously process dozens of analog channels and multiple loops of PID (proportional Integral Derivative) calculations.

Compact In Size

LM Micro Series PLC provides a tight integration of hardware and a complete range of functions within a compact size module.

Diversity of Modules

Adopting a modular design, LM Micro Series PLC consist of a diversity of CPU modules and expansion modules to meet different applications and industries. A CPU module operating with a maximum of 7 expansion modules supports up to 152 digital I/O points or 56 analogue I/O channels.

Flexible System Configuration

LM Micro Series PLC utilizes a flexible system configuration with a large portfolio of expansion modules such as digital I/O, analogue I/O and other dedicated functional modules. Digital I/O modules available are 8-channel, 16-channel, and mix channels (4DI+4DO). Analogue I/O modules available are 4-channel input, 8-channel input, 4-channel thermocouple input, and 4-channel thermal resistance input that are used to receive current, voltage, thermocouple, thermal resistance and other types of signals. Analogue output module available are 2-channel.

Communications

The dedicated communication modules available are the PROFIBUS-DP slave modules and the Ethernet slave modules. Various communication interfaces such as RS-232, RS-485, PROFIBUS-DP and Ethernet are employed for the connection with other systems.

Easy Installation and Wiring

LM Micro Series PLC can be easily mounted on walls or standard DIN rails. The space-saving, patented WAGO wiring terminals are employed to ensure solid and firm wiring.

Data Loss Protection

Instructions and command data of the user are stored in a permanent storage area to prevent data loss caused by power loss or other failures.

Standard Programming Language

PowerPro, the programming software for the system that complies with IEC61131-3 international standard, represents the latest industrial PLC programming trend. Six programming languages are available including LD, FBD, IL, ST, SFC and CFC.

Rich Function Blocks and Instructions

The system is provided with over 400 function blocks and many other instructions tailored according to needs of users. Common instructions include arithmetic operation, evaluation, Boolean, shift, selection, compare, data type conversion, addressing, call, strings etc. Other function blocks include enhanced PID controller, signal generator, function manipulator, analogue processing, MODBUS, PROFIBUS, Ethernet, real-time clock, analogue potentiometer, watchdog, mono-phase and bi-phase counters, pulse output etc.

Off-line Simulation

Off-line simulation allows programmers to simulate, test and debug their programming logic before actual 'live' implementation. Simulation features such as single-step, single cycle, breakpoint debugging and etc, conveniently facilitate the debugging process. All these make programming much easier and more convenient since it is not required to connect the PLC and download the programming codes to hardware devices.

Typical Applications

The LM Micro Series PLC can be utilized in many areas of applications such as the machine tool, punching machinery, printing machinery, spinning machinery, packaging machinery, plastic machinery, environmental protection equipment, central air conditioning, latex industry and various production lines.

Certification



CPU Modules



I/O Expansion Modules



Communication Modules

LM Micro series PLC modules are certified based on European standards EN61131-2 for electromagnetic compatibility testing and safety testing, EN60950-1:2001 low-voltage directives. The certification indicates that LM Micro series PLC products are in compliance with the safety, health, environmental and consumer protection requirements of the Member States of the European Union.



LM Micro Series PLC

Product Selection List		
Modules	Product Code	Description
CPU	LM3104	14 Points , 8x DI 24VDC , 6x DO 24VDC Transistor, 24VDC Power Supply
	LM3105	14 Points , 8x DI 24VDC, 6x DO Relay, 187~242VAC Power Supply
	LM3106	24 Points , 14x DI 24VDC, 10x DO Transistor, 24VDC Power Supply
	LM3016A	24 Points , 14x DI 24VDC, 10x DO Transistor, (2x 100KHz PWM or 50KHz PTO), 24VDC Power Supply
	LM3107	24 Points , 14x DI 24VDC, 10x DO Relay, 187~242VAC Power Supply
	LM3107E	23 Points Mix , 12x DI 24VDC, 8x DO Relay, 2x AI (10-bit, accuracy 1%, 0~10V/0~20mA), 1x AO (12-bit, accuracy 1%, 0~10V/0~20mA), 85~264VAC Power Supply
	LM3108	40 Points , 24x DI 24VDC, 16x DO Transistor, 24VDC Power Supply
	LM3109	40 Points , 24x DI 24VDC, 16x DO Relay, 187-242VAC Power Supply
Communication	LM3401	Profibus-DP slave station interface module
	LM3403	Ethernet interface module
Digital Input	LM3210	8 Points Expansion , 8x 24VDC Digital Input
	LM3212	16 Points Expansion , 16x 24VDC Digital Input
Digital Output	LM3220	8 Points Expansion , 8x 24VDC Digital Output Transistor
	LM3221	16 Points Expansion , 16x 24VDC Digital Output Transistor
	LM3222	8 Points Expansion , 8x Digital DC/AC Output Relay
	LM3223	16 Points Expansion , 16x Digital DC/AC Output Relay
Digital Mix I/O	LM3230	8 Points Mix Expansion , 4x 24VDC Digital Input, 4x 24VDC Digital Output Transistor
	LM3231	8 Points Mix Expansion , 4x 24VDC Digital Input, 4x DC/AC Digital Output Relay
	LM3233	16 Points Mix Expansion , 8x 24VDC Digital Input, 8x DC/AC Digital Output Relay
Analog Input	LM3310	4 Channels Expansion , 4x analog input (pseudo-differential input), 4~20mA/0~20mA/0~10VDC, 12-bits ADC, Accuracy $\pm 0.5\%fs$, AI step-response 6ms.
	LM3310A	4 Channels Expansion , 4x analog input (single-ended input), 4~20mA/0~20mA/0~10VDC, 12-bits ADC, Accuracy $\pm 0.5\%fs$, AI step-response 6ms.
	LM3310B	4 Channels Expansion , 4x analog input (single-ended input), 0~20mA or 0~100mV/500mV/1V/5V/10V, 16-bits ADC, Accuracy $\pm 0.5\%fs$ (0~100mV/500mV), Accuracy $\pm 0.2\%fs$ (0~20mA or 0~1V/5V/10V), AI step-response 50ms.
	LM3311	4 Channels Expansion , 4x analog thermocouple input, J,K,E, N, T, B, R, S type, $\pm 80mV$
	LM3312	4 Channels Expansion , 4x analog RTD input, Cu50, Pt100
	LM3313	8 Channels Expansion , 8x analog input, single-ended input, -20~20mA/-10~10VDC, 12-bits ADC, Accuracy $\pm 0.5\%fs$, AI step-response 15ms.
Analog Output	LM3320	2 Channels Expansion , 2x analog output, 0~20mA /0~10VDC
Analog Mix I/O	LM3330	5 Channels Mix Expansion , 4x analog input, 1x analog output, Input: 4~20mA /0~20mA/0~10VDC, 12-bit ADC, single-ended input, Accuracy $\pm 0.5\%fs$, AI step-response 6ms. Output: 0~20mA/0~10V, 12-bit DAC, Accuracy $\pm 0.5\%fs$.
Software & Cables	LA3801-COM-300	LM PLC Programming RS-232 cable (3-meters), DB9 (male) to DB9 (female)
	LS3600	PowerPro programming software for LM Micro Series PLC (CD)
	LS3810	LM module extension cable (500mm)

Offering a wide range of CPU modules with different configuration to meet your automation needs. We provide various models with digital or analogue inputs and outputs, among which, the LM3107E model combines both digital and analogue I/Os in a single module.

CPU Modules								
Specifications	LM3104	LM3105	LM3106	LM3106A	LM3107	LM3107E	LM3108	LM3109
Digital input	8	8	14	14	14	12	24	24
Digital output	6 x transistor	6 x relay	10 x transistor	10 x transistor	10 x relay	8 x relay	16 x transistor	16 x relay
Analog input	--	--	--	--	--	2	--	--
Analog output	--	--	--	--	--	1	--	--
Maximum number of expansion modules	2	2	4	4	4	4	7	7
Current limit +24VDC (for expansion Bus)	300mA	260mA	300mA	300mA	260mA	260mA	400mA	320mA
Current limit +5VDC (for expansion Bus)	800mA	800mA	800mA	800mA	800mA	800mA	1500mA	1300mA
Communication interface	1x RS-232 (non-isolation)						1x RS-232 and 1x RS-485 (non-isolation)	
Communication protocol	MODBUS RTU, G3 proprietary, or FreePort protocol							
High speed input counter	3 points 100KHz mono-phase input counters or 2 points 100KHz bi-phase input counters							
Pulse output	1 point, 20kHz	None	2 points, 20kHz	2 points, 100kHz PWM or 50kHz PTO	None	None	2 points, 20kHz	None
Timer	Unlimited number of timers, 1ms to 49 days							
Counter	Unlimited number of counters, 15 bits counting range							
Boolean execution speed	0.37µs per instruction							
Power Supply	21~27VDC	187 ~ 242VAC @ 47 ~ 63Hz	21~27VDC	21~27VDC	187 ~ 242VAC @ 47 ~ 63Hz	85 ~ 242VAC @ 47 ~ 63Hz	21~27VDC	187 ~ 242VAC @ 47 ~ 63Hz
Dimension	125mm(L) x 90mm (W) x 70mm(H)					125mm(L) x 90mm (W) x 70mm(H)	200mm(L) x 90mm (W) x 70mm(H)	

Offering various expansion digital inputs/outputs modules with either 8 or 16 points, among which, the LM3230 and LM3231 models both contain 4 DIs and 4 DOs within one module.

Expansion Digital I/O Modules			
Digital Input	DI		Dimension
LM3210	8 points, 0 ~ 30VDC		50mm(L) x 90mm (W) x 70mm(H)
LM3212	16 points, 0 ~ 30VDC		75mm(L) x 90mm (W) x 70mm(H)
Digital Output	DO		Dimension
LM3220	8 points, transistor DC output		50mm(L) x 90mm (W) x 70mm(H)
LM3221	16 points, transistor DC output		75mm(L) x 90mm (W) x 70mm(H)
LM3222	8 points, relay DC/AC output		50mm(L) x 90mm (W) x 70mm(H)
LM3223	16 points, relay DC/AC output		75mm(L) x 90mm (W) x 70mm(H)
Digital Mix	DI	DO	Dimension
LM3230	4 points, 0 ~ 30VDC	4 points, transistor DC output	50mm(L) x 90mm (W) x 70mm(H)
LM3231	4 points, 0 ~ 30VDC	4 points, relay DC/AC output	50mm(L) x 90mm (W) x 70mm(H)
LM3233	8 points, 0 ~ 30VDC	8 points, relay DC/AC output	50mm(L) x 90mm (W) x 70mm(H)

Offering various expansion analogue inputs/output modules such as pseudo-differential, single ended, thermocouple, RTD, and NTC. Among all the models, the LM3330 provides 4 channels of analogue inputs and a 1 channel of analogue output.

Expansion Analog I/O Modules						
Analog Input	AI	Resolution	Input Range (Voltage/Temperature)	Input Range (Current)	Dimension	
LM3310	4 channels, Pseudo-Differential	12 bit A/D converter	0 ~ 10V	0 ~ 20mA / 4~20mA	75mm(L) x 90mm (W) x 70mm(H)	
LM3310A	4 channels, Single-Ended	12 bit A/D converter	0 ~ 10V	0 ~ 20mA / 4~20mA	75mm(L) x 90mm (W) x 70mm(H)	
LM3310B	4 channels, Single-Ended	16 bit A/D converter	0 ~ 100mV 0 ~ 500mV 0 ~ 1V 0 ~ 5V 0 ~ 10V	0 ~ 20mA	75mm(L) x 90mm (W) x 70mm(H)	
LM3313	8 channels, Single-Ended	12 bit A/D converter	-10V to +10V	-20mA ~ +20mA	75mm(L) x 90mm (W) x 70mm(H)	
LM3311	4 channels, Thermocouple	----	J,K,T,N,E,R,S,B thermocouple type, voltage range $\pm 80\text{mV}$	----	75mm(L) x 90mm (W) x 70mm(H)	
LM3312	4 channels, RTD	----	Pt100 (-150 ~ 619.6°C), Pt100 (-150 ~ 157.2°C), Cu50 (-50 ~ 150.1°C), Cu50 (-50 ~ 140.1°C),	----	75mm(L) x 90mm (W) x 70mm(H)	
LM3314	4 channels, NTC	----	R = 10K at 25°C; B value is selectable.	----	75mm(L) x 90mm (W) x 70mm(H)	
Analog Output	AO		Output Range (Voltage)	Output Range (Current)	Dimension	
LM3320	2 channels	----	0 ~ 10V	0 ~ 20mA	75mm(L) x 90mm (W) x 70mm(H)	
Analog Mix	AI	AO	Input/Output Range (Voltage)	Input/Output Range (Current)	Dimension	
LM3330	4 channels, Single Ended	1 channel	12 bit A/D converter	0 ~ 10V	Input: 0 ~ 20mA / 4 ~ 20 mA Output: 0 ~ 20mA	75mm(L) x 90mm (W) x 70mm(H)

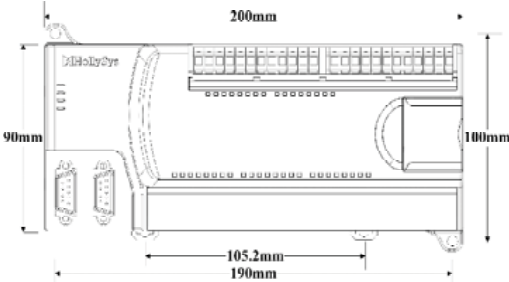
PROFIBUS-DP slave station interface module is used to establish communication with other PLC while the Ethernet Interface module are used to establish communication with computers via the RJ-45 interface.

Communication Modules					
	Description	Interface	Protocol	Baud Rate	Dimension
LM3401	PROFIBUS-DP slave station Interface Module	9 pin D type socket or wiring terminal	PROFIBUS-DP (Slave Station)	9.6, 19.2, 45.45, 93.75, 187.5, 500Kbps and 1, 1.5, 3, 6, 12Mbps (auto adaptive)	75mm(L) x 90mm (W) x 70mm(H)
LM3403	Ethernet Interface Module	Ethernet RJ-45	MODBUS TCP (Slave Station)	10 Mbps	75mm(L) x 90mm (W) x 70mm(H)

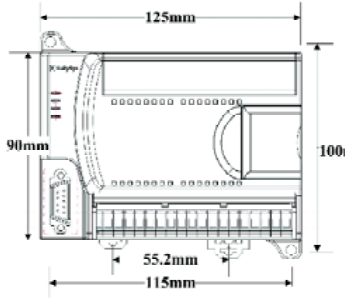
Programming Software and Cable	
	Description
LA3801-COM-300	LM PLC Programming RS-232 cable (3-meters), DB9 (male) to DB9 (female)
LS3600	PowerPro programming software for LM Micro Series PLC (CD)
LS3810	LM module extension cable (500mm)

Environmental Specifications	
Operating Temperature	0°C~55°C
Storage Temperature	-40°C ~ +70°C
Relative Humidity	5%~95% (non condensing)
Drop Test	GB/T2423.7-1995: 50mm, 4 times (without transport packaging)
Free-fall Drop Test	GB/T2423.8-1995: 1m, 5 times (with transport packaging)
Shock Resistance	IEC/EN 60086-2-27 or GB/T2423.5-1995: 15G (147m/S ²) (11ms along 6 axes)
Vibration Resistance	IEC/EN 60086-2-6 or GB/T2423.10-1995: 1G (9.8m/S ²) (resistance to vibration from 10 ~ 150Hz along all 3 axes)
Degree of Protection	IP20
Insulation Resistance	1000VDC, 1min @ 5mA
Environment	Avoid environment containing corrosive gases, Install in a dust-free location

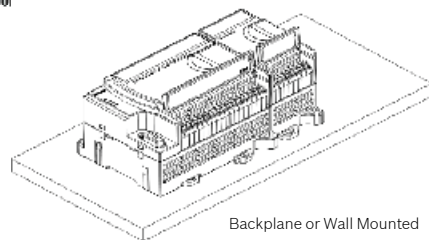
Electromagnetic Compatibility		
Electrostatic discharge immunity tests	External Casing	IEC 61000-4-2: Level 2/3, contact discharge 4kV, environment discharge 8kV
Voltage dips, short interruptions and voltage variations immunity test	AC Power	IEC 61000-4-11: Level 3, Polar disruption 0.5 wave
Electrical fast transient / burst immunity test		IEC 61000-4-4: Level 3, 2kV
Surge immunity test		IEC 61000-4-5: Level 2/3, wire to wire 1kV, wire to ground 2kV
Radiated, radio-frequency, electromagnetic field immunity test	I/O signal or Control signal	IEC 61000-4-3: Level 3, 80MHz ~ 1MHz, 10V / m using 1KHz signal 80% modulation
Electrical fast transient/burst immunity test		IEC 61000-4-4: Level 3, 1kV
Immunity to conducted disturbances, induced by radio-frequency fields		IEC 61000-4-6: Level 3, 10V, 0.15 ~ 80MHz, 1KHz and below, 80% amplitude modulation



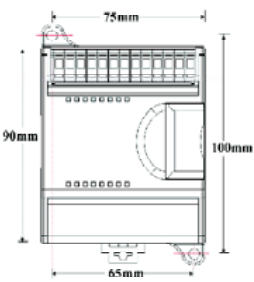
CPU module



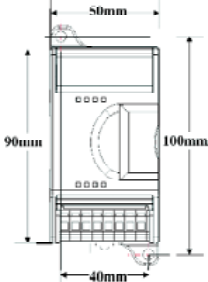
CPU module



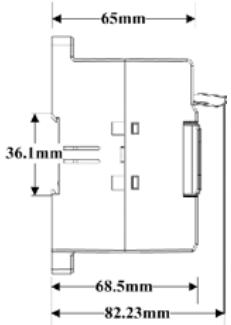
Backplane or Wall Mounted



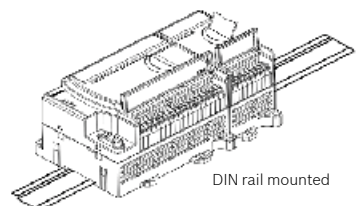
I/O module or communication module



I/O module



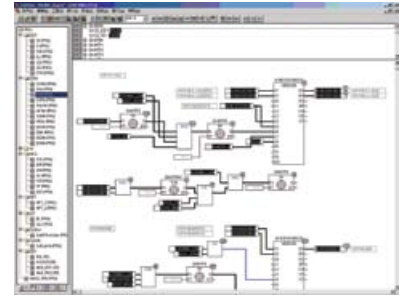
side view of any module



DIN rail mounted

PowerPro Programming Software

In complete accordance with IEC61131-3 international programming standard, PowerPro is a comprehensive, Windows-based programming software tool for LM Micro series PLC. It provides an off-line simulation feature that allows programmers simulating, testing and debugging the programming logic before the actual “live” implementation. This makes programming much easier and more convenient since it is not required to connect the PLC and download the programming codes to the hardware devices.



Programming Languages fully comply with IEC61131-3 Industrial Standard

- Supporting 6 types of programming languages editor
 - **Instruction List (IL)**
 - **Structural Text (ST)**
 - **Function Block Diagram (FBD)**
 - **Ladder Diagram (LD)**
 - **Sequence Function Chart (SFC)**
 - **Continuous Function Chart (CFC)**
- Depending on variable requirements, programmers can choose the relevant programming languages to work with. While working with FBD, LD, or IL, programmers are allowed to switch in between these programming languages.

Hundreds of Instructions and Function Blocks

- Over 400 instructions and function blocks to be employed according to variable requirements of user.
- Common instructions include arithmetic, evaluation, Boolean, shift, selection, compare, data type conversion, addressing, call, strings and etc.
- Common function blocks include enhanced PID controller, signal generator, function manipulator, analogue processing, Modbus, ProfiBus, Ethernet, real-time clock, analogue potentiometer, watchdog, mono-phase and bi-phase counters, pulse output and etc.

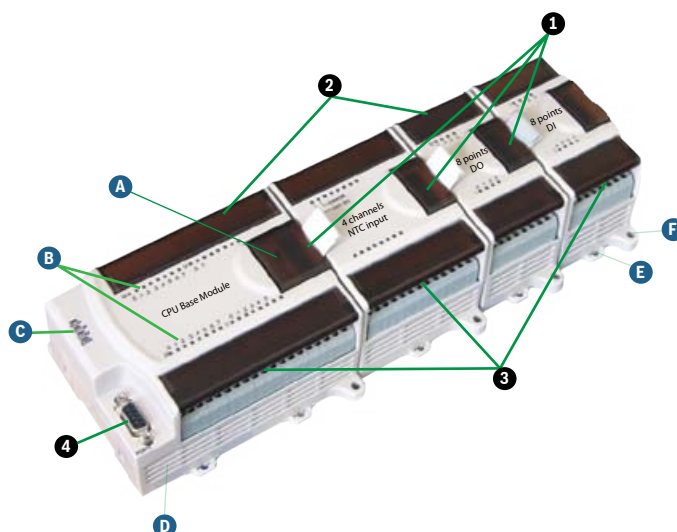
Integrated Simulation

- Debugging of application program without hardware is possible with the build-in simulation feature of PowerPro. The application program can be checked before it is downloaded to the PLC.
- Showing all the variable values declared in the declaration part of each editor.
- All the inputs and outputs can also be simulated.

User Defined libraries

- Customized libraries can be easily created.

Connections



Legends

- 1** Connection to Expansion Modules
- 2** Wiring Terminal for Output + Input Power Supply
- 3** Wiring Terminal for Input + Output Power Supply
- 4** RS-232 / RS-485 Communication Port
- A** RUN/STOP operation switch + Analog presets
- B** I/O Channels Status Indicator
- C** PLC Status Indicator - Run, Stop, Com, Error
- D** Heat Radiator
- E** DIN Rail Fastener
- F** Hole for Backplane or Wall Mounting



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