



## Auto-tune PID Controller

LC5296-AT  
LC5248E-AT  
LC5296L-AT  
LC5296V-AT



Masibus LC5296-AT / LC5248E-AT / LC5296L-AT / LC5296V-AT PID Controller series is designed to offer outstanding control performance in a compact package providing a comprehensive solution for a wide variety of applications: such as plastic manufacturing, packaging machinery and food processing applications requiring precise heat/cool control and processes protection alarming.

LC5296-AT / LC5248E-AT / LC5296V-AT PID Controller offer a cost-effective alternative to implement loops in a PLC while at the same time improving loop performance. It accepts one universal process input suitable for thermocouple, RTD or linear mA/Volt. All inputs and outputs can be read directly over the modbus communication interface by the supervisory host system as well as process value can be retransmitted to remote PLC/DCS. This expands capabilities of available PLC/DCS and host supervisory system I/O, simplifies machine troubleshooting and remote diagnostics.

LC5296-AT / LC5248E-AT / LC5296L-AT / LC5296V-AT PID Controller With a fast responsive PID auto-tuning algorithm it is equipped with Heat/Cool relay or SSR output for control function. Auto-tuning adjusts the PID parameters for desired set-point according to the current process dynamics so it has no harmful effect on the current operation. It has flexibility to switch control to On-Off or manual mode for non-critical applications.

LC5296-AT / LC5248E-AT / LC5296V-AT PID Controller has outputs available providing a combination of relay (alarm output) and relay or SSR (control output) or Motorized valve Forward/Reverse without feedback (control output) based on application requirement. Whereas LC5296L-AT / PID controller has 3 outputs providing combination of 2 Relay (alarm output) or SSR (control output)

Compact size and simple programming makes the installation and operation of controller easier and user-friendly.

### Features

- Auto-tune PID
- Universal input (TC, RTD, Volts, mA)
- 15 Alarm configurations
- RS-485 Modbus communication (optional in LC5296-AT / LC5248E-AT / LC5296V-AT model)
- Retransmission output (optional in LC5296-AT model)
- Relay / SSR control output option
- Password protected configurations
- Auto/manual selection with bump less transfer
- Fail-safe design protecting the process in case of system malfunctioning
- Display brightness control
- Transmitter power supply in LC5296-AT/LC5296L-AT/LC5248E-AT /LC5296V-AT model
- Function Key : selectable for RUN/STOP or auto/manual or none.(LC5296L-AT)

### Applications

- Injection molding machines
- Plastic extrusion process
- Packaging machines
- Food processing applications

TECHNICAL SPECIFICATIONS

Input										Analogue PV Output*(Option) (only in LC5296-AT model)																			
Input Type			Thermocouple (E, J, K, T, B, R, S), RTD (Pt100), Current (Ext. 250Ω), Voltage							Current			0-20mA/ 4-20mA @500Q Max.																
Display Range			Refer table-1							Voltage			0-5V/ 1-5V/ 0-10V @3 KΩ Min.																
Accuracy			±0.25% of FS ±1 count for TC, RTD input							Accuracy			0.25% FS																
ADC Resolution			16 bits							Communication Output (Optional in LC5296-AT/LC5248E-AT/LC5296V-AT)																			
Display Resolution			0.1 / 1.0 °C							Interface			RS-485																
Sampling Rate			5 Samples/sec.							Protocol			Modbus RTU																
CJC Error			±2.0 °C							Baud Rate			9600, 19200, 38400																
Sensor Open			All inputs except 0-5V / 0-10 V							Alarm Output																			
Sensor Burnout Current			0.25µA							LC5296-AT/LC5248E-AT/LC5296V-AT					LC5296L-AT														
RTD excitation Current			0.166 mA (Approx.)							Relays					2 (If control o/p is AO) or 1 (If control o/p is Relay/ SSR) or Not available (If control o/p is F/R without feedback)														
NMRR			> 40dB							Type					Single Change over (C, NO, NC)														
CMRR			> 120dB							Rating					5A @ 230VAC / 30VDC														
Temp-co			< 100ppm for input to display							Transmitter supply In LC5296-AT/LC5296L-AT/																			
Input Impedance			< 150ppm for input to retransmission output (LC5296-AT/LC5248E-AT/LC5296V-AT)							LC5248E-AT /LC5296V-AT model only					24V DC (±10%) @26mA (Current limited)														
Max Voltage			20VDC							Power Supply																			
Display & Keys										Standard										85-260VAC / 100-300VDC									
LC5296-AT										Optional										18-36VDC									
LC5296L-AT										Power Consumption										10 VA Approx. (LC5296-AT/LC5248E-AT/LC5296V-AT)									
LC5248E-AT										Isolation (Withstanding voltage)										5VA Approx. (LC5296L-AT)									
LC5296V-AT										Between primary terminals* and secondary terminals**: At least 1500 V AC for 1 minute																			
Process Value										Between primary terminals* and grounding terminal: At least 1500 V AC for 1 minute																			
7 segment, Red LED, 4 digits										Between grounding terminal and secondary terminals**: At least 1500 V AC for 1 minute																			
0.4", 7 segment, Green LED, 4 digits										Between secondary terminals**: At least 500 V AC for 1 minute																			
0.4", 7 segment, Green LED, 4 digits										* Primary terminals indicate power terminals and relay output terminals.																			
0.28", 7 segment, Green LED, 4 digits										** Secondary terminals indicate analog I/O signal and Communication O/P.																			
0.31", 7 segment, Green LED, 4 digits										Insulation resistance: 20MΩ or more at 500 V DC between power terminals and grounding terminal																			
Keys										Physical																			
SET1, SET2, Increase, Decrease, A/M										LC5296-AT/ LC5296L-AT										LC5248E- AT									
Enter, Increase, Decrease, A/M										LC5296V- AT																			
Enter, Increase, Decrease, A/M										Dimension (in mm)(H x W x D)										96x96x75									
Enter, Increase, Decrease A/M										Front Bezel (in mm) (H x W)										48x48x120									
Relay, Communication, A/M & SSR										Panel Cutout (in mm) (H x W)										96x48x85									
Relay & SSR										Depth Behind Panel (in mm)										96x48									
Communication, A/M & SSR										Weight (Approx.)										92.5x92.5									
										Enclosure Material										45x45									
										Enclosure Protection										92x45									
										Terminal Cable Size										65									
																				115									
																				120g									
																				300g									
																				ABS									
																				IP20									
																				2.5mm <sup>2</sup>									
Output										Environmental																			
Control Output										Operating Temperature										0 to 55 °C									
Control Type										Storage Temperature										0 to 80°C									
ON/OFF, P, PI, Auto tune PID										Humidity										30-95% RH (non-condensing)									
Manual Offset										Table-1: Display Range																			
±50% of P band										Input										Input Type									
Proportional Band										Range																			
0.0 to 999.9 or 0 to 9999										Thermocouple										E									
IntegralTtime																				J									
0(off) to 1000 sec.																				K									
Derivative Time																				T									
0(off) to 180 sec.																				B									
Cycle Time																				R									
For SSR																				S									
For Relay																				PT-100 (3 wire)									
1 to 60 Sec																				-200 to 850 °C,-199.0 to 850.0 °C									
10 to 300 sec. (Hyst in ON/OFF mode)																				1-5V/0-5V/0-10V DC									
Relay Control Output																				0/4-20mA (Ext 250 Ω)									
Relays																				-1999 to 9999									
1 No. or 2 nos. in case of F/R without feed back O/P																													
Type																													
Single change over (C, NO, NC)																													
Rating																													
5A @ 230VAC / 30VDC																													
SSR Control Output (Optional in lieu of Relay control O/P)																													
Rating																													
11V DC@20mA																													
Resolution																													
10ms																													
Analogue MV Output (Optional in LC5296-AT/LC5248E-AT/LC5296V-AT)																													
Current																													
0-20mA/4-20mA@500Q Max.																													
Voltage																													
0-5V/ 1-5V/ 0-10V @3 KΩ Min.																													
Accuracy																													
0.25% of FS																													
Ordering Code										Ordering Code																			
Model		Input		Power Supply		Control Output		Output Option				Model		Input		Power Supply		Output											
								1 (AO1*) 2 (AO2**or RS485)																					
LC5296-AT		1 E		U1 85-260VAC/ 100-300VDC		1 Relay		N None N None				LC5296L-AT		1 E		U1 85-260VAC/ 100-300VDC		1 Relay1+Relay2											
LC5248E-AT		2 J		U2 18-36VDC		2 SSR		1 4-20 mA 1 4-20 mA <sup>#</sup>						2 J		U2 18-36VDC		2 Relay1+SSR											
LC5296V-AT		3 K				3 AO1*		2 0-20 mA 2 0-20 mA <sup>#</sup>						3 K				3 Relay1+Relay2+SSR											
		4 T				4 Relay -		3 1-5 V 3 1-5 V <sup>#</sup>						4 T															
		5 B				On/Off		4 0-5 V 4 0-5 V <sup>#</sup>						5 B															
		6 R				F/R without feedback		5 0-10 V 5 0-10 V <sup>#</sup>						6 R															
		7 S						6 RS485						7 S															
		9 Pt-100												9 Pt-100															
		C 4-20 mA												C 4-20 mA															
		D 0-20 mA												D 0-20 mA															
		E 1-5 V												E 1-5 V															
		F 0-5 V												F 0-5 V															
		G 0-10 V												G 0-10 V															
		X Default I/P type <sup>**</sup>												X Default I/P type <sup>**</sup>															
Head Office: Masibus Automation And Instrumentation Pvt. Ltd.										All specifications are subject to change without notice																			
B-30, GIDC Electronics Estate, Sector-25, Gandhinagar-382024, Gujarat, India.										due to continuous improvements.																			
Tel: +91 79 23287275-77, Fax: +91 79 23287281.										Doc. Ref. LC5296-AT/LC5248E-AT/LC5296L-AT /LC5296V-AT_																			
E-mail: sales@masibus.com, Web: www.masibus.com										R6F_12/23																			