



## TC5396

Auto-Tune PID Controller

Large & Bright Display

Advanced. Efficient. Economical

Masibus TC5396 PID Controller is designed to offer advanced performance at a competitive price, the controller comes with a Large White LED display plus 10 segment bargraph for display of MV, universal Input, multiple output options, ideally suited for a wide range of applications such as plastic processing machines, packaging machinery and food processing applications. The controller has four relay outputs which can be configured as control, auxiliary and Alarm.

TC5396 PID Controller improves process efficiency and quality, Input is truly Universal, configurable for any Thermocouple, RTD or mA/Volt. All inputs and outputs parameters are accessible over Modbus communication interface option, Retransmission option can be used for recording/datalogging.

TC5396 PID Controller has a advanced Auto-tuning function and can be set-up in different control modes from On-off, PID and Valve position control without feedback, control output type options include Relay, SSR and Analog, Manual mode override allows operator to manually control the process.

TC5396 PID Controller has extended Alarm capability, 15 different Alarm modes are possible for each Alarm output, the four relays can be configured for control output or Alarm based on the Actuator type.

The unit is easy to configure, operate and password protected, parameters that require frequent changes can be user selected and grouped in first level of access for quick parameterization.

## **Features**

- Advanced Auto-tune PID Algorithm
- Universal input (TC, RTD, Volts, mA)
- 15 Alarm configurations
- RS485 Modbus Communication (optional)
- Variety of Retransmission Output (optional)
- Relay or SSR control output option
- User customized configuration level for quick access
- Auto/Manual selection with bump less transfer
- Auto-tune PID, On-Off or Valve position control
- PV bias for input correction
- Programmable digital filter
- Manual reset to prevent overshoot
- Selectable Ramp and 1 Soak

## **Applications**

- Injection Molding machines
- Packaging machines
- Food and Beverages
- Industrial Ovens
- Plastic Industry
- Hot Stamping Machines

## **TECHNICAL SPECIFICATIONS**

Input Type	I LCI II (IC) (L	of EchicAllons						
Injust Type		Input 1 PV input	Analog Output 2	-AO2 (Ontic	n)			
Current, Voltage				7102 (Optio		n		
Display Range	Input Type							
Accuracy	Display Range	, e						
ACCI Resolution 16 bits   Communication Output-RS485 (Option)   Commun	. , ,		_			0 10 ( 00 ( 121 )		
ADC Resolution	Accuracy		,	Output-RS4				
Display Resolution	ADC Resolution			Output No-		II Parameters		
Sampling Rate   \$ 5 Samples/Soc   \$ 2.0 °C   CF ror   \$ 2.0 °C								
Transmitter supply	1 1							
Sensor goep protection				. /				
Sensor Burnout current   0.25uA   Standard   85 260/WAC / 100 300VDC		All inputs except 0-5V / 0-10V	mansmitter supply	У				
MARK		·	0			*		
NMRR	RTD excitation current	≈ 0.16mA				100-300VDC		
Solation (Withstanding voltage	NMRR	> 40dB						
Between primary terminals** and secondary terminals** and ascondary	CMRR	> 120dB						
Pote transport   Pote Notage   Petween secondary terminals **At least 500 VAC for 1 minute **Primary terminals informs terminals (70 signal and communication O/P instruction of the primary terminals informs terminals (70 signal and communication O/P instruction of the primary terminals informs terminals (70 signal and communication O/P instruction of the primary terminals informs terminals (70 signal and communication O/P instruction of the primary terminal informs informs of the primary terminal informs of t	Temp-co	< 100ppm/°C			ondary terminals**	:At least 1500 V AC for 1 minute		
The Noting	Input Impedance	> 1MΩ	<ul> <li>Between secondary t</li> </ul>	erminals**:At le	east 500 V AC for :	1 minute		
Process Value								
Process Value	0	Display & Kevs				Communication O/F.		
Set Value	Process Value				Physical			
Manipulated Value   10 segment bar Orange LED   Ckeys   Enter, A/M, Increase, Decrease,   Front Bezel (in mm) (H x W x D)   100 x 100 x 55			Mounting type		Panel			
Keys         Enter, A/M, Increase, Decrease, Fror Relay, Communication, A/M, Auto tune, SP1, SP2         Fron Relay, Communication, A/M, Auto tune, SP1, SP2         Front Bezel (in mm) (H x W) 92 x 92         92 x 92           Control Type         On/Off, P. Pl., Auto tune PID, Valve Position Control (without Feedback)         Weight (approx.)         300g           Manual offset         ±50% of P band         Enclosure Protection         IP20           Manual offset         ±50% of P band         Enclosure Protection         IP20           Manual offset         ±50% of P band         Enclosure Protection         IP20           Manual offset         ±50% of P band         Enclosure Protection         IP20           Manual offset         ±50% of P band         Enclosure Protection         IP20           Integral time         0 (off) to 1000 Sec         Humidity         So 95% RH non-condensing           For SSR         1 to 60 Sec         For SSR         Table-1: Display Range           For SSR         1 to 60 Sec         For SSR         Table-1: Display Range           For SSR         1 to 60 Sec         For SSR         Table-1: Display Range	Manipulated Value					x 100 x 55		
Panel Cutout (in mm) (H x W)   92 x 92   Panel Cutout (in mm) (H x W)   92 x 92   Panel Cutout (in mm) (in mm)   52   Panel Cutout (in mm) (in mm)   52   Panel Cutout (in mm)   52   Panel Cutout (in mm)   52   Panel Cutout (in mm)   62   Panel Cutout (in mm) (it x multing (in mail and its cutout (in mitout (in mitout (in mitout (in	•	ě –						
Output	For Polary Communication, A/M		Panel Cutout (in mm) (H x W) 92 x 92					
Control Type	Status LEDs							
Control Type         Con/Off, P, PI, Auto tune PID, Valve Position Control (without Feedback)         Enclosure Material Enclosure Protection IP20         ABS (Front: Polycarbonate)           Manual offset         ±50% of P band         Enclosure Protection         IP20           Manual offset         ±50% of P band         Environmental           Proportional band         0.1 to 200.0 %         Operating temperature         0.55 °C           Integral time         0 (off) to 180 Sec         Humidity         30.95% RH non-condensing           Derivative time         0 (off) to 180 Sec         Humidity         30.95% RH non-condensing           Cycle time         Table-1: Display Range           For SSR         1 to 60 Sec         Humidity         Range <tr< td=""><td></td><td></td><td colspan="5"></td></tr<>								
Control Type	Control Type	Cutput	Enclosure Materia	al	ABS (Front: P	olycarbonate)		
Terminal & Cable Size   Barrier type terminal 2.5mm²		On/Off P PL Auto tune PID	Enclosure Protect	ion				
Manual offset	Control Type		Terminal & Cable Size		Barrier type terminal 2.5mm²			
Proportional band         0.1 to 200.0 %         Operating temperature         0-55 °C           Integral time         0 (off) to 1000 Sec         Storage temperature         0-80 °C           Derivative time         0 (off) to 180 Sec         Humidity         30-95% RH non-condensing           Table-1: Display Range           For SSR 1 to 60 Sec         1 to 60 Sec         Input         Input Type         Range           For SSR 1 to to 300 Sec (Hyst in on/off mode)         Input         Input Type         Range           Relay Output (RL1, RL2)         E         -200 to 1000 °C*           Type         Single Change over (C, NO, NC)         Thermocouple         T         -200 to 1372 °C*           Thermocouple         T         -200 to 400 °C*         Thermocouple         Thermocouple         T         -200 to 400 °C*           Relay Output (RL3, RL4)         Thermocouple         T         -200 to 400 °C*         Thermocouple         Thermocouple         T         -200 to 400 °C*         Thermocouple         R         0 to 1768 °C         Thermocouple         R         0 to 1768 °C         Thermocouple         R         0 to 1768 °C         Thermocouple         R         1 -5V/0-5V/0-10V DC         1-10 °C         1-10 °C         1-	Manual offset	,			Environmen	tal		
Integral time			Operating temper	rature	0-55 °C			
Derivative time   O (off) to 180 Sec   Humidity   30-95% RH non-condensing					0-80 °C			
Table-1: Display Range   For SSR   1 to 60 Sec   Hyst in on/off mode   Input   Input   Type   Range   For SSR   10 to 300 Sec (Hyst in on/off mode   Input   Input   Type   Range   For SSR   10 to 300 Sec (Hyst in on/off mode   Input	_				30-95% RH r	non-condensing		
For SSR		2 (211) 12 222 222	,	Ta				
For SSR   10 to 300 Sec (Hyst in on/off mode)   Relay Output (RL1, RL2)   J   -200 to 1000 °C*		1 to 60 Sec	Innut					
Function   Control, Alarm   K   Control   Alarm   Control   Contr	For SSR	10 to 300 Sec (Hyst in on/off mode)	IIIput		pc	•		
Function   Control, Alarm   Type   Single Change over (C, NO, NC)   Rating   5A @ 230VAC / 30VDC   Relay Output (RL3, RL4)   R   0 to 1768 °C	Relay Output (RL1, RL2)							
Type         Single Change over (C, NO, NC)         Thermocouple         T         -200 to 400 °C*           Rating         5A @ 230VAC / 30VDC         R         450 to 1800 °C           Relay Output (RL3, RL4)         R         0 to 1768 °C           Function         Alarm         S         0 to 1768 °C           Type         Single Change over (C, NO)         RTD         PT-100 (3 wire)         -200 to 850 °C*           Rating         5A @ 230VAC / 30VDC         Linear         1-5V/0-5V/0-10V DC         0/4-20mA (Ext 250 Ω)         -1999 to 9999           SSR Output (Option in lieu of RL1)         *0.1 °C selectable for range -199.9 to 999.9         *0.1 °C selectable for range -199.9 to 999.9           Function         Control, Retransmission         *0.20mA/ 4-20mA @500Ω Max         *0.20mA/ 4-20mA @500Ω Max           Voltage         0-5V/ 1-5V/ 0-10V @3 KΩ Min         RAD Min	Function	Control, Alarm		-				
Rating       5A @ 230VAC / 30VDC       B       450 to 1800 °C         Relay Output (RL3, RL4)       R       0 to 1768 °C         Function       Alarm       S       0 to 1768 °C         Type       Single Change over (C, NO)       RTD       PT-100 (3 wire)       -200 to 850 °C*         Rating       5A @ 230VAC / 30VDC       Linear       1-5V/0-5V/0-10V DC       0/4-20mA (Ext 250 Ω)       -1999 to 9999         SSR Output (Option in lieu of RL1)       *0.1 °C selectable for range -199.9 to 999.9         Function       Control, Retransmission         Current       O-20mA/ 4-20mA @500Ω Max         Voltage       O-5V/ 1-5V/ 0-10V @3 KΩ Min	Туре	Single Change over (C, NO, NC)	Thermocouple					
Relay Output (RL3, RL4)         R         0 to 1768 °C           Function         Alarm         S         0 to 1768 °C           Type         Single Change over (C, NO)         RTD         PT-100 (3 wire)         -200 to 850 °C*           Rating         5A @ 230VAC / 30VDC         Linear         1-5V/0-5V/0-10V DC         0/4-20mA (Ext 250 Ω)         1999 to 9999           Function         Control         *0.1 °C selectable for range -199.9 to 999.9         **           Analog Output 1-AO1 (Option)         Function         Control, Retransmission         **	Rating	5A @ 230VAC / 30VDC	memocoapic					
Function   Alarm   S   O to 1768 °C     Type   Single Change over (C, NO)     Rating   5A @ 230VAC / 30VDC     SSR Output (Option in lieu of RL1)     Function   Control     Rating   11V DC@20mA     Analog Output 1-AO1 (Option)     Function   Control, Retransmission     Current   O-20mA / 4-20mA @500Ω Max     Voltage   O-5V/ 1-5V/ O-10V @3 ΚΩ Min     S	Relay Output (RL3, RL4)							
Type         Single Change over (C, NO)         RTD         PT-100 (3 wire)         -200 to 850 °C*           Rating         5A @ 230VAC / 30VDC         1-5V/0-5V/0-10V DC         0/4-20mA (Ext 250 Ω)         -1999 to 9999           Function         Control         *0.1 °C selectable for range -199.9 to 999.9         *0.1 °C selectable for range -199.9 to 999.9           Analog Output 1-AO1 (Option)         Function         Control, Retransmission         *0.1 °C selectable for range -199.9 to 999.9           Function         Control, Retransmission         *0.20mA/ 4-20mA @500Ω Max           Voltage         0-5V/ 1-5V/ 0-10V @3 KΩ Min	Function	Alarm						
Rating         5A @ 230VAC / 30VDC           SSR Output (Option in lieu of RL1)         Linear         1-5V/0-5V/0-10V DC 0/4-20mA (Ext 250 Ω)         -1999 to 9999           Function         Control         *0.1 °C selectable for range -199.9 to 999.9           Analog Output 1-AO1 (Option)         Function         Control, Retransmission           Current         0-20mA/ 4-20mA @500Ω Max           Voltage         0-5V/ 1-5V/ 0-10V @3 KΩ Min	Туре		RTD		3 wire)			
Current   O-20mA (4-20mA (Ext 250 Ω)   O/4-20mA (Ext 250 Ω)	Rating	5A @ 230VAC / 30VDC	KID					
Control   Rating   11V DC@20mA   *0.1 °C selectable for range -199.9 to 999.9	1 1 7		Linear			-1999 to 9999		
Analog Output 1-AO1 (Option)         Function       Control, Retransmission         Current       0-20mA/ 4-20mA @500Ω Max         Voltage       0-5V/ 1-5V/ 0-10V @3 KΩ Min	Function		*0.1.9C aplantable					
FunctionControl, RetransmissionCurrent0-20mA/ 4-20mA @500Ω MaxVoltage0-5V/ 1-5V/ 0-10V @3 KΩ Min	- C		U.1 C selectable	e for range -1	177.7 10 777.9			
Current       0-20mA/ 4-20mA @500Ω Max         Voltage       0-5V/ 1-5V/ 0-10V @3 KΩ Min								
Voltage 0-5V/ 1-5V/ 0-10V @3 KΩ Min		· ·						
Accuracy 0.25% FS		-						
	Accuracy	0.25% FS						

Ordering code

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Model	Input		Power Supply		Option-1 (RL1/SSR)		Option-2 (AO1)		Option-3 (AO2/RS485)	
TC5396	1	Е	U1	85-265VAC /	1	Relay	Ν	None	Ν	None
	2	J	01	100-300VDC	2	SSR	1	4-20 mA	1	4-20 mA
	3	K	U2	18-36VDC			2	0-20 mA	2	0-20 mA
	4	Т					3	1-5V	3	1-5V
	5	В					4	0-5V	4	0-5V
	6	R						0-10V	5	0-10V
	7	7 S							6	RS485
	9	Pt-100								
	_	1-5V								
	E	(4-20mA**) **Ext 250 Ohm								
	F	0-5V		EXC 230 OTHIT						
		(0-20mA**)								
	G	0-10V								
	G	0-10V								