

### Tehničke specifikacije

Specification	EM231, 4TC×PID	EM231, 8TC×PID
Physical Features		
Dimensions(W×H×D)	71.2×80×62mm	71.2×80×62mm
Power Loss(dissipation)	1.7W	1.7W
Power Consumption		
From +5V(from I/O bus)	87mA	
From L+	60 mA	
L+ voltage range,class 2 or DC sensor supply	20.4 ~ 28.8V DC	
LED indicator	24 VDC Power Supply Good: ON = no fault,OFF = no power ; SF: ON=module fault, Blink=input signal error, OFF=normal;	
Analog Input Features		
Input type	Floating Thermocouple	
Input range	TC type: K	
Number of analog input points	4 points	8 points
Isolation		
Field to Logic	500V AC	
Field to 24V DC	500V AC	
24V DC to logic	500V AC	

Common mode input range (input channel to input channel)	120V AC	
Common mode rejection	>120dB@120V AC	
Input resolution		
Temperature	0.1°C/0.1°F	
Voltage	15 bits plus sign	
Measuring principle	Sigma-Delta	
Module update time for all channel	425ms	825ms
Wire length to sensor, maximum	100 m	
Wire loop resistance	100Ω	
Suppression of interference	85dB@ 50Hz/60Hz/400Hz	
Data word format	Voltage: -27648 to +27648	
Input impedance	≥1MΩ	
Maximum input voltage	30V DC	
Input filter attenuation	-3dB@ 21kHz	
Basic error	0.1% FS(Voltage)	
Repeatability	0.05% FS	
Cold junction error	±1.5°C	
24V DC supply voltage range	20.4 to 28.8 VDC	
Diagnostic program	LED : EXTF , SF	
PID Features		
PID arithmetic	PID+FUZZY argument auto-tuning	

Sampling time	1 second
Minimum output pulse time	10 ms
PID type	P、PI、PD、PID
PID output type	Analog or PWM
PID output polarity	Bipolar or unipolar

### Configuring PID Address

#### Calculating the PID address

PID address	Formula	Note
Address for PID argument	$A=(2048+S*256)+16*C$	S is the installing slot no.of the module (0 ~ 6) C is the point no.( 0 ~ 7 for 8PID module and 0 ~ 3 for 4PID module)
Address for PID positive pulse	$X=(2048+S*256)+12$	
Address for PID negative pulse	$Y=(2048+S*256)+13$	

#### PID argument output (Module to CPU)

Description	Address	Setting Value	Actual Value
Actual temperature	VM A	-2000 ~ 13000	-200 ~ 1300°C
Status word	VM A+2		data read
PID analog output	VM A+4	-32000 ~ 32000	-32000 ~ 32000

#### PID argument input (CPU to module)

Description	Address	Setting Value	Actual Value
Setting temperature	VM A+128	-2000 ~ 13000	-200 ~ 1300°C
Control bytes		When VB A+130 is zero	When VB A+130 is 1

	V(A+130).0	PID disable, no output	PID enable
	V(A+130).1	Integral is always active and Kp is not auto tuning	Integral is not active and Kp is auto tuning
	V(A+130).2	Unipolar PID output, 0 ~ 32000	Bipolar PID output, 32000 ~ -32000, with calefaction and cooling function
	V(A+130).3	Unused	
	V(A+130).4	Integral is active	Integral is not active
	V(A+130).5	Differential is active	Differential is not active
	V(A+130).6	Filteing for input	Not Filtering for input
Pulse output cycle for PID	VW A+132	1 ~ 255	1 ~ 255 seconds
Kp	VW A+134	0 ~ 9999	0 ~ 999.9
Ti (Integral time)	VW A+136	0 ~ 3600	0 ~ 3600 seconds
Td (differential time)	VW A+138	0 ~ 3600	0 ~ 3600 seconds

Address for positive pulse output

point 0	V X.0
point 1	V X.1
point 2	V X.2

point 3V	X.3
point 4V	X.4
point 5V	X.5
point 6V	X.6
point 7V	X.7

Address for negative pulse output

point 0V	Y.0
point 1V	Y.1
point 2V	Y.2
point 3V	Y.3
point 4V	Y.4
point 5V	Y.5
point 6V	Y.6
point 7V	Y.7

Example

The EM231 8AI×PID module is installed at the second slot, now to configure its last PID loop( with  $K_p=120, T_i=360, T_d=50$ , and the pulse output cycle = 2s)

Firstly calculating the PID address:

$$S=1, C=7$$

$$A = 2048 + 1 * 256 + 16 * 7 = 2416$$

$$X = 2048 + 1 * 256 + 12 = 2316$$

$$Y = 2048 + 1 * 256 + 13 = 2317$$

Then setting or reading the argument data refer to the following note:

VW2544 //setting emperature, actual value=setting data / 10

VB2546 //control byte (PID enable, auto-tuning, bipolar output)  
 VW2548 //setting pulse output cycle  
 VW2550 //Setting Kp  
 VW2552 //Setting Ti  
 VW2554 //Setting Td  
 VW2416 //The actual temperature  
 VW2418 //The status word  
 VW2420 //The PID analog output

The module of PID parameter takes the CPU's V memory area.

For PID module to work correctly, please don't use the V memory area taken by PID modules in other functions.

Module at slot 0 takes address: VW2048 to VW2298

Module at slot 1 takes address: VW2304 to VW2554

Module at slot 2 takes address:VW2560 to VW2810

Module at slot 3 takes address:VW2816 to VW3066

Module at slot 4 takes address:VW3072 to VW3322

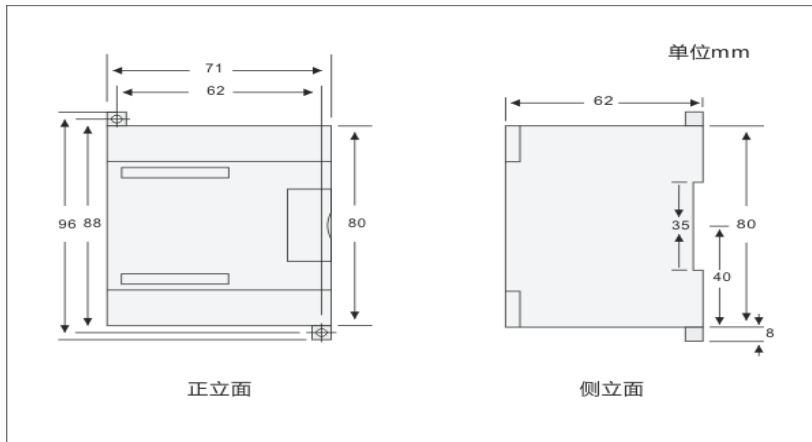
Module at slot 5 takes address:VW3328 to VW3578

Module at slot 6 takes address:VW3584 to VW3834

You can call the PIDSetting subroutine in EM231 PID library to configure the PID parameters.

thermocouple type	SW3	0: Type J 1: Type K
Burnout direction	SW4	0: Upscale (+3276.7degrees) 1: Downscale (-3276.8degrees)
Temperature scale	SW5	0:Celsius (°C), 1:Fahrenheit (°F)
cold junction compensation	SW6	0: enable 1:disable

Dimenzije



### Šema spajanja

