IN PURSUIT OF GROWTH & EXCELLENCE

Shihlin Electric

WT Series

Digital PID Temperature Controller

www.seec.com.tw

FA Web

Double Loop

Precise Control

High Reliability

WT Series Classical Re-evolution

High Quality & High Performance With Best Process Control

- ✓ Sampling Time 50ms
- ✓ High Accuracy ±0.1%
- ✓ Speed upper to 115200 bps

Excellent Anti-Interference Ability

Adopt new anti-interference algorithm and pass the highest level of EMC verification in CE certification.It can resist electromagnetic interference in heavy noise environment.

EMC Shielding

Double-Loop Design

The input adopts double-loop design, which can accept two sensor input and drive two output module at the same time, realize temperature and humidity control on a WT909.

High Speed Sampling and High Accuracy

Both loops can perform high-speed sampling for 50ms, enabling stable control and response. Built-in 18-bit high resolution ADC circuit provides up to 0.1% accuracy.

50ms ADC 18bit

Certification and Universal Voltage

All models get CE approval.operate on any voltage from AC 85~265V at 50/60 Hz,DC 24V is also available.

CE

Customize Function Key

It can be quickly executed the event by A/M key.
Ex: auto/manual switch, run/stop switch etc.

A M

Parameter Lock Function

All parameters are separated in five operation levels (Level1~Level5). Each parameter can be hidden or locked to prevent users unauthorized changes.

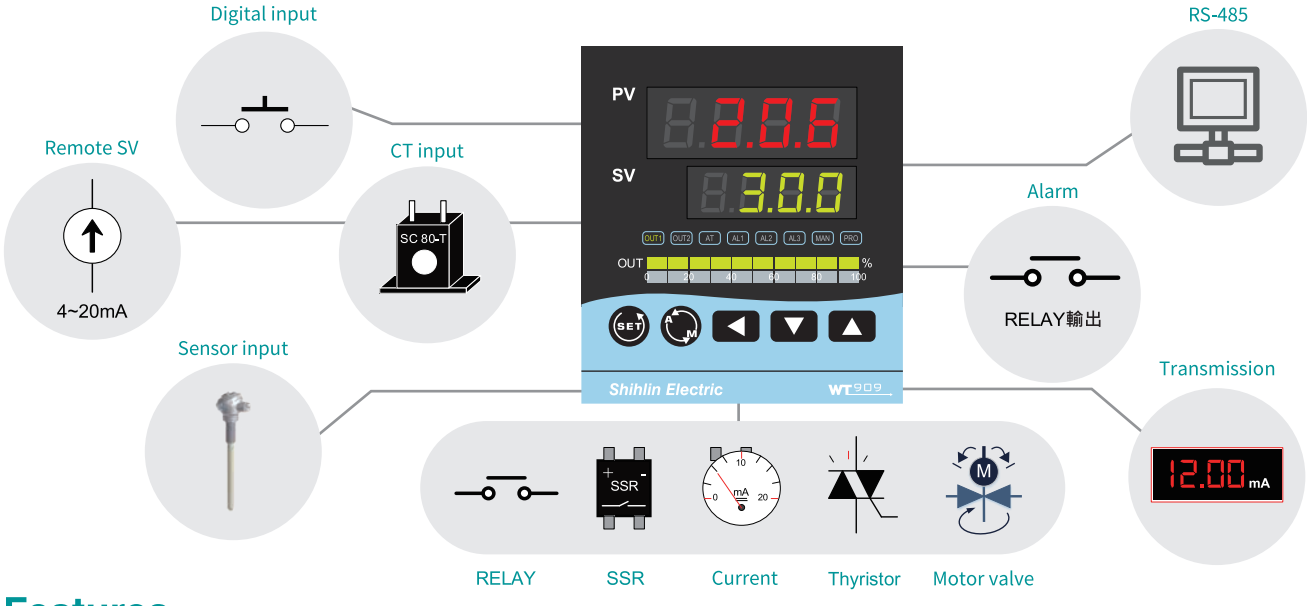
Status Indicator Light

Real time monitor the status of output (OUT1/OUT2)、alarm(AL1/AL2/AL3),auto-tunning (AT),manual output(MAN) and program execute(PRO).

Bar-Graph

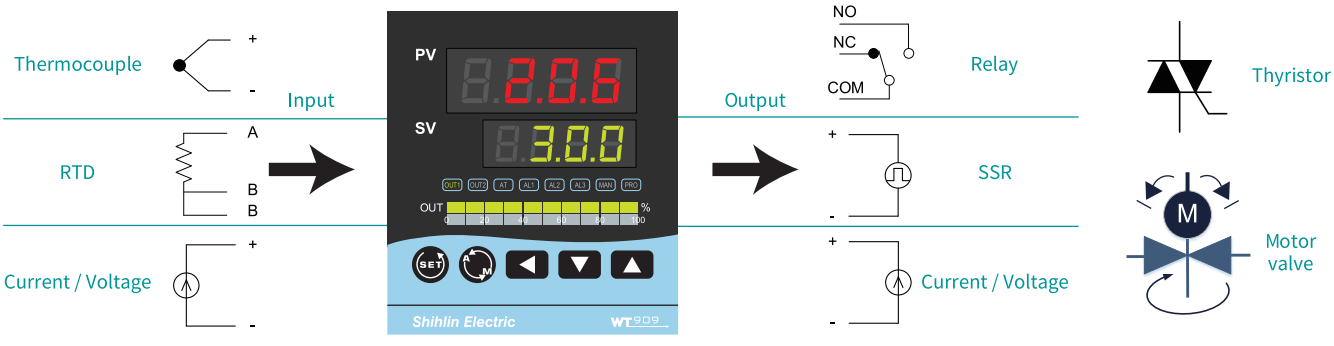
The output percentage is directly displayed on the panel with a bar-graph indicator 10 LED's corresponding to every 10% differential in output (0~100%) (except WT404).

Function block diagram



Features

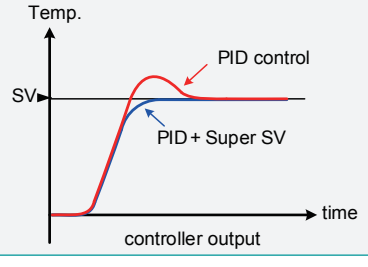
Various I/O Types



Excellent Control Performance

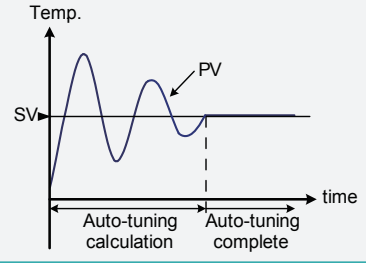
PID Control

Super SV function can effectively suppress temperature overshoot and quickly reach the set temperature.



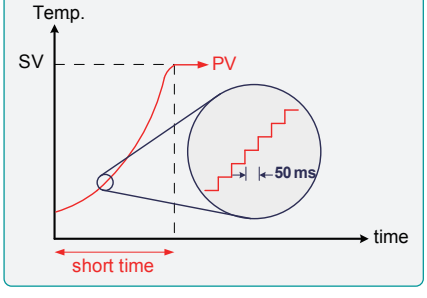
Auto-tuning

Calculate the optimal PID of the system value automatically, to achieve precise control effect.



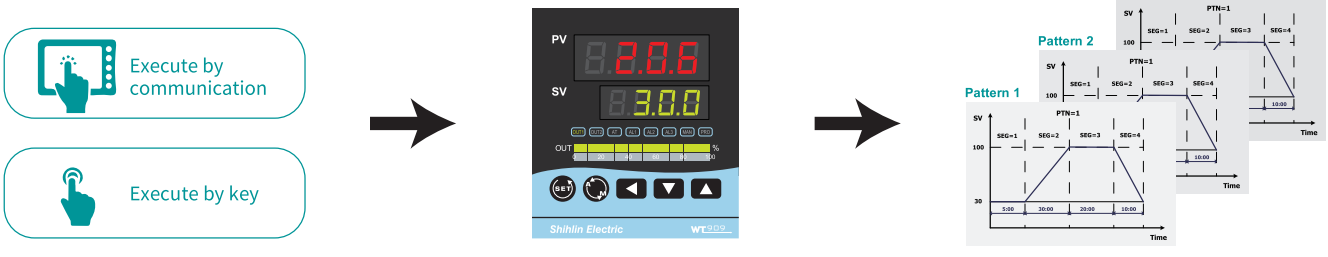
High speed control

50ms sampling time for fast and precise control of the occasion.



Powerful Program Control

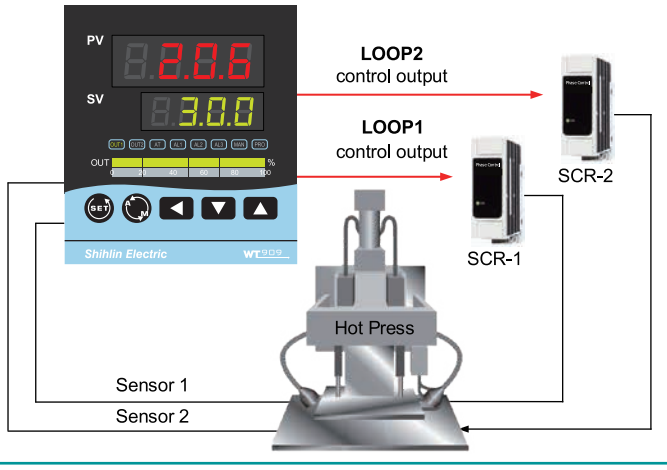
Provides 15 patterns of 10 segments of program control, each segment can be arbitrarily set to ramp, soak ,step or cool down temperature, the user can be arbitrary according to the demand, the maximum can support to 150 segments program control.



Features

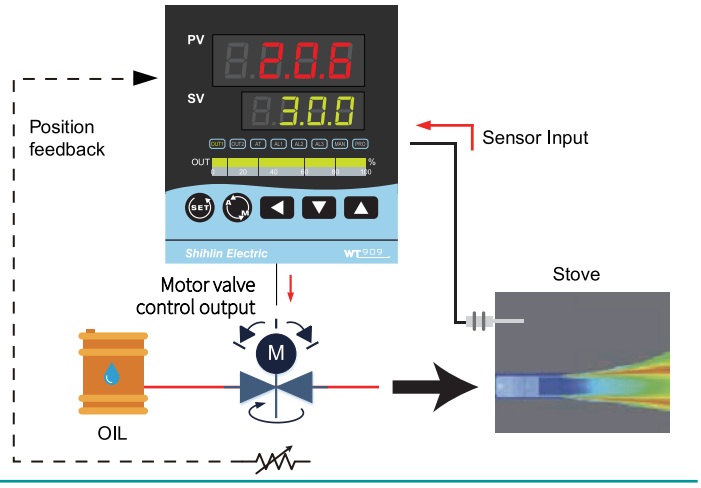
Double Loop Control

Double Loop design, accept two sensor inputs at the same time, independently control two systems, effectively reduce system costs.



Motor Valve Control

Can use position feedback control of valve opening input or servo control without valve opening input.

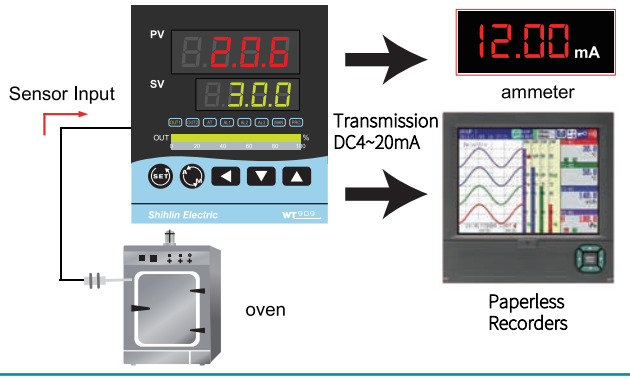


Transmission

Transfer parameter digital values as analog signals to external devices.

signals : 0~20mA , 4~20mA , 0~5V , 1~5V ,
0~10V ...

parameters : SV1, PV1,MV1...

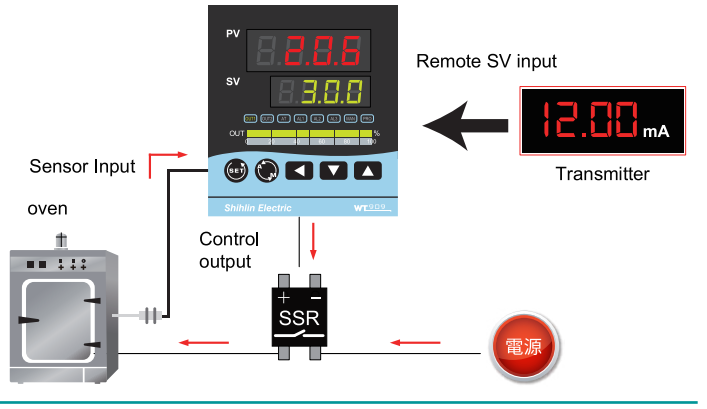


Remote SV

SV value is controlled by an analog signal from an external device.

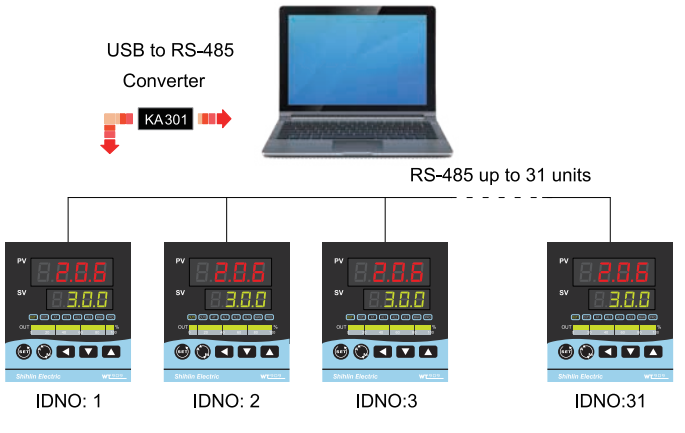
signals : 0~20mA , 4~20mA , 0~5V , 1~5V , 0~10V ...

parameters : SV



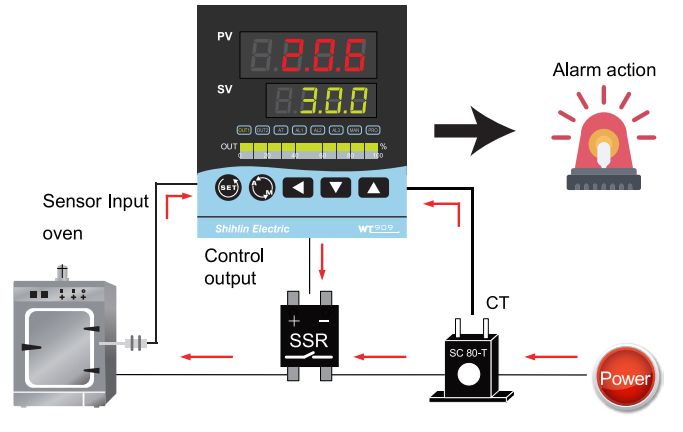
Communication

Compatible with Modbus RTU communication protocol to quickly establish links with HMI, PLC or SCADA software.



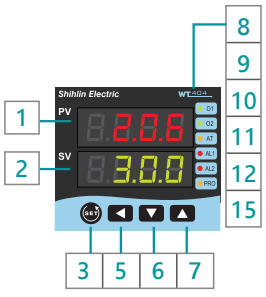
Heater Break Alarm(HBA)

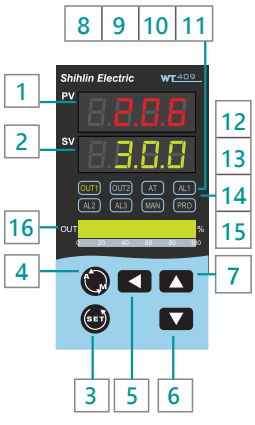
With a CT (current transformer) to monitor the heater current in real time, when the current value is abnormally reduced an alarm signal can be output to notify the user.

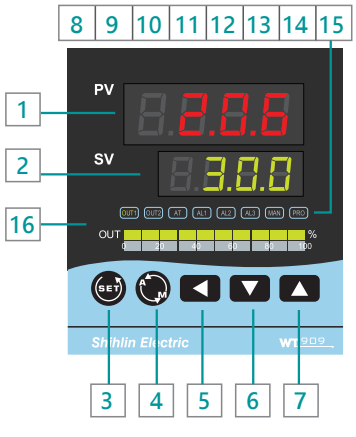


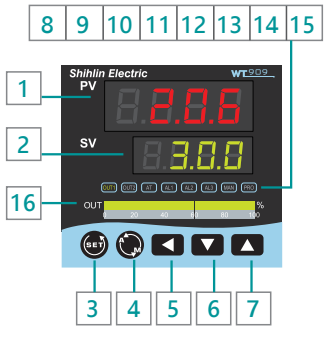
Appearance

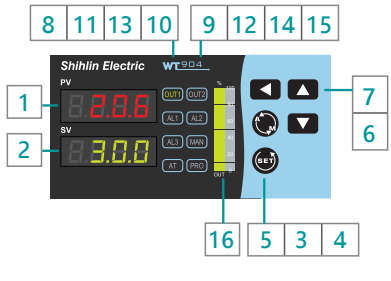
Parts Description







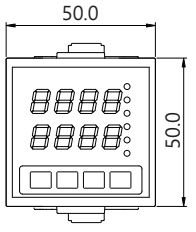


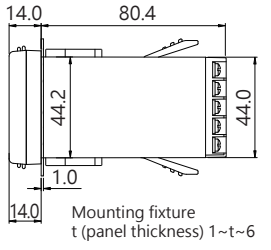


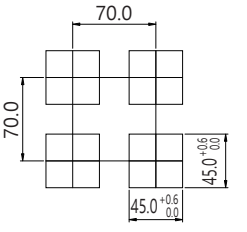
NO.	NAME	Function
1	PV	Indicates PV (measured value) and character information such as parameter codes and error codes (Red)
2	SV	Indicates SV (target set value) and parameter Values (Green)
3	SET	Used for parameter calling up and set value registration
4	A/M	Auto/manual switch or others function start
5	<	Shift digits when settings are changed
6	∨	Decrease Key (-1000,-100,-10,-1)
7	∧	Increase Key (+1000,+100,+10,+1)
8	OUT1	Lamp lit when OUT1 is activated (Green)
9	OUT2	Lamp lit when OUT2 is activated (Green)
10	AT	Lamp lit when Auto-tuning is activated (Orange)
11	AL1	Lamp lit when Alarm 1 is activated (Red)
12	AL2	Lamp lit when Alarm 2 is activated (Red)
13	AL3	Lamp lit when Alarm 3 is activated (Red)
14	MAN	Lamp lit when controller in manual mode or get error condition (Orange)
15	PRO	Lights when program running (Orange)
16	OUT1%	Output percentage (Green)

External and Panel Cutout Dimensions

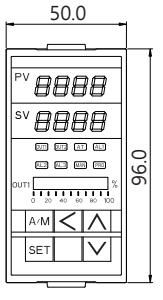
WT404

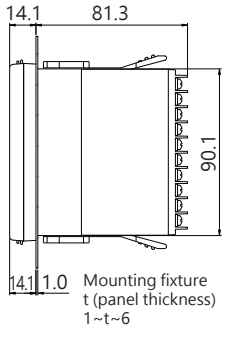


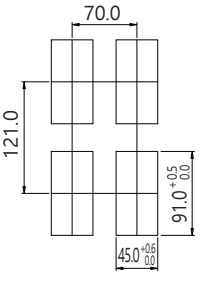




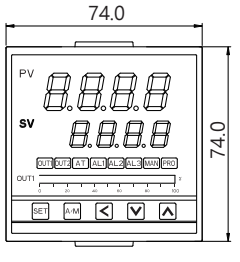
WT409

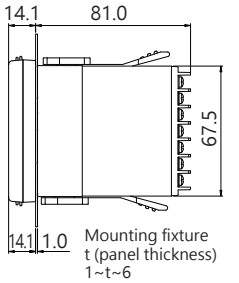


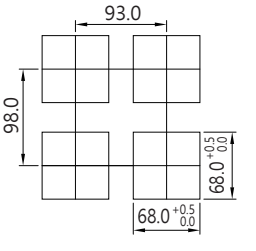




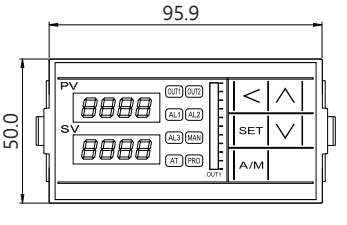
WT707

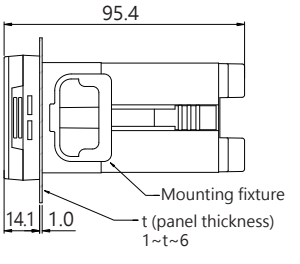


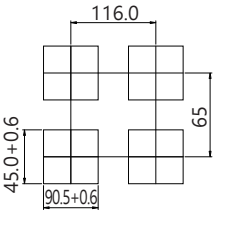




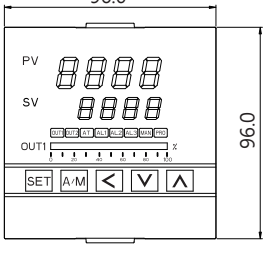
WT904

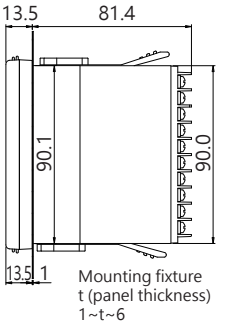


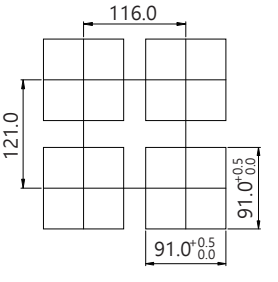




WT909

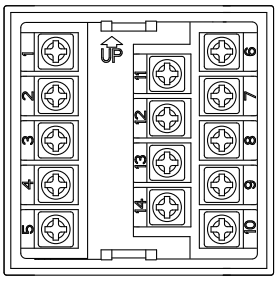




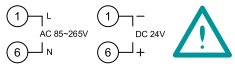


Terminal Arrangement

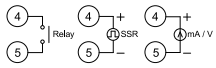
WT404



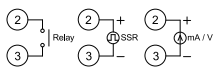
Power



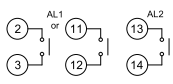
Output-1



Output-2



Alarm-1
Alarm-2

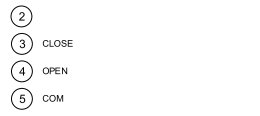


Communication

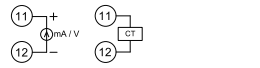
1 Φ Zero cross

DI Input

Motor valve

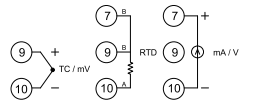


Remote/ CT Input

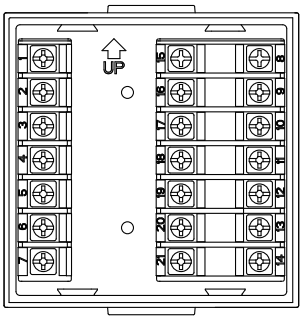


TRS

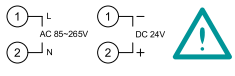
Input



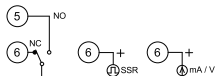
WT707



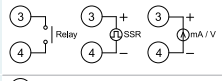
Power



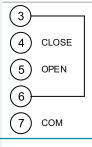
Output-1



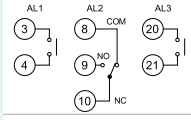
Output-2



Motor valve

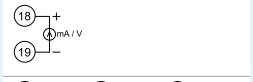


Alarm-1
Alarm-2
Alarm-3

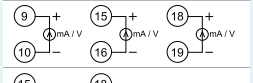


Communication

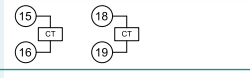
TRS



Remote

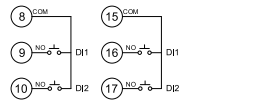


CTInput

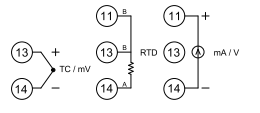


1 Φ Zerocross Phaseangle

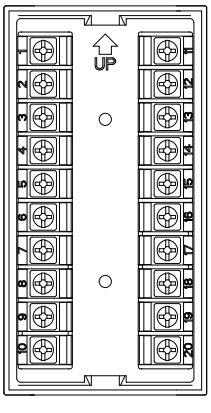
DI Input



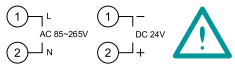
Input



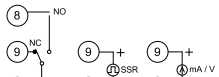
WT409/904



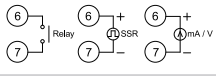
Power



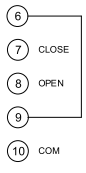
Output-1



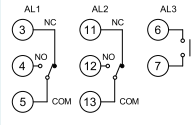
Output-2



Motor valve

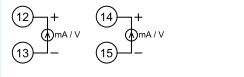


Alarm-1
Alarm-2
Alarm-3

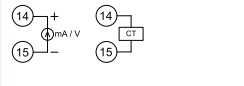


Communication

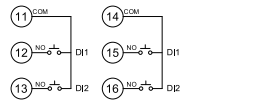
TRS



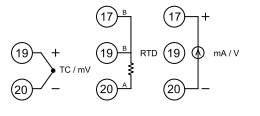
Remote/ CT Input



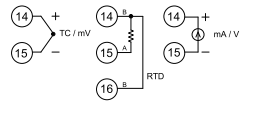
DI Input



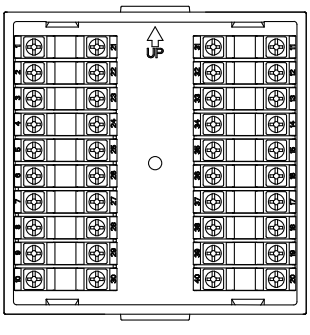
Input-1



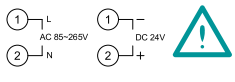
Input-2



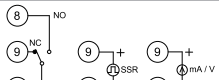
WT909



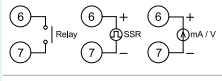
Power



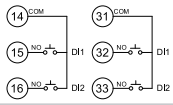
Output-1



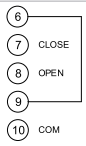
Output-2



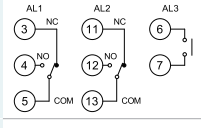
DI Input



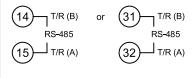
Motor valve



Alarm-1
Alarm-2
Alarm-3

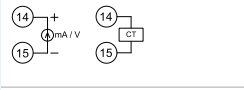


Communication

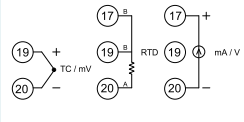


TRS

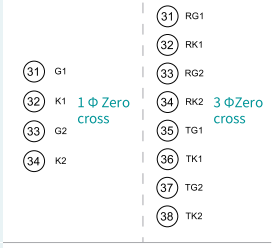
Remote/ CT Input



Input-1

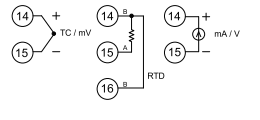


1 Φ / 3 Φ Zero cross



1 Φ Phase angle

Input-2



Specifications

Standard Spec.	
Supply voltage	AC 85 ~ 265V DC 24V ±10%
Power Consumption	AC approx. 6VA DC approx. 4W
Memory	Non-volatile memory Maximum writes : 1000,000 times Data retention : 10 years
Operating temperature	0~50°C (32~122°F)
Humidity range	20% ~ 90% RH
Weight	WT404 approx. 120g WT409 approx. 170g WT707 approx. 150g WT904 approx. 170g WT909 approx. 230g
Dimension (mm)	WT404 48W X 48H X 95.5L (1/16 DIN) WT409 48W X 96H X 95.5L (1/8 DIN) WT707 72W X 72H X 95.5L (3/16 DIN) WT904 96W X 48H X 95.5L (1/8 DIN) WT909 96W X 96H X 95.5L (1/4 DIN)
Operating environment	Non-corrosive, flammable gas, slight dust ring environment, no high frequency, no direct shock, places the sun is not directly exposed.
Input	
Set	Maximum 2 sets
Accuracy	Cold junction compensation diode external ±(0.1% of reading + 1 digit)
	Cold junction compensation diode inside ±(0.3% of reading + 1 digit)
Sampling time	50ms
TC	K、J、R、S、B、E、N、T、W、PLII、L
RTD	PT100
mA dc	0~5V、0~10V、0~2V、1~5V 2~10V、0~25mV、0~50mV、 0~20mA、4~20mA、0~1V、 10~50mV、0~70mV
Input filter	First-order low-pass filter Time constant : 0.1 to 10.0 sec.(When set to 0, the filter is off)
PV compensation	Both zero and high points can be compensated
Output	
Set	Maximum 2 sets
Control	1.PID, P, PI, and PD control (including AT function) 2.ON/OFF control 3.Heat and Cooling PID control (including AT function)
Relay	1.SPST-NO, 250VAC, 5A Electrical life : 100,000 times 2.SPDT-NO, 250VAC, 5A Electrical life : 50,000 times 3.SPDT-NC, 250VAC, 2A Electrical life : 20,000 times
SSR	ON : 24 V OFF: 0V Maximum load current : 20mA With short circuit protection circuit
mA	Resolution: 10 bits Signal type: 4~20mA, 0~20mA, 0~5V, 0~10V, 1~5V, 2~10V
Heater Break Alarm (HBA)	
CT model	SC-80T, SC-100T
Maximum current	SC-80T : 80A, SC-100T : 100A
Accuracy	SC-80T : ±3%, SC-100T : ±5%
Aperture	SC-80T : 5.9mm, SC-100T : 12.6mm
Output	Free load alarm 1~3

Alarm	
Set	Maximum 3 sets
Mode	Program end, System error, HBA, Soak timer, Deviation high, Deviation low, Band, Process high, Process low, Program run, System normal, Ramp Soak Timer, Timer, Counter, 24H Timer
Relay specifications (resistive load)	1.SPST-NO, 250VAC, 5A Electrical life: 100,000 times 2.SPDT-NO, 250VAC, 5A Electrical life: 50,000 timers 3.SPDT-NC, 250VAC, 2A Electrical life: 20,000 times
Timer	
set	1 set
Time Format	Hour : Minute. or Minute : second
Maximum Time	99hr.59min、99min.59sec
output	Free load alarm 1~3
Transmission	
set	1 set
Resolution	14 bits
Accuracy	0.1%
Parameters	SV1, PV1, MV1, SV1R, PV1R, MV1R, SV2, PV2, MV2, SV2R, PV2R, MV2R
Signal Type	4~20mA, 0~20mA, 0~5V,0~10V, 1~5V, 2~10V
Remote	
set	1 set
Resolution	18 bits
Parameters	Local SV
Signal Type	4~20mA, 0~20mA, 0~5V,0~10V, 1~5V, 2~10V
Motor Valve	
set	1 set
Resolution	18 bits
Parameters	PV2
Signal Type	1KΩ or 560Ω
Digital Input	
set	2 sets
External contact specifications	Dry contact without electricity Open circuit : over 500KΩ Short circuit : less 10Ω
Function	1.SV switching 2.RUN/STOP switching 3.Manual switching 4.AT RUN/STOP 5.Remote SV RUN/STOP 6.Retransmission RUN/STOP 7.Timer RUN/STOP 8.Counter 9.Program RUN/STOP
Communication	
Communication	RS-485
Protocol	Modbus RTU, TAIE
Baud rate	2400, 4800, 9600, 19200, 38400, 57600, 115200 bps
Communication format configuration	1. Starting bit : 1 2. Information bits : 8 3. Bit check : None, Odd, Even 4. Stop bits : 1 or 2
Reponses time	0~250ms
Maximum connections	31pcs

Order Information

Model	
WT404	48x48 mm
WT409	48x96 mm
WT707	72x72 mm
WT904	96x48 mm
WT909	96x96 mm

Output 1	Output 2	Alarm	TRS	Remote	COMM	Input type	Power	Accessories
1	0	1	0	0	0	0 1	A	A

Output 1	Output 2	Alarm	TRS	Remote	COMM	Input type	Power	Accessories
0 None	0 None	0 None	0 None	0 None	0 None	See input type table code	A AC 85~265V	A Normal
1 Relay	1 Relay	1 1 Set	1 4~20mA	1 4~20mA	3 TTL		D DC 24V	B Program
2 Voltage Pulse (SSR Drive)	2 Voltage Pulse (SSR Drive)	2 2 Sets	2 0~20mA	2 0~20mA	B RS-485(FY)			
3 4~20mA	3 4~20mA	3 3 Sets	A 0~5V	A 0~5V	C RS-485			
4 0~20mA	4 0~20mA		B 0~10V	B 0~10V				
A 0~5V	A 0~5V		C 1~5V	C 1~5V				
B 0~10V	B 0~10V	A HBA	D 2~10V	D 2~10V				
C 1~5V	C 1~5V	B HBA+AL2		E DI				
D 2~10V	D 2~10V	C HBA+AL2+AL3		F Remote+DI				
5 1ϕSCR zero cross control				M Motor valve control feedback				
6 3ϕSCR zero cross control				J PT(Second Input)				
7 Motor valve control				K TC(Second Input)				
8 1ϕSCR phase angle control				L Linear(Second Input)				

※1 Block means optional functions with additional charge

※2 HBA :Heater Break Alarm (HBA must use AL 1 as alarm relay)

※3 The Second Input WT904/409/909

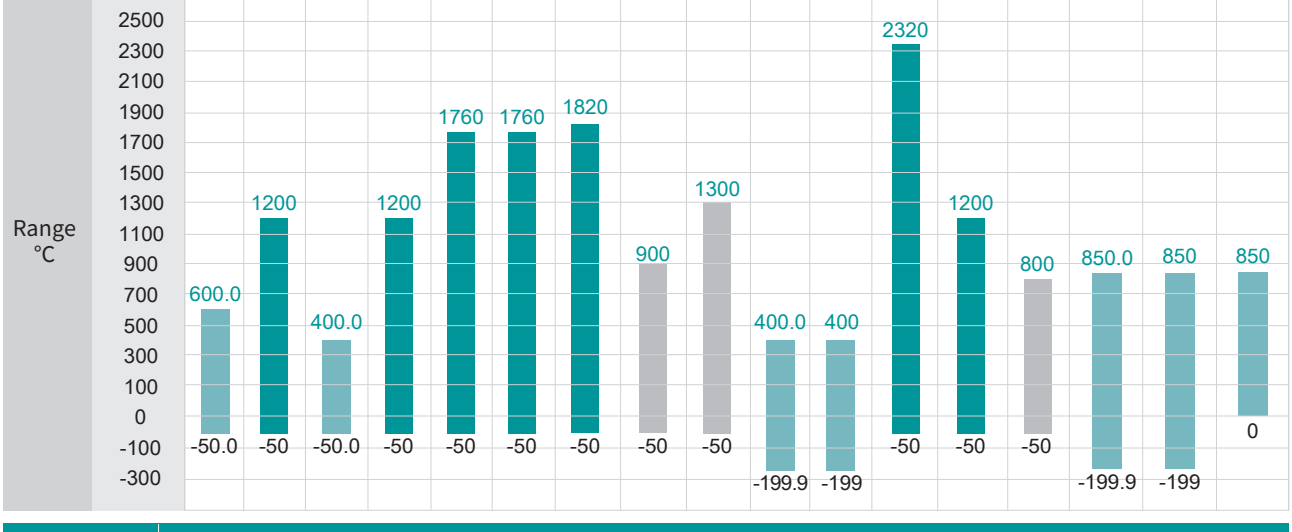
Combination of options and models

○:Available X:Available * Remote SV function is not available ,if HBA function has been spcified

Model	OUT1				OUT2	Alarm2	Alarm3	HBA	Transm-ission	Remote SV	Second input	Communi-cation	Power DC24V	Program
	1ØSCR zero cross control	3ØSCR zero cross control	Motor valve control	1ØSCR phase angle control										
WT404	O	X	O	X	O	O	X	O	O	O	X	O	O	O
WT707	O	X	O	O	O	O	O	O	O	O	X	O	O	O
WT409	X	X	O	X	O	O	O	O	O	O	O	O	O	O
WT904	X	X	O	X	O	O	O	O	O	O	O	O	O	O
WT909	O	O	O	O	O	O	O	O	O	O	O	O	O	O

Input Type Table

TYPE	Thermocouple														RTD		
	K		J		R	S	B	E	N	T		W	PLII	L	PT100		
Kind	K1	K2	J1	J2	R	S	B	E	N	T1	T2	W	PLII	L	DP1	DP2	DP3
Code	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17



TYPE	LINEAR											
	AN1	AN2						AN3	AN4			
Code	18	19	20	21	22	23	24	25	26	27	28	29
Range	0~25mV	0~50mV	0~20mA	0~1V	0~2V	0~5V	0~10V	0~70mV	4~20mA	10~50mV	1~5V	2~10V
	4 kinds of choices：-1999~9999 -199.9~999.9 -19.99~99.99 -1.999~9.999											

Shihlin

Headquarters: 16F, No. 88, Sec. 6, ChungShan N. Rd.., Taipei, Taiwan, 111
TEL:+886-2-2834-2662 FAX:+886-2-2836-6187

HsinFun Factory (Taiwan): No.234, ChungLun, HsinFun, HsinChu, Taiwan, 304
TEL:+886-3-599-5111 FAX:+886-3-5902167

SuZhou Factory(China): 88, Guangdong St, New District, Suzhou, Jiangsu, China 215129
TEL: +86-512-6843-2662 FAX: +86-512-6843-2599

Official website www.seec.com.tw Automation Division website www.seecfa.com automation@seec.com.tw

Specification in this catalog are subject to change without notice for ongoing product modification and improvements.
© Shihlin Electric & Engineering Corporation. All rights reserved.

B190830.TC-BO3