



User Manual

Temperature Controller PCE-RE21R, PCE-RE21S, PCE-RE21T



User manuals in various languages (français, italiano, español, português, nederlands, türk, polski, русский, 中文) can be found by using our product search on: www.pce-instruments.com

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1 Safety notes

Please read this manual carefully and completely before you use the device for the first time. The device may only be used by qualified personnel and repaired by PCE Instruments personnel. Damage or injuries caused by non-observance of the manual are excluded from our liability and not covered by our warranty.

- The device must only be used as described in this instruction manual. If used otherwise, this can cause dangerous situations for the user and damage to the meter.
- The instrument may only be used if the environmental conditions (temperature, relative humidity, ...) are within the ranges stated in the technical specifications. Do not expose the device to extreme temperatures, direct sunlight, extreme humidity or moisture.
- Do not expose the device to shocks or strong vibrations.
- The case should only be opened by qualified PCE Instruments personnel.
- Never use the instrument when your hands are wet.
- You must not make any technical changes to the device.
- The appliance should only be cleaned with a damp cloth. Use only pH-neutral cleaner, no abrasives or solvents.
- The device must only be used with accessories from PCE Instruments or equivalent.
- Before each use, inspect the case for visible damage. If any damage is visible, do not use the device.
- Do not use the instrument in explosive atmospheres.
- The measurement range as stated in the specifications must not be exceeded under any circumstances.
- Non-observance of the safety notes can cause damage to the device and injuries to the user.

We do not assume liability for printing errors or any other mistakes in this manual.

We expressly point to our general guarantee terms which can be found in our general terms of business.

If you have any questions please contact PCE Instruments. The contact details can be found at the end of this manual.



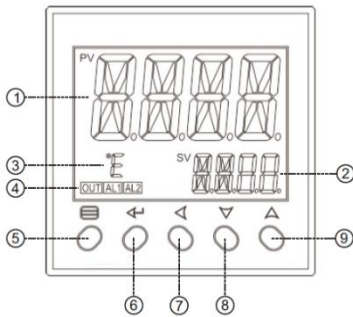
2 Main features

- White large characters color LCD display and new higher contrast LCD with greatly improved visibility.
- Easy to Use, from Model Selection to Setup and Operation.
- The External waterproof sealing ring and the Internal waterproof sealing ring make the instrument reach the good waterproof performance.
- Plastic Handle waterproof type key, is a hard surface that won't scuff, Operation feel clear and smooth.
- Input type: K, E, J, N thermocouples and Pt100 platinum resistance freely programmable.
- Use digital calibration technology for input Measurement accuracy:0.3%FS, maximum resolution is 0.1°C.
- Use advanced artificial intelligent control algorithm, no overshoot and with the function of auto tuning (AT) and self-adaptation.
- With worldwide power supply of AC/DC100-240V or DC12-24V.

3 Technical parameters

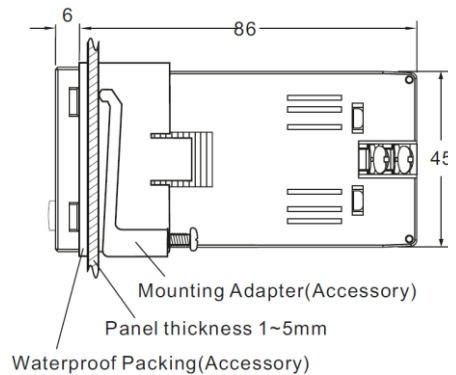
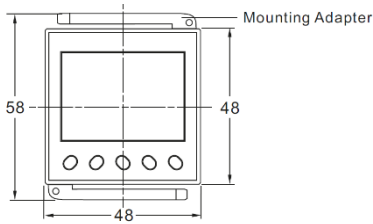
Power supply voltage	AC/DC 100~240V or DC 12-24V (-15%, +10% / 50-60HZ)	
Operating voltage range	85% to 110% of rated supply voltage	
Power consumption	Approx. 5.2 VA at 100 to 240V AC, Approx. 3 VA at 12 to 24 VDC	
Measurement accuracy	0.3% FS ± 1 measurement unit	
Input type and Measuring range	K (-50~+1300°C), E (0~800°C), J (0~1000°C), N (0~1300°C), Pt100 (-200~+600°C)	
Decimal point	0,0,0	
Response time	≤ 0.5 sec. (when digital filter parameter InF=0)	
Control mode	one-stop regulating, Intelligent Fuzzy PID algorithm	
Control output	PCE-RE21R	Relay output 3A / 250V AC; 5A / 30V DC
	PCE-RE21S	SSR output 12V DC / 50mA (Used to drive SSR)
	PCE-RE21T	Triac output NO TRIAC 1A / 250V AC
Electromagnetic compatibility (EMC)	IEC61000-4-4 (Electrical Fast Transient Burst) ± 4 KV / 5KHz; IEC61000-4-5 (Surge), 4KV	
Isolation withstanding voltage	Between power relay contact or signal terminals ≥ 2300 V DC; between isolated electroweak terminals ≥ 600 V	
Operating Ambient	Temperature: 0~60 °C; Humidity $\leq 90\%$ RH	

4 Front Panel Description

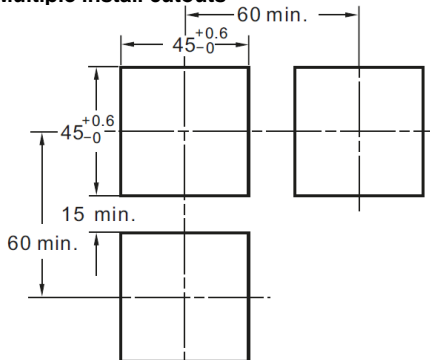


1. No. 1 display, PV or specified parameter
2. No. 2 display, SP or specified parameter value
3. Temperature unit: °C/°F
4. Operation indicators:
OUT indicators, AL 1 indicator, AL2 indicators
5. Setup key: For accessing parameter table and conforming parameter modification
6. Enter key: For confirm and change to another Parameter
7. Data shift key
8. Data decrease key
9. Data decrease key

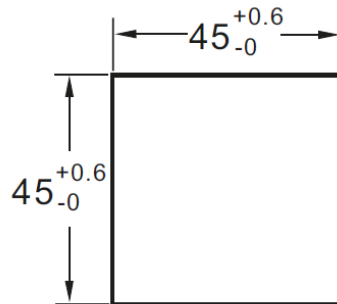
5 Size






Multiple install cutouts






Single install cutout



6.2 Set value setting

In the basic display state, press  ,  ,  key can directly modify the given value.

6.3 “At”PID parameter auto-tuning


Press  and hold for 2 seconds, the At parameter appears, "At" parameter "OFF" is set to "ON" and then press the  key to confirm instrument can start the implementation of the autotuning. Given function, the instrument in the basic display state display will flash the word "At", the instrument after 2 oscillation cycle ON-OFF control can automatically calculate the PID parameters. If you want to advance to give up auto-tuning , "At" parameter "ON" is set to "OFF" and then press  key to confirm.

Given tuning parameter values obtained are not identical, to perform auto-tuning function, should be first given value set in the most commonly used value or middle value, if the system is good insulation properties of the furnace, the given value should be set in the system uses the maximum, and then Execute the start of the operation of auto-tuning function. Reasons to learn, auto-tuning after the initial use, the effect may not be the best, you need a period of time (usually the same time auto-tuning control) before they can get the best results.


7 Parameter list and function

7.1 Field parameters

In the basic display state, press and hold  key 2 seconds, enter the field parameters,

Parameter code	Meaning of parameters	Explain	Setting range
HAL1	AL1 high limit alarm value	“HAL1” is the absolute value alarm or deviation value alarm, by “ALtd” parameter definition. When the value set to Max. will disable this function. (3200)	-999~+32000
LAL1	AL1 low limit alarm value	“LAL1” is the absolute value alarm or deviation value alarm, by “ALtd” parameter definition. When the value set to Min. will disable this function. (-999)	
HAL2	AL2 high limit alarm value	“HAL1” is the absolute value alarm or deviation value alarm, by “ALtd” parameter definition. When the value set to Max. will disable this function. (3200)	
LAL2	AL2 low limit alarm value	“LAL1” is the absolute value alarm or deviation value alarm, by “ALtd” parameter definition. When the value set to Min. will disable this function. (-999)	
Srun	running state	run:Run control state StoP:Stop state, No.2 display flashing display "StoP".	run StoP
LOC	Parameter lock	LOC<9000, will automatically for 0, allowed to modify the SV Set Value. LOC≥9000, are not allowed to modify the SV Set Value. Set the LOC = 800, then press  key to confirm, can enter the following system parameters.	0~9999

7.2 Field parameter

In the field parameters, set Loc=800, then press the  key to enter the system parameters.

AHYS	Alarm hysteresis	Avoid frequent alarm on-off action because of the fluctuation of PV	0~2000
ALtd	Alarm mode	ALtd=0, AL1 is the deviation value alarm, AL2 absolute value alarm ALtd=1, AL1 and AL2 is the absolute value alarm. ALtd=2, AL1 and AL2 is the deviation value alarm.	0~2
CntL	Control mode	onoF: on-off control. For situation not requiring high precision. FPId: advanced artificial intelligence "FUZZY PID" control.	onoF FPId
orEv	Selection of heating refrigeration	onr: Reverse acting. Increase in measured variable causes a decrease in the output, such as heating control. ond: Direct acting. Increase in measured variable causes an increase in the output, such as refrigerating control.	onr ond
P	Proportional band	Proportional band in PID and APID control. Instead of percentage of the measurement range, the unit is the same as PV. Generally, optimal P, I, D and CP can be obtained by auto tuning. They can also be manually inputted if you already know the correct Values.	1~32000
I	Integration time	Integration time	1~9999 seconds
d	Differential time	No derivative effect when d=0	0~3200 seconds
CP	Control cycle	CP reflect the instrument operator to adjust the speed, the size of the CP that affect the control accuracy. With SSR, SCR output control cycle preferable to shorter, usually 0.5-3.0 Seconds. The relay switch output is generally in 15-40 sec. When the output relay switches, the CP will be limited to 3 seconds, and self-tuning At will automatically set the CP as the appropriate value, taking into account the control accuracy and mechanical switch life. When the control mode CntL = onoF, the action of the CP as an output disconnect or power-on output ON Delay time.	0.2~ 300.0
HYS	Control hysteresis	HYS is used for on-off control to avoid frequent on-off action of relay. For a reverse acting (heating) system, when PV > SV, output turns off; when PV<SV-HYS, output turns on. For a direct acting (cooling) system, when PV<SV, output turns off; when PV>SV+HYS, output turns on.	0~200.0
Int	Input Signal	Input spec: K, E, J, N, Pt (Pt100)	
dp	Decimal point	0 (no decimal), 0.0 (one decimal place).	0 0.0

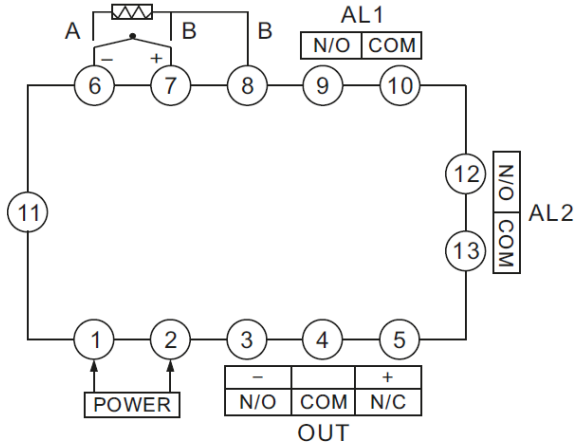
SC	Input Shift Adjustment	Sc is used to shift input to compensate the error caused by transducer, input signal, or auto cold junction compensation of thermocouple. PV after compensation=PV before compensation + Sc It is generally set to 0. The incorrect setting will cause measurement inaccurate.	-199.9~ +400.0
InF	PV input filter	The value of InF will determine the ability of filtering noise. When a large value is set, the measurement input is stabilized but the response speed is slow. Generally, it can be set to 1 to 3. If great interference exists, then you can increase parameter "InF" gradually to make momentary fluctuation of measured value less than 2 to 5. When the instrument is being metrological verified, "InF" s can be set to 0 or 1 to shorten the response time.	0~40
dU	Temperature Unit select.	°C : celsius equals °F : fahrenheit equals	°C °F
SvL	Low limit of SV	Minimum value that SV is allowed to be.	-999~ +3200
SvH	Upper limit of SV	Maximum value that SV is allowed to be.	

8 Default settings

Parameter code	factory setting	Parameter code	factory setting	Parameter code	factory setting
HAL1	3200	CnEL	FPI d	dP	0
LAL1	-999	orEU	onr	Sc	0
HAL2	3200	P	25	InF	2
LAL2	-999	l	200	dU	°C
SrUn	rUn	d	500	SPL	-99
Loc	0	CP*		SPH	999
RHY5	2	HYS	2		
RLtd	0	Int	P		

* solid state relay output type CP factory is set to 20 ,
the relay contact output type CP factory set to 150 .

9 Wiring diagram



10 Note

(1) Can not normally display measured values in the display window alternating show: "orAL" character, indicating that the input of the measurement signal abnormalities or Out of range; check Int parameter settings, and then the input sensor signals are the same category, if it is determined the same, check the input sensing Signal not pick the wrong line, if it is determined to not pick the wrong line, check whether the sensor problem, replace another sensor to try.

(2) The instrument used by the local environmental temperature and humidity can not exceed the scope of the provisions, the instrument around should allow sufficient space for heat dissipation, instrument internal temperature rise due to thermal radiation will lead to a result of the measurement accuracy and service life of the affected. In this Case, to be taken to a forced cooling fan or other measures to reduce the ambient temperature.

(3) the extension or connection then the thermocouple leads should be used with the thermocouple type to match the compensation conductor; extend or connect the thermoelectric Resistance of the lead, you should use the minimal resistance of the wire and cable away from power lines and load connection, in order to avoid signal interference.

11 Warranty

You can read our warranty terms in our General Business Terms which you can find here: <https://www.pce-instruments.com/english/terms>.

12 Disposal

For the disposal of batteries in the EU, the 2006/66/EC directive of the European Parliament applies. Due to the contained pollutants, batteries must not be disposed of as household waste. They must be given to collection points designed for that purpose.

In order to comply with the EU directive 2012/19/EU we take our devices back. We either re-use them or give them to a recycling company which disposes of the devices in line with law.

For countries outside the EU, batteries and devices should be disposed of in accordance with your local waste regulations.

If you have any questions, please contact PCE Instruments.





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