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AUBER SYL PID TEMPERATURE CONTROLLER
INSTRUCTION MANUAL

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Version 3.4
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WARNING

• Wiring precautions
-Install an external protection circuit if failure of this instrument could result in damage to your system. Bimetal thermostat or thermo fuse are the most common method for extra protection
-In order to prevent instrument damage or failure, protect the power line and the input/output lines from high currents by using fuses with appropriate ratings.
- When using solid state relay (SSR) for heater switching, proper heat sink is needed for heat dissipation from SSR when current is more than 10 A.. SSR will need very fast blowing fuse (such as an I^2t fuse) for protection.

• Power supply
-Supply power of the specified rating.
-Do not turn on the power until all of the wiring is completed.
-Never use this instrument in the presence of inflammable gases or vapor.
-In order to prevent electric shock or burns, never touch the inside of the instrument.
-Do not attempt to modify this instrument.

• Maintenance
-Only authorized service engineers should replace parts.
-In order to use this instrument continuously and safely, conduct periodic maintenance. Some parts used in this instrument have a limited service life and may deteriorate over time.

1. Brief Introduction

The AUBER intelligent temperature controller is a high performance, highly reliable, intelligent PID controller. It can be used for a variety of applications such as the automatic control of temperature, flow rate, pressure, and fluid level.

Features
- Supports 18 different types of input devices which can be selected from the keypad.
- A combination of fuzzy logic and traditional PID, the control is rapid, smooth, and has an advanced auto-tuning system.
- Dual Alarms outputs are standard for all models.
- Optional 32 steps ramp/soak function

2. Specification

- Input type:
  Thermocouple: K, S, WRe (5/26), T, E, J, B, N
  Resistance temperature detector: Pt100, Cu50,
  DC voltage: 0~5V, 1~5V, 0~1V, -100~100mV, -20~20mV, -5~5V, 0.2~1V.
  DC current (external shunt resist needed): 0~10mA, 1~20mA, 4~20mA.
- Input range:
  Please see section **6.8** for detail..
- Measurement accuracy:

0.2%Full scale: RTD, linear voltage, linear current and thermocouple input with ice point compensation or Cu50 copper compensation.
0.2%Full scale or ±2° C: thermocouple input with internal automatic compensation.

Note: for thermocouple B, the measurement accuracy of ±0.2% can only be guaranteed when input range is between 600~1800° C.

- Response time ≤ 0.5s (when FILT=0)
- Resolution: 1°F (°C), 0.1°C.
- Control mode:
  Fuzzy logic enhanced PID control and auto tuning (PID).
  On-off control mode (dead band adjustable)
  Manual control mode.
- Output mode (modular)
  Relay contact (NO): 250VAC/7A, 120V/10A, 24VDC/10A
  SSR voltage output: 12VDC/30mA
- Alarm output: Relay contact. 250VAC/1A, 120VAC/3A, 24V/3A
- Alarm function: Process high alarm, process low alarm, deviation high alarm, and deviation low alarm.
- Manual function: AUTO/MAN bump less transfer
- Power supply voltage rating: 85~264VAC/50~60Hz.
- Power consumption: ≤5W
- Ambient temperature: 0~50° C, 32~122° F
- Front panel dimension: 48 x 48 mm (1/16 DIN)
- Panel cutout dimension: 45 x 45 mm (1.775" x 1.775")

3. Model Code

Check whether the delivered product is as specified by referring to the following model code list.

SYL- [1] [2] [3] [4] [5]

[1] Controller size
1. 1/32 DIN (24 x48 mm)
2. 1/16 DIN (48 x 48 mm)
4. ¼ DIN (96 x96 mm)

[2] Alarm Output Mode
0. No alarm
1. With single alarm output: Alm1 is deviation high alarm (or process high alarm).
2. With single alarm output: Alm1 is deviation low alarm (or process low alarm).
3. With dual alarm outputs

[3] Control Output Mode
0. Two position Mode (ON/OFF mode), relay contact output.
2. Three position mode (ON/OFF mode), two relay contacts output.
4. PID mode, relay contact output.
5. PID mode, logic level output for SSR.

[4] Input Type
1. RTD.
2. Thermocouple.
3. Voltage.
4. Current.

[5] Program Option
P. With 32 steps ramp/soak program.
R2. With RS232 interface.
R4. With RS485 interface.
Empty. Regular model without ramp/soak option

Note that the input type can be set by the user. Output modules, however, have to be installed by the factory.

4. Mounting

4.1. Cautions for mounting

(1) Select the mounting location as following:
- Air pressure: 86~106kPa
- Ambient temperature: 0~50°C
- Ambient Humidity: 45~85%RH

(2) Select a mounting location that avoids the following:
- Rapid changes in ambient humidity which may cause condensation.
- Corrosive or inflammable gases.
- Direct vibration or shock to the mainframe.
- Water, oil, chemicals, vapor or steam splashes.
- Excessive dust, salt or iron particles.
- Direct air flow from an air conditioner.
- Should be used indoors where the system is not exposed to direct sunlight.
- Ventilate well enough so that heat does not accumulate.

4.2. Mounting Procedure

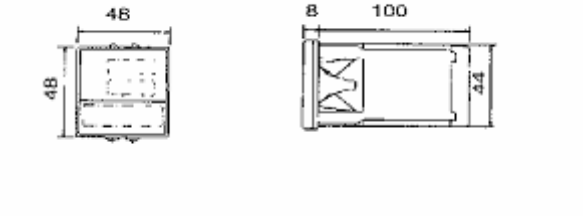
(1) Make a rectangular cutout corresponding to the number of controllers to be mounted on panel by referring to the panel cutout dimensions.

Model	Panel dimension H XB	Case dimension hXbXL	Cutout dimension h' Xb '
SYL-2	48X48 mm	44X44X100 mm	(44+1) X(44+1) mm
SYL-4	96x96 mm	91X91X100 mm	(91+1) X(94+1) mm

(2) When mounting more than one instrument, the horizontal distance between cutouts should be greater than 25mm and the vertical distance greater than 30mm.

(3) Insert the controllers into the panel from the front.

(4) Insert mounting bracket from back of the controller and push it until its teeth are engaged with the teeth on the controller and controller is tight.



5. Wiring

5.1. Cautions for wiring

(1) For the thermocouple input, use the specified compensation wire.

(2) For RTD input, use leads with low resistance and having no resistance differences between the 3 leads. If the RTD only has two wires, terminal 3 and 4 must be shorted together.

(3) Keep input signal wiring away form instrument power, electric equipment power, and load lines in order to avoid noise induction.

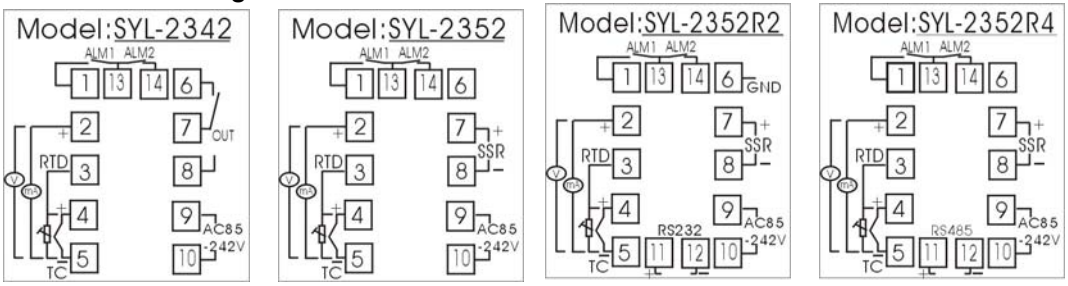
(4) When using ungrounded thermocouple sensor that is in touch with a large conductive subject, the electromagnetic field picked up by the sensor tip might be too large for the controller to handle, the temperature display will change erratically. In that case, connecting the shield of thermocouple to terminal 5 (circuit ground of the controller) might solve the problem. Another option is to connect the conductive subject to terminal 5.

(5) If the instrument power wiring cannot be positioned in such a way that noise from the equipment power cannot be avoided, a filter will be necessary.
- To obtain a satisfactory noise filter effect, select the most suitable type after due considerations of instrument power supply voltage and filter frequency characteristics.
- Shorten the distance between twisted power supply wire pitches in order to reduce noise introduction between the filter and instrument.
- Both the noise filter and instrument should be installed on panels that are grounded to the output side of the filter.

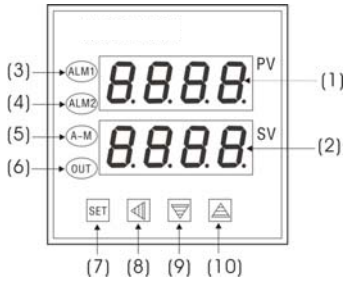
• Do not install fuses and/or switches on the filter output side since this may reduce its effectiveness.

(6) The power supply wires should be insulated and rated for 600V.
(7) This controller has no internal fuse. Therefore, install a fuse close to the instrument when it is needed. (Recommend fuse rating: 250V 1A Slow Blow)
(8) Do not fasten the screws too tightly. (screw type M3X6, recommended tighten torque: 0.4Nm)

5.2 Terminal configuration

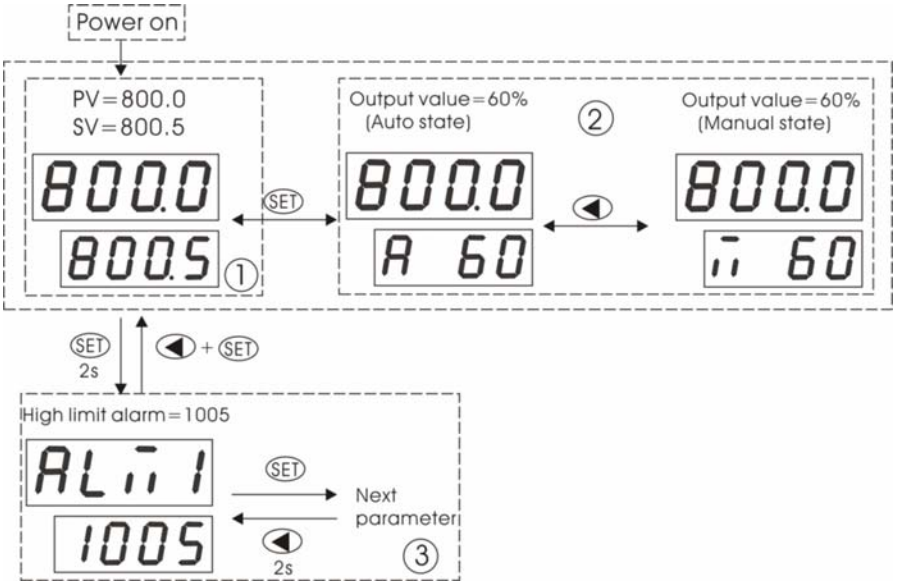


6. Front Panel and Operation



(1) PV display: Indicates the process variable (PV).
(2) SV display: Indicates the setting value (SV) or output value (%).
(3) ALM1 indicator: When ALM1 output is ON, a red LED lights up.
(4) ALM2 indicator: When ALM2 output is ON, a red LED lights up.
(5) A-M indicator: When Manual adjustment is ON, a green LED lights up. For the controller with Ramp/Soak option, this light indicates that the operation has started.
(6) OUT indicator: When OUT is ON, a green LED lights.
(7) Mode key (SET)
When pressed momentarily, it switches the lower (SV) display between set value and percentage of output (% output). When pressed and held for two seconds will put the controller into parameter setting mode.
(8) Data shift key or Auto/Manual function key (A/M)
(9) Decrement key V: Decreases numeric value of the setting value.
(10) Increment key Λ: Increases numeric value of the setting value.

6.1. Display Status



When the power is turned on (1), the upper display window shows the measured value (PV) and the lower window shows the four-digit set point value.

Press the SET key to change the display status into mode (2)., The output value will be displayed in the lower display window. (1) and (2) are the basic status of the instrument. During the basic status mode, "SV" display window will indicate certain states of the system as follows:

- If the input measurement signal goes beyond the acceptable range (caused by incorrect setting of the sensor spec. or open (short) circuit), "orAL" will be displayed with blinking. Then the instrument terminates its control function automatically, and the output value is fixed according to the parameter outL.
- When alarm is on, it will display "ALM1", "ALM2", "Hy-1", or "Hy-2", which indicates process high alarm, process low alarm, deviation high alarm, and deviation low alarm.

6.2 Basic Operation

6.2.1 Change set value (SV)

Press the ▼ or ▲ key once and release it. The decimal point on the lower right corner will start to flash. Then press the ▼ or▲ key to change SV until the desired value is displayed. There is no need to press the SET key as the decimal point will stop flashing after no keys are pressed for 3 seconds. If the change of SV is large, press the (A/M) key to move the flashing decimal point to the desired digit that needs change. Then press the ▼ or▲ key to change SV starting from that digit.

6.2.2 Display transfer

Press the SET key to change the display status. The display can be transferred between display status (1) and display status (2).

6.2.3 Man/Auto mode switch

Bumpless switching between AUTO and MAN can be performed by pressing the A/M key. The A-M LED will light up when the controller is in Manual mode. In Manual mode, the output amplitude can be increased or decreased by pressing Λ and V (display status 2).

Please note that manual control is initially disabled (A/M setting equal to 2) because most users do not use manual control. To activate the manual control, set A/M=0 or 1.

6.2.4 Parameter Setup Mode

If the instrument is on its basic display status ((1) or (2)), press SET and hold for about 2 seconds until the parameter setup menu is displayed (display status (3)). Use V and Λ modifies a

digit and A/M selects which digit to modify. Hold down (A/M) and press SET to exit the parameter setup mode. The instrument will also exit if no key is pressed for about 10 seconds.

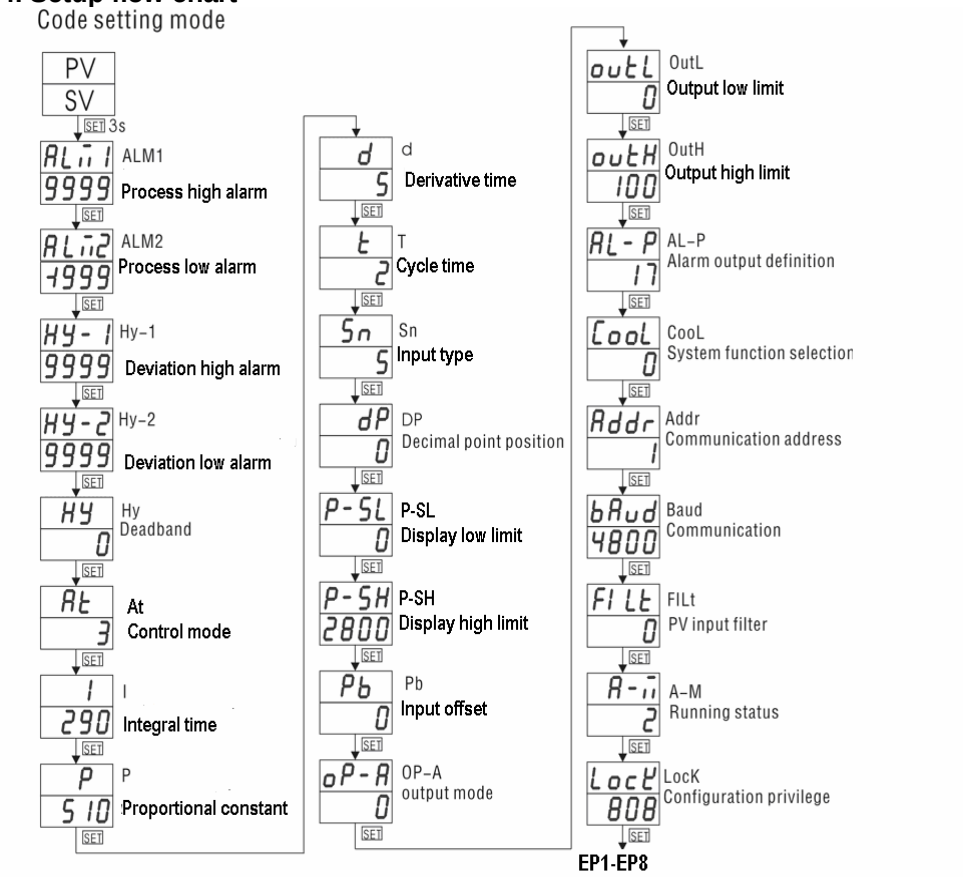
Remarks: 1. The changed parameter will be automatically registered without pressing the SET key.

2. If the controller is locked, only limited parameters (or no parameters) can be changed.

6.3 Fuzzy Logic enhanced PID control and auto tuning

For the first time user, it is a good idea to use the auto tuning feature to let the controller automatically determine the PID constants. The auto-tune can be started in two ways. 1) set the At=2. It will start automatically after 10 seconds. 2) Set At=1. Then you can start the auto-tune any time during the normal operation by pressing the A/M key. During auto tuning, the instrument executes on-off control. After 2-3 times on-off action, the microprocessor in the instrument will analyze the period, amplitude, waveform of the oscillation generated by the on-off control, and calculate the optimal control parameter value. The instrument begins to perform accurate artificial intelligence control after auto tuning is finished. If you want to exit from auto tuning mode, press and hold the (A/M) key for about 2 seconds until the blinking of "At" symbol is stopped in the lower display window. Generally it will meet you need to perform auto tuning one time only. After the auto tuning is finished. The instrument will set parameter "At" to 3, which will disable triggering of auto-tuning with the (A/M) key. This will prevent an accidental repeat of the auto-tuning process.

6.4. Setup flow chart



6.5 Parameter Setting

Code	Description	Setting Range	Initial Setting	Remarks
ALM1	Process high alarm	-1999~+9999 °C or °F	100	
ALM2	Process low alarm	-1999~+9999 °C or °F	50	
Hy-1	Deviation high alarm	0~9999 °C or °F	9999	
Hy-2	Deviation low alarm	0~9999 °C or °F	9999	
Hy	Dead band	0~20 or 0~2000 °C or °F	0.3	
At	Auto tuning	0~3 see text for details	3	Set to 1 or 2 to start auto tuning
I	Integral time	0~9999	1000	
P	Proportional Constant	1~9999 %	500	
d	Derivative Time	0~2000	120	
t	Cycle rate	0~125	2 for SSR, 4 for relay	
Sn	Input type	0~37 see text for details	0 (K type thermal couple)	
dP	Decimal point position	0~3 see text for details	0	
P-SL	Display low limit	-1999~+9999 °C or °F	-100	
P-SH	Display high limit	-1999~+9999 °C or °F	2500	
Pb	Input offset	-1999~+4000 -1999~+9999 °C or °F	0.0	
OP-A	Output mode	0~2 see text for details	0	
OUTL	Output low limit	0~110 %	0	
OUTH	Output high limit	0~110 %	100	
AL-P	Alarm output definition	0-17 see text for details	17	
COOL	System function selection	0~15 see text for details	10	For heating and °F display
Addr	Communication address	0~100	1	For RS232 and RS485 model
bAud	Communication baud rate	0~19200	4800	For RS232 and RS485 model
FILT	PV input filter	0~20	0	
A-M	A-M status	0. Manual 1. Automatic 2. Manual suppressing	2	Manual control is disabled. Set to 1 to activate.
Lock	Configuration privilege	0~9999	808	All parameters are unlocked
EP1-EP8	Field parameter definition	nonE ~ A-M	nonE	To be defined by user

6.5.1 Alarm parameter "ALM1", "ALM2", "Hy-1", "Hy-2"

These 4 parameters set instrument's alarm function. Alarm signal will be triggered to make instrument's relay contact close, if alarm condition is satisfied. Alarm messages is displayed in turn in SV display window. When the cause of alarm is removed, then the alarm is cleared automatically.

Alarm condition is following:

- **ALM1**: High limit absolute alarm. If the process value is greater then the value specified as "ALM1+Hy" (Hy is the dead band), then the alarm is set. It turns off when the process value is less than "ALM1-Hy".

- **ALM2**: Low limit absolute alarm. If the process value is less than the value specified as "ALM2+Hy", then the alarm is set, and the alarm will be cancelled if the process value is great than "ALM2-Hy".
- **Hy-1**: Deviation high alarm. If PV minus SV is greater than the value specified as "Hy-1 +Hy", the alarm is set, and the alarm will be cancelled if the process value is less than the value of "Hy-1 -Hy". It also used as the second high limit alarm in on-off control.
- **Hy-2**: Deviation low alarm. If PV minus SV is less than the value specified as "Hy-2 +Hy", the alarm is set, and the alarm will be cancelled if the process value is great than the value of "Hy-2 -Hy". It also used as the second high limit alarm in on-off control.

6.5.2 Dead band parameter "Hy"

The dead band parameter Hy permits protection of position control output from high switching frequencies caused by process input fluctuation. Dead band parameter is used for on/off control, 4-alarm control as well as the position control at auto tuning.

For example: Hy parameter can affect upper absolute alarm as the following, provided upper alarm parameter "ALM1" is set as 800 ºF, Hy parameter is set as 2.0 ºF.

- Instrument is in normal status at the beginning, when process value is greater than 802 ºF (ALM1+Hy), the upper absolute alarm can be triggered.
- Instrument is in upper alarm status at the beginning, when process value is less than 798 ºF (ALM1-Hy), the alarm can be cleared

6.5.3 Control mode parameter "At"

At=0 ON OFF control, suitable for the applications which don't need high precision.
At=1 Get the controller ready to start the Auto tuning by pressing the A/M key.
At=2 Start auto tuning. The function is the same as starting auto tuning from front panel.
At=3 this configuration is automatically set after auto tuning is done. Auto tuning from the front panel is inhibited to prevent accidental re-starting of the auto tuning process. To start auto tuning again, set At=1 or At=2.

6.6. Control action explanations

6.6.1 PID

Please note that because this controller uses fuzzy logic enhanced PID control software, the definition of the control constants (P, I and d) are different than that of the traditional proportional, integral, and derivative parameters. For the first time user, we strongly suggest you use the Auto Tuning function to set the PID parameters first (see 6.3). If the auto tuning result is not satisfactory, you can manually fine-tune the PID constant for improved performance.

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(1) Proportional constant "P"

Please note the P is not defined as Proportional Band as in the traditional model. Its unit is not degrees. The larger constant results in larger and quicker action, which is the opposite of the traditional proportional band value. It also functions in the entire control range rather than a limited band.

If you are controlling a very fast response system (>1F/second) that fuzzy logic is not quick enough to adjust, set P=1 will change the controller to the traditional PID system with a moderate gain for the P.

(2) Integral time "I"

Integral action is used to eliminate offset. Larger number means slower action. When temperature fluctuates regularly (system oscillating), increase the integral time. Decrease it if the controller is taking too long to eliminate the temperature offset. When I =0, the system becomes a PD controller.

(3) Derivative time "D"

Derivative action can be used to minimize the temperature over-shoot by responding to its rate of change. The larger the number, the faster the action.

6.7 Cycle time “t”

Parameter T can be set between 0.5 to 125 seconds (t=0 represent 0.5 second). It represents the speed at which the output is turned on and off. When the output device is a mechanical relay, the cycle time should be set >4 second. To increase the service lifetime, it is recommended to set it between 20.0~60.0 seconds. However, longer time might reduce the accuracy of the control in a fast responding system. When the output is logic level that controls a SSR, the cycle time can be set at 2 seconds or less for better performance.

6.8 Input selection “Sn”

Sn	Input device	Display range (ºC)	Display range (ºF)
0	K	-50～+1300	-58～2372
1	S	-50～+1700	-58～3092
2	WRe (5/26)	0～2300	32～4172
3	T	-200～350	-328～662
4	E	0～800	32～1472
5	J	0～1000	32～1832
6	B	0～1800	32～3272
7	N	0～1300	32～2372
20	Cu50	-50～+150	-58～302
21	Pt100	-200～+600	-328～1112
26	0～80Ω	-1999～+9999 Defined by user with P-SL and P-SH	
27	0～400Ω		
28	0～20mV		
29	0～100 mV		
30	0～60 mV		
31	0～1V		
32	0.2～1V 4-20mA (w/ 50 Ω Resistor)		
33	1～5V 4～20mA (w/ 250Ω Resistor)		
34	0～5V		
35	-20～+20mV		
36	-100～+100mV		
37	-5V～+5V		

6.9 Decimal point setting parameter “dP”

1) In case of thermocouple or RTD input, dP is used to define temperature display resolution.

dP=0, temperature display resolution is 1 ºC (ºF).

dP=1, temperature display resolution is 0.1 ºC . **Please note that 0.1 degree resolution is only available for Celsius display. It is not available for Fahrenheit for this model.**

Adjustment of this parameter only affects the display, and gives no effect on control or

retransmission output because the internal temperature measurement resolution is fixed at 0.1 ° C. The temperature will be displayed at the resolution of 0.1 °C for input below 1000 °C and 1°C for input over 1000°C .

2) For linear input devices:

dP=0, display 0000 format.

dP=1, display 000.0 format.

dP=2, display 00.00 format.

dP=3, display 0.000 format.

6.10 "P-SH" and "P-SL":

P-SL is the set point low limit, and P-SH is the high limit.

1) For linear input devices, "P-SH" and "P-SL" are used to define the display span.
2) For TC or RTD input, they define the set value range.

6.11 Input offset "Pb"

Pb is used to make input offset to compensate the error produced by sensor or input signal itself. "Pb" is used to make input shift to compensate the error produced by measurement.

Example: If the temperature probe is measuring 5°C in ice water, it For example, provided that the input signal remains unchanged, if parameter "Pb" is set to 0.0°F, the temperature measurement of the instrument is If the instrument probe is measuring 500.0 °F when "Pb" is set to 0.0 degrees, then when "Pb" is set to 10.0 °F, the instrument will read 510.0 °F.

6.12 Output definition parameter "OP-A"

Parameter OP-A is used to define the mode of the main output signal, and must match the module type installed as the main output. The user should not change it.

- **OP-A=0**, time-proportional output (All SYL controllers use this mode).
- **OP-A=1**, linear current output.
- **OP-A=2**, Position proportional output.

6.13 Alarm output definition parameter "AL-P"

Parameter "AL-P" may be configured in the range of 0 to 63, and used to define which alarms ("ALM1", "ALM2", "HY-1" and "HY-2") is output to AL1 or AL2. Its function is determined by the following formula:

AL-P=AX1+BX2+CX4+DX8+EX16

If A=0, then AL2 is activated when Process high alarm occurs;
If A=1, then AL1 is activated when Process high alarm occurs;
If B=0, then AL2 is activated when Process low alarm occurs;
If B=1, then AL1 is activated when Process low alarm occurs;
If C=0, then AL2 is activated when Deviation high alarm occurs;
If C=1, then AL1 is activated when Deviation high alarm occurs;
If D=0, then AL2 is activated when Deviation low alarm occurs;
If D=1, then AL1 is activated when Deviation low alarm occurs;

If E=0, then alarm types, such as "ALM1" and "ALM2" will be displayed alternatively in the lower display window when alarm occurs. This makes it easier to determine which alarms occurred.

If E=1, then alarm types, will not be displayed in the lower display window (except for "orAL"). Generally this setting is given when the alarm output is used for control purposes.

For example: In order to activate AL1 when a process high alarm occurs, trigger AL2 by a Process low alarm, Deviation high alarm, or Deviation low alarm, and not show the alarm type will in the lower display window, set A=1, B=0, C=0, D=0, and E=1. Parameter "AL-P" should be configured to:

AL-P=1X1+0X2+0X4+0X8+1X16=17 (this is the factory default setting)

Note: Unlike some of the controllers that can be set to only one type alarm (either absolute or deviation but not both at same time), this controller allows both type of alarm functions simultaneously. If you only want one type of alarm to function, set the other type alarm parameter to maximum or minimum (ALM1, Hy-1 and Hy-2 to 9999, ALM2 to –1999) to stop its function.

6.14 COOL setting

Parameter “COOL” is used to set some system functions

COOL=AX1 +BX2+CX4+DX8

A=0, reverse action control mode for heating control.

A=1, direct action control mode for cooling control.

B=0, without alarm suppressing when turned on or when set point changes.

B=1, alarm suppressing at power up or set point changes.

C=0, auxiliary function module of the instrument works as communication interface (not applicable for this model)

C=1, auxiliary function module of the instrument works as linear current output. (not applicable for this model)

D=0, display unit in °C.

D=1, display unit in °F.

The factory setting is A=0, B=1, C=0, and D=1 so

COOL=0X1+1X2+0X4+1X8=10

To change from Fahrenheit to Celsius display, set COOL=2

6.15 Input digital filter parameter “FILT”

If measurement input fluctuates due to noise, then a digital filter can be used to smooth the input. “FILT” may be configured in the range of 0 to 20. FILT=0 means no filter. FILT=20 is for the maximum filter with lowest noise but slow response time.

6.16 System parameter “A-M”

Parameter A-M is used to define auto/man be working status as below.

- **A-M=0**, manual control state
- **A-M=1**, automatic control state
- **A-M=2**, automatic control state, in this state manual operation is prohibited. When the A/M key is pressed, it will not switch between automatic and manual control. This parameter functions differently for controllers with the ramp/soak function (see supplemental manual for details).

6.17 Parameter Lock

If parameter **LocK** is set to other values than 808, then only field parameters 1 through 8 and parameter **LocK** itself can be changed. When parameter **LocK** is set to 808, the user can set all parameters.

- Parameter **LocK** provides several operation privileges. See the following:
- **LocK=0**, modification field parameters and set point is allowed.
- **LocK=1**, allowed to display and view field parameters, and to set point. But the modification of field parameters (except parameter LocK itself) is not allowed.
- **LocK=2**, allowed to display and view field parameters, but the modification of field parameters and set point (except parameter LocK itself) is not allowed.
- **LocK=808**, configuration of all parameters and set point is allowed.
- If **LocK** is set to other values than the above mentioned, the result may be one of those above mentioned, and most of them are the same as when LocK=1 is set.
- If you set **LocK** to be 808 during field parameter (EP1-EP8) setting, parameter LocK will automatically be changed to 0 when you finish setting the field parameter, but if you set LocK to 808 after the parameters are unlocked, parameter LocK will be saved as 808 permanently.

6.18 Field parameter definition: “EP1-EP8”

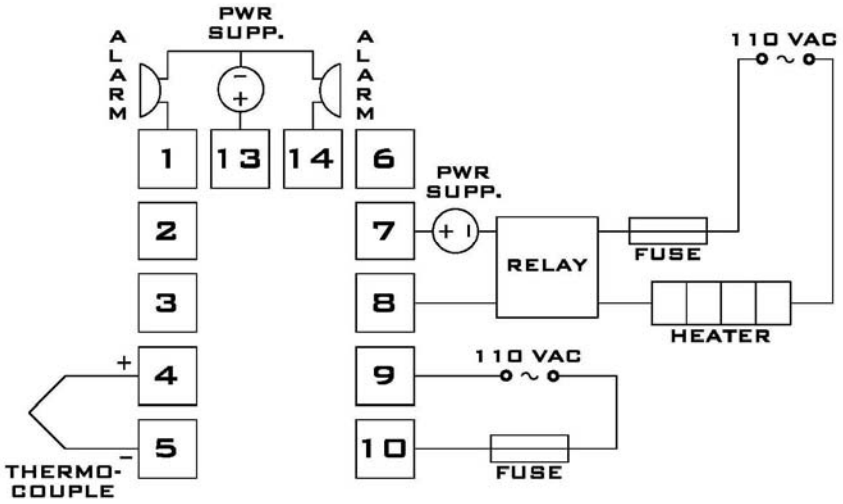
EP1-EP8 define 1-8 field parameters for operators’ use in parameter table. Their parameter values can be set to any parameters except parameter **EP** itself. When **LocK** is set to 0, 1, 2, and so on, only parameters or setting values of program defined in an **EP** can be displayed. Other parameters cannot be displayed or modified. This function can speed up parameter modification and prevent important parameters (like input, output parameters) from being modified accidentally.

Parameters from EP1 to EP8 can define 8 field parameters at most. If the number of field parameters is less than 8 the first unused parameter is defined as none. For example, if only ALM1 and ALM2 need to be modified by field operators, the parameter EP can be set as following:

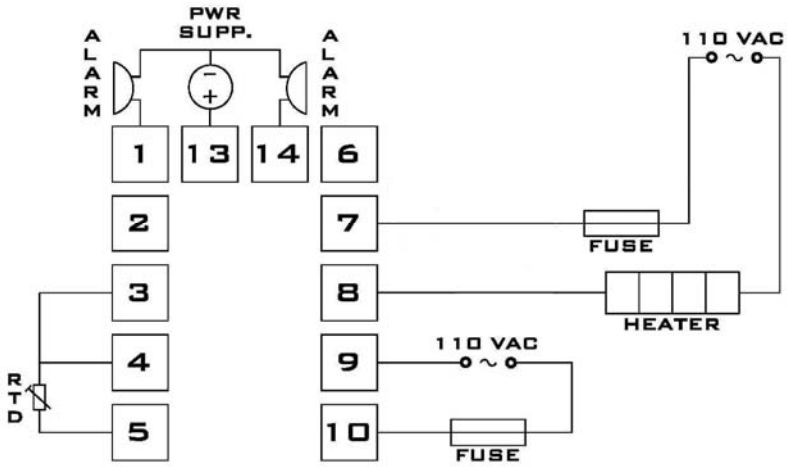
LocK=0, EP1=ALM1, EP2=ALM2, EP3=nonE.

If field parameters are not needed after the instrument is initially adjusted, simply set EP1 to nonE.

7. Wiring examples

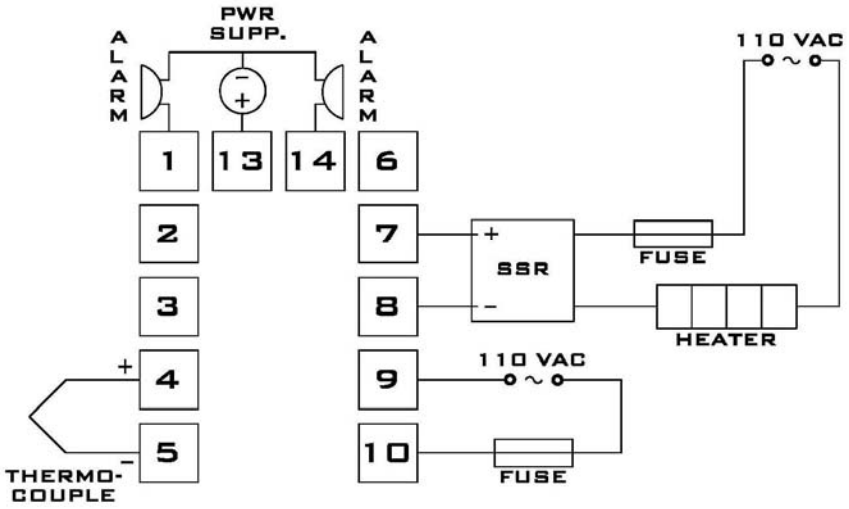


SYL-2342 and SYL-2342P with thermocouple input and external relay output. Please note that the internal relay output (terminal 7 and 8) has no power by itself. A “PWR SUPP” (power supply) must be used to drive the external relay. The voltage of the power supply needs to match the coil voltage of the external relay. The voltage of power supply for alarm outputs needs to match the requirement of the alarm used.



SYL-2342 and SYL-2342P with RTD input. When using two wires RTD, terminal 3 and 4 need to be connected together. The heater is driven by the internal relay of the controller directly. The

heater must consume less current than the internal relay's maximum rating (7A at 240VAC and 10 A at 120VAC).



SYL-2352 and SYL-2352P with thermocouple input. The fuse for SSR needs to be T square type or fast blow. Proper heating sink is needed when the SSR switching more than 10 A of current.