VC5H Hot-Runner Temperature Controller User's Manual

CE

Thank you for purchasing model VC5H series Hot runner Temperature Controller.
Before installing, connecting or using the controller, please go through this instruction manual carefully and use the unit in proper manner.

Alarm Messages

Displayed	Code	Description
- - -	- - -	Temperature Sensor Wire Breakage
tCr	TCR	Temperature Sensor Wire reversed connection
tCS	TCS	Temperature Sensor Wire short circuit
HtS	HTS	Heater short circuit
LPA	LPA	Control circuit abnormal
oLd	OLD	Overload
FSb	FSB	Fuse open circuit
EEP	EEP	EEPROM Error
H.	HI	Upper limit alarm
Lo	LO	Lower limit alarm
AtA	ATA	Ambient temperature alarm

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Features

- LCD Display Module
- One-key Start(Stop) / standby(Boost) function
- Built-in Buzzer
- Overvoltage protection, preventing burning of module resulting from faulty wiring
- Heater short-circuit protection
- Automatic detection of wire breakage of heater
- TRIAC short-circuit protection
- Detection against temperature wire breakage and reverse Troubleshooting of Temperature Sensor wiring.
- Blown Fuse detection
- Display function of current and output ratio.
- Two options for trigger output (phase/zero level)
- Smart SOFT START function
- Manual output in case of temperature sensor unusually
- Auto/Manual Selection Function
- PID Automatic Temperature Control
- Output percentage limit setting
- Two options of temperature sensor wire types (J/K)
- Two options of temperature unit (°C/°F)
- Six alarm options
- Temperature Range:

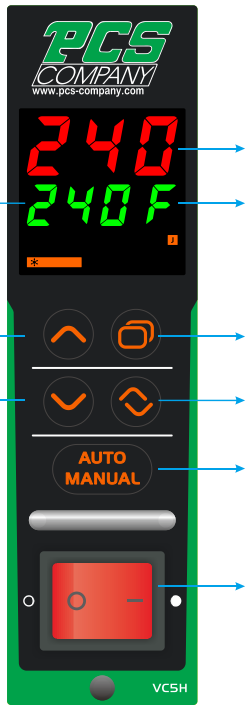
K type: 0~600°C(32~999°F) / J TYPE: 0~600°C(32~999°F)

- RS485 communication function: ASCII and RTU mode (Optional)

Specification

- Power Input: 230Vac ±10%, 50/60Hz
- Power Consumption: 230Vac: 3W
- Power Output: 3450W, 230Vac/15A
- Input Temperature Sensor: J/K type
- Temperature Control Range: 0~600°C / 32~999°F
- Control Accuracy: ±0.25%FS
- Measurement Accuracy: ±0.25%FS
- Storage Temperature: -20~70°C / -4~158°F
- Working Temperature: -10~50°C /14~122°F
- Humidity: 0~80%RH (no condensate)
- Output Method: Zero Level/Phase
- Fuse: Quick response ceramic 250Vac /20A 30mm
- Detection Function: Current/ Fuse open circuit/ TRAIC short-circuit
- Communication mode: RS-485 (Standard MODBUS), Optional
- Communication rate: 9600/19200/38400/57600/115200

Faceplate description



Setting/Output Percentage/ Current Value

Present Value

Unit

Increment Key

Decrement Key

Function Key

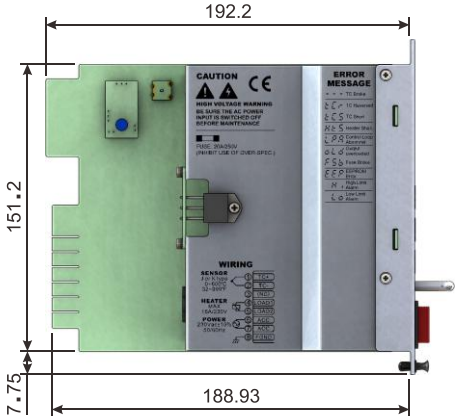
Set Key

Auto/Manual/Setting Value/Output Percentage/Current Mode Key

Power Switch

- Manual Output Indicator
- AT(Auto tuning) Indicator
- Soft Start Indicator
- Standby/Boost Indicator (Sparkling for Boost)
- K J Thermocouple Type
- Heater Output Indicator
- Alarm Indicator
- RS485 Communication Indicator

Faceplate appearance and dimension

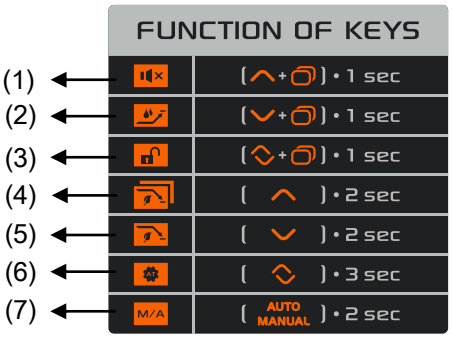


Unit: mm

RS-485 Communication Function (Option)

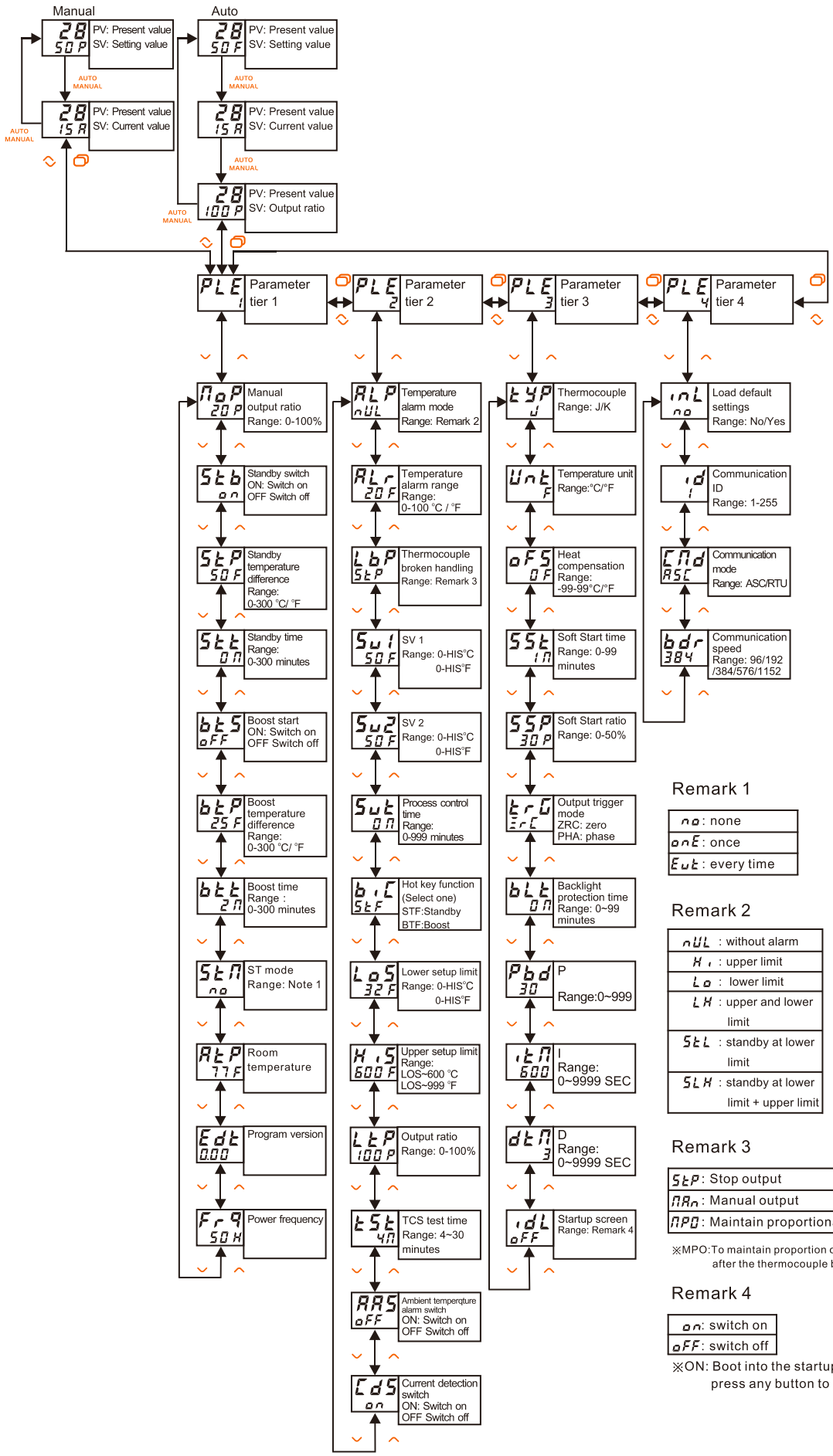
- Communication Mode: Modbus ASCII or RTU mode. (Default setting: ASCII)
- Communication baud rate: 9600/19200/38400/57600/115200 (Default setting: 38400)
- Communication ID: 1-250 (Default setting: 1)

Hot Keys



(1) Shut Buzzer
(2) Soft Start for de-moisture
(3) Password setting
(4) Multi Standby/Boost
(5) Single Standby/Boost
(6) Auto Tuning
(7) Manual / Auto

Parameter flow chart



Remark 1

no	none
onE	once
Eut	every time

Remark 2

nUL	without alarm
H i	upper limit
Lo	lower limit
LH	upper and lower limit
StL	standby at lower limit
SLH	standby at lower limit + upper limit

Remark 3

StP	Stop output
MAn	Manual output
MPO	Maintain proportional output

※MPO:To maintain proportion of output after the thermocouple broke.

Remark 4

on	switch on
oFF	switch off

※ON: Boot into the startup screen, then press any button to escape.

Control modes

1. Auto Mode: The Controller performs automatic PID control of the temperature according to set values.
2. Manual Mode: In some conditions (e.g., temperature sensor wire breakage), the controller allows manual adjustment of output percentage for maintaining the desired temperature.
3. Switchover method: [AUTO MANUAL] • 2 sec

SOFT START for de-moisture

To prevent burn out of heater element resulting from over-current caused by high moisture content in it, this Soft Start (de-moisture) function can be enabled so that low-current heating removes the moisture in the heater element for protection.

1. SOFT START conditions: Need to set Output Ratio for SOFT START (SST) and execution duration (SSP) when the present temperature is below 120°C/248°F and manual output and automatic calculation (PID). When setting is complete, it is necessary reset the machine and re-start the machine. SOFT START is disabled if SST is set to zero; SOFT START will not be activated when the machine is re-started.
2. Interrupting a SOFT START: [∨ + ▢] • 1 sec

Troubleshooting of Temperature Sensor

1. Hot runner molds, due to sophisticated structure and multiple temperature control stages, are prone to temperature sensor unusual problems (especially at the sprue gate) during the production process, resulting in interrupted production, and the machine has to be stopped for repair.
2. The VC5H provides an Open Circuit Control Mode which allows automatic switching over from Auto Operation to a Manual Output Mode (with a setting of Manual Output Ratio made in advance); this allows continuation of the production process without stopping the machine, until a production session is completed, before carrying out service.

Standby Function

In the event that the machine needs to be stopped temporarily, the plastic material remaining in the runner tends to deteriorate if left at a high-temperature for a long period of time. This Temperature Maintenance Function can be employed to lower the temperature and ensure the quality of the material. This function may be activated either by One-key Start/Stop or individual Start/Stop:

1. One-key-for-all Start/Stop Switching: [∧] • 2 sec

   (Dependent on the left most module.)
2. Individual Start/Stop function: [∨] • 2 sec

Boost Function

When the VC5H utilizes the sprue gate and the gate gets clogged, this function can be used to raise the temperature and to melt the clogged plastic and solve the blockage.

1. One-key-for-all Start/Stop Switching: [∧] • 2 sec

   (Dependent on the left most module.)
2. Individual Start/Stop function: [∨] • 2 sec

PS. Please refer to [Parameter tier 2] of flowchart for hot key function.

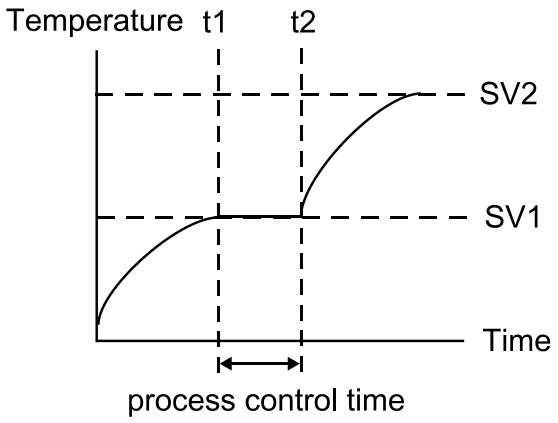
Over- load Protection

1. Normal Conditions: Actual current ≦15A
2. Error Status: When actual current becomes >17A, output will stop and an alarm will be activated.

PID Control Automation Algorism and Adjustment

1. ST: For the controller to calculate optima PID values for the heating system, carry out this PID Automation Algorism function at the initial use of the controller or when the heating system has been altered. On completion of the PID calculation, the controller will save the latest PID values into the internal memory and perform the optimal temperature control accordingly. (AT indicator flashing during operation)
2. Automatic PID Value Adjustment activation conditions:
   ■Temperature Setting (SV) -
   The present temperature(PV) must be > 30°C or 86°F.
   ■Present Temperature (PV) -
   When room temperature is < 30°C or 86°F.
   Adjustment will only be activated when both the above conditions are satisfied.
3. AT: In specific conditions where the ST calculation may not be activated or when the temperature fluctuates, the AT function calculates the rising curve and dropping curve of the remaining temperature for attaining the P. I. D. values for heating from the present value to the SV value and stop the heating. (AT indicator remaining lit during operation)
4. Soft Start and ST : Perform soft start, then execute AT or ST in accordance with the conditions chosen.

Process control



Wiring