

# Temperature Controller for Panel Mounting

## PID Controller, Dimensions 96 x 96 mm

### Model CS4L

WIKA Data Sheet AC 85.04

#### Applications

- Plant and industrial furnace construction
- Process engineering
- Plastics technology and processing
- Ventilation and air conditioning technology
- General industrial applications

#### Special Features

- Control characteristic adjustable (PID, PI, PD, P, ON/OFF)
- Integrated auto-tuning function
- Control output optionally relay, logic level or 4 ... 20 mA
- Multi-function input for Pt100, thermocouples and industry standard signals
- Optionally with 2nd alarm output, heater burnout alarm, 2nd control output, serial interface or transmitter supply



Temperatur Controller Model CS4L

#### Description

Model CS4L is a digital temperature controller for displaying, controlling and monitoring of temperatures.

The controller has a multi-function input, i. e. the input configuration is adjustable.

Thereby the flexibility of the controller is significantly increased, stock-keeping is simplified.

An alarm output for process value monitoring is also available as standard.

The control parameters can be set over wide ranges. An auto-tuning function can be activated, which makes it easier to find the ideal control parameters.

The controllers are designed for panel mounting.

The control output is alternatively equipped with a relay (for slow controls), with a logic level to drive a solid state relay (for fast controls and high current loads) or with an analogue current signal 4 ... 20 mA.

Optionally available are a 2nd alarm output for process value and control loop monitoring, a heater burnout alarm for supervising the manipulated variable, a 2nd control output, a 24-V transmitter supply and, instead of the standard parameter memory for a 2nd set value, a serial interface RS-485.

**Specifications**
**Model CS4L**

Display	
- Process value	7-segment LED, 4-digit, red, character size 18 mm
- Set value	7-segment LED, 4-digit, green, character size 12.6 mm
- Indication range	-1999 ... 9999
Input	
- Number and type	1 multi-function input for resistance thermometers, thermocouples and industry standard signals
- Input configuration	selectable via terminal configuration and menu-driven programming
- Resistance thermometers	Pt100, JPt100, 3-wire max. permissible resistance per wire: 10 $\Omega$
- Thermocouples	Type K, J, R, S, B, E, T, N, PL-II, C (W/Re5-26) max. permissible external resistance: 100 $\Omega$ at type B: max. 40 $\Omega$
- Standard signals	0 ... 20 mA, 4 ... 20 mA input resistance 50 $\Omega$ (external shunt, optionally available) max. permissible input current: 50 mA
	0 ... 1 V input resistance > 1 M $\Omega$ max. permissible input voltage: 5 V
	0 ... 5 V, 1 ... 5 V, 0 ... 10 V input resistance > 100 k $\Omega$ max. permissible input voltage: 15 V
- Measuring time	250 ms
Control output 1	3 different versions are possible
- Relay contact	load: AC 250 V, 3 A (resistive load) AC 250 V, 1 A (inductive load, $\cos \varphi = 0.4$ )
- Logic level	DC 0/12 V max. 40 mA (short-circuit proof) to actuate a solid state relay
{- analogue current signal}	DC 4 ... 20 mA, load max. 550 $\Omega$
Control characteristics	PID, PI, PD, P, ON/OFF (adjustable)
Control parameter	An auto-tuning function can be activated to find suitable control parameters.
- Proportional band	thermocouples: 0 ... 1000 $^{\circ}\text{C}$ resistance thermometers: 0.0 ... 999.9 $^{\circ}\text{C}$ standard signals: 0.0 ... 100.0 %
- Integral time	0 ... 1000 s
- Differential time	0 ... 300 s
- Cycle time	1 ... 120 s (not available with control output analogue current signal)
- Hysteresis	only available at ON/OFF control characteristic thermocouples and resistance thermometers: 0.1 ... 100.0 $^{\circ}\text{C}$ standard signals: 1 ... 1000 (the placement of the decimal point follows the input configuration)
{Control output 2} <sup>1) 2)</sup>	for three-step control alternatively equipped as relay contact, logic level or analogue current signal
- Relay contact	load: AC 250 V, 3 A (resistive load), AC 250 V, 1 A (inductive load, $\cos j = 0,4$ )
- Logic level	DC 0/12 V max. 40 mA (short-circuit proof) for solid state relay
{- analogue current signal}	DC 4 ... 20 mA, load max. 550 $\Omega$
- Proportional band	0.0 up to 10.0 times the proportional band of control output 1
- Integral time	identical with the integral time of control output 1
- Differential time	identical with the differential time of control output 1
- Cycle time	1 ... 120 s (not available with control output 2 analogue current signal)
- Overlap- /Dead band	thermocouples and resistance thermometers: -100.0 ... 100.0 $^{\circ}\text{C}$ standard signals: -1000 ... 1000 (the placement of the decimal point follows the input configuration)
- Hysteresis	only available at ON/OFF control characteristic thermocouples and resistance thermometers: 0.1 ... 100.0 $^{\circ}\text{C}$ standard signals: 1 ... 1000 (the placement of the decimal point follows the input configuration)

{ } Items in curved brackets are optional extras for an additional price.

1) From the options control output 2, alarm output 2 and heater burnout alarm only two options can be selected at the same time.

2) A combination of control output 2 and transmitter supply is not possible.

**Specifications  
(Continuation)**
**Model CS4L**

Alarm outputs	
- Alarm output 1	for process value monitoring (alarm type, switching mode, hysteresis and delay adjustable)
- {Alarm output 2} <sup>1)</sup>	alternatively for process value monitoring or control loop monitoring or process value and control loop monitoring with combined output
- {Heater burnout alarm} <sup>1)</sup>	for 1 phase heating systems (not available with control output analogue current signal) alternatively for max. 5 A, 10 A, 20 A or 50 A, current transformer is supplied with controller
- Relay contact <sup>3)</sup>	load: AC 250 V, 3 A (resistive load), AC 250 V, 1 A (inductive load, cos φ = 0.4)
{Parameter memory} <sup>4)</sup>	memory for a 2nd set value activated by short-circuiting of two connection terminals at the back of the controller
{Serial interface} <sup>4)</sup>	RS-485 The transfer rate is adjustable (2400 bps, 4800 bps, 9600 bps or 19200 bps).
{Transmitter supply} <sup>2)</sup>	DC 24 V ± 3 V, max. 30 mA
Power supply	AC 100 ... 240 V, 50/60 Hz (max. permissible 85 ... 264 V) or AC/DC 24 V, 50/60 Hz (max. permissible 20 ... 28 V)
Power consumption	approx. 8 VA
Ambient conditions	
- Ambient temperature	0 ... 50 °C
- Storage temperature	-20 ... +50 °C
- Humidity	35 ... 85 % relative humidity, non-condensing
Case	
- Material	polycarbonate, black
- Ingress protection	front: IP66, back: IP00 (per IEC 60529/EN 60 529)
- Mass	approx. 370 g
- Mounting	screw brackets for a panel thickness of 1 up to 15 mm

{ } Items in curved brackets are optional extras for an additional price.

1) From the options control output 2, alarm output 2 and heater burnout alarm only two options can be selected at the same time.

2) A combination of control output 2 and transmitter supply is not possible.

3) Valid for alarm output 1 and alarm output 2 resp. heater burnout alarm.

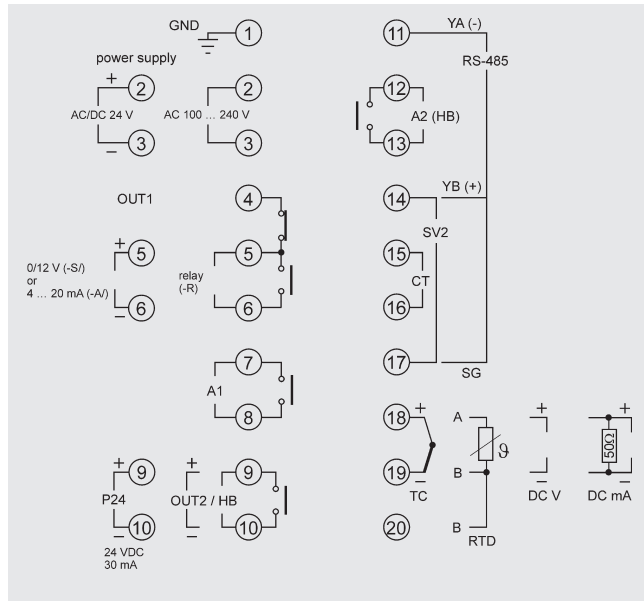
4) At controller with serial interface the serially parameter memory is not available.

Input signals	Measuring span		Measuring error in [%] of the span	
			Standard	Exception
Current signals				
0 ... 20 mA, 4 ... 20 mA	-1999 ... 9999 <sup>5)</sup>		± 0.2 % ± 1 digit	-
Voltage signals				
0 ... 1 V, 0 ... 5 V, 0 ... 10 V	-1999 ... 9999 <sup>5)</sup>		± 0.2 % ± 1 digit	-
1 ... 5 V	-1999 ... 9999 <sup>5)</sup>		± 0.2 % ± 1 digit	-
Thermocouples				
Type K, NiCr-Ni	-200 ... +1370 °C	-320 ... +2500 °F	± 0.2 % ± 1 digit <sup>6)</sup>	≤ 0 °C: ± 0.4 % ± 1 digit
	-199.9 ... +400.0 °C	-199.9 ... +750.0 °F	± 2 K	≤ 0 °C: ± 0.4 % ± 1 digit
Type J, Fe-CuNi	-200 ... +1000 °C	-320 ... +1800 °F	± 0.2 % ± 1 digit <sup>6)</sup>	≤ 0 °C: ± 0.4 % ± 1 digit
Type R, PtRh-Pt	0 ... 1760 °C	0 ... 3200 °F	± 0.2 % ± 1 digit <sup>6)</sup>	≤ 200 °C: ± 6 K
Type S, PtRh-Pt	0 ... 1760 °C	0 ... 3200 °F	± 0.2 % ± 1 digit <sup>6)</sup>	≤ 200 °C: ± 6 K
Type B, PtRh-PtRh	0 ... 1820 °C	0 ... 3300 °F	± 0.2 % ± 1 digit <sup>6)</sup>	≤ 300 °C: not specified
Type E, NiCr-CuNi	-200 ... +800 °C	-320 ... +1500 °F	± 0.2 % ± 1 digit <sup>6)</sup>	≤ 0 °C: ± 0.4 % ± 1 digit
Type T, Cu-CuNi	-199.9 ... +400.0 °C	-199.9 ... +750.0 °F	± 2 K	≤ 0 °C: ± 0.4 % ± 1 digit
Type N, NiCrSi-NiSi	-200 ... +1300 °C	-320 ... +2300 °F	± 0.2 % ± 1 digit <sup>6)</sup>	≤ 0 °C: ± 0.4 % ± 1 digit
Type PL-II	0 ... 1390 °C	0 ... 2500 °F	± 0.2 % ± 1 digit <sup>6)</sup>	-
Type C (W/Re5-26)	0 ... 2315 °C	0 ... 4200 °F	± 0.2 % ± 1 digit <sup>6)</sup>	-
Resistance thermometers				
Pt100 (3-wire)	-200 ... +850 °C	-300 ... +1500 °F	± 0.1 % ± 1 digit <sup>6)</sup>	-
	-199.9 ... +850.0 °C	-199.9 ... +999.9 °F	± 0.1 % ± 1 digit <sup>6)</sup>	-
JPt100 (3-wire)	-200 ... +500 °C	-300 ... +900 °F	± 0.1 % ± 1 digit <sup>6)</sup>	-
	-199.9 ... +500.0 °C	-199.9 ... +900.0 °F	± 1 K	-

5) Decimal point adjustable

6) Referring to the measuring span in °C.

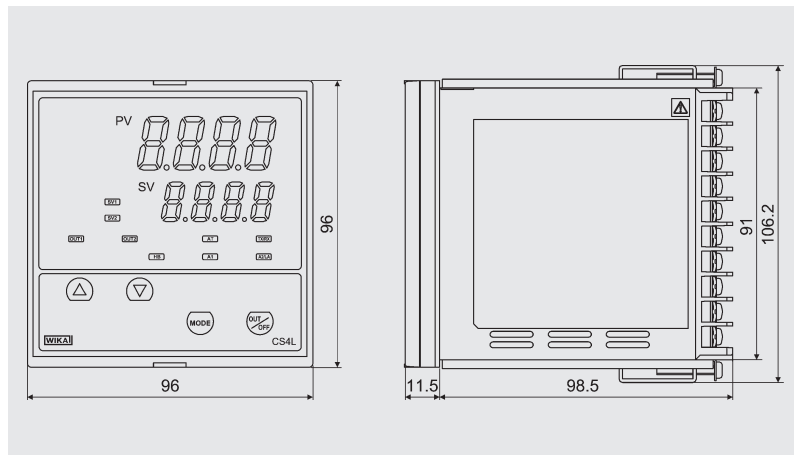
## Terminal arrangement



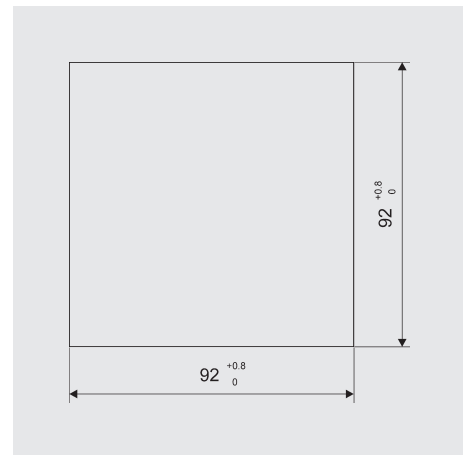
### Legend:

TC	Input thermocouple
RTD	Input RTD
DC V	Input voltage signal
DC mA	Input current signal
OUT 1	1st control output
(-R/)	Control output relay
(-S/)	Control output logic level 0/12 V
(-A/)	Control output analogue current signal 4 ... 20 mA
OUT 2	2nd control output
A1	Alarm output 1
A2	Alarm output 2
HB	Heater burnout alarm
CT	Current transformer for heater burnout alarm
SV2	Parameter memory for 2nd set value
RS-485	Serial interface RS-485
P24	Transmitter supply

## Dimensions in mm



## Panel cutout in mm



Modifications may take place and materials specified may be replaced by others without prior notice. Specifications and dimensions given in this leaflet represent the state of engineering at the time of printing.

