

Temperature Controller

PID controller, with Fuzzy Logic,
self optimizing,
also with serial communication

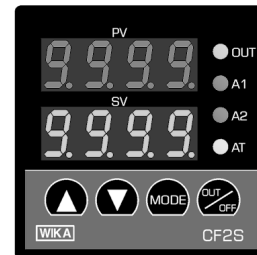
48 mm x 48 mm • Model CF2S

Electronic Temperature Measurement

Areas of application

for control tasks in

- Process and procedure technology
- Plant construction
- Plastic technology and processing
- Ventilation and air conditioning technology



Features

- **Control characteristic**
 - PID / PD controller, self optimizing
 - two-step controller (ON / OFF)
- **Multi-function input**
 - thermocouples
 - resistance thermometers
- **Control output**
 - relay
 - logic level
 - continuous, 4 ... 20 mA
- **Displays**
 - each one display for process value and setting value
 - LED display, 4-digit
 - switchable for °C or °F
- **Alarm output**
 - max. two alarm contacts
 - setable switching logic, also with stand-by function

Options

- current input 4 ... 20 mA
- loop monitoring
- serial communication

Other features

- program mode
- self optimizing
- self monitoring
- sensor monitoring
- sensor correction
- cold junction compensation

Description

Compact digital temperature controller with fuzzy logic for controlling, displaying and monitoring temperature signals.

All types of commonly used temperature sensors can be connected to the multi-function input. As an alternative option the input signal may be selected as a current signal 4 ... 20 mA.

The control parameters can be set over wide ranges. Self optimizing parameter setting which can operate with fuzzy logic, as well, may also be brought in. This feature enables an optimal self setting of the controller.

Offered apart from standard features for simple control tasks the feature serial communication is available as optional extra.

At no extra cost the control output can be provided to choice as relay (for slow control operations), logic level (for fast control operations) or as continuous output 4 ... 20 mA. Optional alarm outputs for monitoring functions.

These controllers have been designed for switch panel mounting.

Specification

Model CF2S

Input: setable (multi-function input), measuring span setable

			max. Measuring range ¹⁾		Resolution
RTDs	Pt 100	DIN IEC 751	-199.9 ... + 850.0 °C	-199.9 ... + 999.9 °F	0.1 °C / 0.1 °F
			-200 ... + 850 °C	-320 ... + 1560 °F	1 °C / 1 °F
	JPt 100	JIS C 1606	-199.9 ... + 500.0 °C	-199.9 ... + 900.0 °F	0.1 °C / 0.1 °F
Thermocouples	Type K, NiCr-Ni	DIN IEC 584	- 200 ... + 1370 °C	- 320 ... + 2500 °F	1 °C / 1 °F
	Type J, Fe-CuNi	DIN IEC 584	- 200 ... + 1000 °C	- 320 ... + 1800 °F	1 °C / 1 °F
	Type T, Cu-CuNi	DIN IEC 584	- 199.9 ... + 400.0 °C	-199.9 ... + 750.0 °F	0.1 °C / 0.1 °F
	Type E, NiCr-CuNi	DIN IEC 584	0 ... + 1000 °C	0 ... + 1800 °F	1 °C / 1 °F
	Type N, NiCrSi-NiSi	DIN IEC 584	0 ... + 1300 °C	0 ... + 2300 °F	1 °C / 1 °F
	Type R, PtRh-Pt	DIN IEC 584	0 ... + 1760 °C	0 ... + 3200 °F	1 °C / 1 °F
	Type S, PtRh-Pt	DIN IEC 584	0 ... + 1760 °C	0 ... + 3200 °F	1 °C / 1 °F
	Type B, PtRh-PtRh	DIN IEC 584	0 ... + 1820 °C	0 ... + 3300 °F	1 °C / 1 °F
	Type W5, W5Re/We26Re	ASTM E998	0 ... + 2315 °C	0 ... + 4200 °F	1 °C / 1 °F
Current input	4 ... 20 mA		- 1999 ... 9999 ²⁾	–	1 ²⁾

1) Switchable display unit °C or °F (DIP switch).
2) Scaling and decimal point freely setable.

Input circuiting

Resistance thermometer 3 wire symmetric, max. permissible connection resistance: 10 Ω each wire
Thermocouple max. permissible connection resistance: 100 Ω
Current input (option) input impedance: 50 Ω

Display

process value: 4-digit, 7-segment LED, red, 8 mm high
setting value: 4-digit, 7-segment LED, green, 8 mm high
measuring time: 125 ms (8 conversions in a second)
divers status indicators

Control characteristic

PD algorithm
PID algorithm
two-step controller (ON / OFF)

Control parameters

control parameter setting ranges, self optimizing setting (Fuzzy Logic) can be brought in:
proportional band: 0.1 ... 99.9 % of end of measuring range
integral time: 0 ... 3600 s
differential time: 0 ... 3600 s
proportional cycle: 0 ... 120 s
hysteresis: 0.1 ... 100.0 K

Accuracy

± 0.3 % of set measuring span ± 1 digit (restrictions with thermocouples)
Type K, Type J, Type T with values < 0 °C : ± 0.4 % of measuring range ± 1 digit
Type R and Type S with values < 200 °C : ± 4 K ± 1 digit

Electrical data

power supply: AC 100 ... 240 V 50 ... 60 Hz, optional: AC/DC 24 V
power consumption: approx. 8 VA
isolation resistance: ≥ 10 MΩ with DC 500 V
isolation voltage: AC 1500 V, 60 s (function groups against each other)

Electromagnetic compatibility (EMC)

interference emission per EN 55 011 (1991) Group 1 Class A
interference immunity per EN 50 082-2 (1993)

Outputs

control output available in 3 different versions:
• relay contact load: AC 250 V, 3 A (ohmic load)
AC 250 V, 1 A (inductive load, cos φ = 0.4)
• logic level DC 0 / 12 V max. 40 mA (short circuit-proof)
for solid state relay
• analogue current signal 4 ... 20 mA (load max. 550 Ω)

Outputs (continued)

alarm output

one alarm output is part of the standard version,
optionally available is a 2nd alarm output (common contact root), the alarm output 2 may be
designed according to various operating principles, e.g. for loop monitoring.

relay contact

load: AC 250 V, 3 A (ohmic load)
AC 250 V, 1 A (inductive load, $\cos \varphi = 0.4$)

switching logic

5 different versions setable, to some extent also with stand-by function
hysteresis setable: 0.1 ... 100.0 K

Serial interface

RS 232-C
RS 485

Ambient conditions

ambient temperature: 0 ... +50 °C
storage temperature: -20 ... +50 °C
humidity: 35 ... 85 % relative humidity, noncondensing

Case

for switch panel mounting 48 mm x 48 mm

dimensions: 48 mm x 48 mm x 110 mm (W x H x D)
case material: polycarbonate, flame resistant
operation: key pad
colour: black
ingress protection: panel front IP 50 (IEC 529 / EN 60 529)
mounting: clips, stainless steel, for switch panel thickness up to 3 mm
weight: approx. 140 g

Other features

Program mode

temperature profiles are realised per 7-fold parameter memory

Self monitoring

automatic execution of initial test after connection to power supply,
thereafter monitoring due to internal malfunction

Sensor monitoring

optical signalling of sensor burnout and sensor short circuiting

Sensor correction

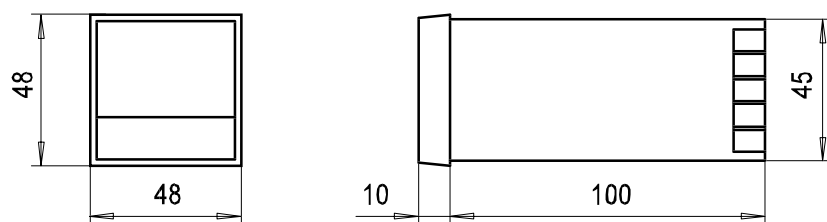
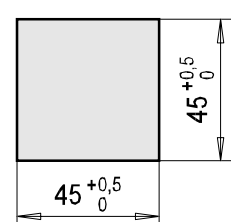
setable

Cold junction compensation

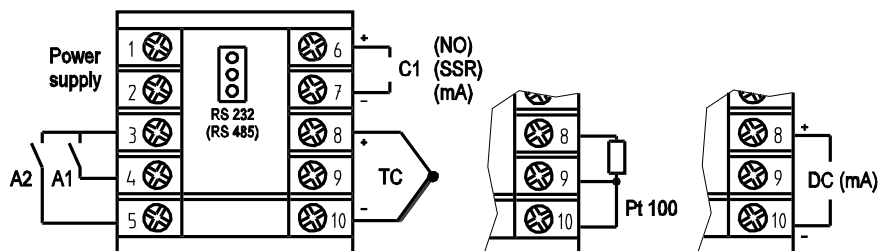
± 1 K in ambient temperature range 0 ... 50 °C

Further options

- screw bracket (for switch panel thickness from 1 mm up to 15 mm) instead of clips
- ingress protection of panel front IP 54 (additional seal), screw bracket necessary
- terminal cover for additional protection

Dimensions in mm**Panel cutout** in mm

3220 672.01

Designation of terminal connectors

3220 991.01

Legend:

Power supply power supply
C1 control output
(NO) relay
(SSR) logic level
(mA) analogue current signal
TC input thermocouple
Pt 100 input resistance thermometer
DC (mA) current input
A1 alarm output 1

optional:

A2 alarm output 2
RS 232 serial interface RS 232-C
RS 485 serial interface RS 485

Order code for temperature controller Model CF2S 48 mm x 48 mm

Field No.	Code	Features
1	Control output	
	R	relay
	S	logic level DC 0/12 V for solid state relay
	A	analogue current signal (4 ... 20 mA)
	Input configuration	
	K1	thermocouple type K (NiCr-Ni), range -200 ... +1370 °C 1)
	J1	thermocouple type J (Fe-CuNi), range -200 ... +1000 °C 1)
	S1	thermocouple type S (PtRh-Pt), range 0 ... +1760 °C 1)
	T1	thermocouple type T (Cu-CuNi), range -199.9 ... +400.0 °C 1)
	N1	thermocouple type N (NiCrSi-NiSi), range 0 ... +1300 °C 1)
2	R1	thermocouple type R (PtRh-Pt), range 0 ... +1760 °C 1)
	E1	thermocouple type E (NiCr-CuNi), range 0 ... +1000 °C 1)
	B1	thermocouple type B (PtRh-PtRh), range 0 ... +1820 °C 1)
	C1	thermocouple type W5 (W5Re/W26Re), range 0 ... +2315 °C 1)
	11	Pt 100, range -199.9 ... +850.0 °C 1)
	74	current input (4 ... 20 mA) 2)
	Power supply	
	H	AC 100 ... 240 V 50 ... 60 Hz
	L	AC/DC 24 V

Options:

4	Alarm output 2	
	AS	setable switching logic
	AR	loop monitoring
	AL	setable switching logic and loop monitoring with combined output
4	Serial communication	
	C2	RS 232-C
	C5	RS 485
4	Terminal connections	
	KA	with additional terminal cover <i>Without terminal cover as standard</i>
4	Mounting provision	
	FS	screw bracket <i>Stainless steel clips as standard</i>
4	Ingress protection	
	IP	IP 54 3) <i>In front IP 50 as standard</i>
4	V?	to customer's specifications <i>Please state as additional text</i>

Ordercode:

CF2S - 3	A -	1	/	M -	2	3	Options (Field No. 4):	4)
only with feature current input 4 ... 20 mA, without multi-function input:								
CF2S - 3	A -	1	/	A -	74	3	Options (Field No. 4):	4)

Additional text:

- 1) Setable input.
2) Sensor input is not able to switchover, no multi-function input with this special input.
3) This option needs to be combined with optional mounting provision: screw bracket, code FS.
4) Please separate the codes for several options by a hyphen if you wish to combine options.
Examples for multi-function input CF2S-3 A - R / M - 11 H - AS - C2 - FS - IP
 for current input 4 ... 20 mA CF2S-3 A - R / A - 74 H - AS - FS - IP

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



WIKAI Alexander Wiegand GmbH & Co.
Alexander-Wiegand-Straße · 63911 Klingenberg
☎ (0 93 72) 132-0 · ☎ (0 93 72) 132-406/414
http://www.wika.de · E-mail: info@wika.de