

Temperature Controller

PID controller, with Fuzzy Logic, self optimizing, also with heater burnout alarm

48 mm x 48 mm • Model CF1S

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

SV ODE CFF

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 ℃ or ¶

• Alarm output

- max. two alarm contacts
- setable switching logic, also with stand-by function

Options

- heater burnout alarm

Other features

- 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.

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 monitoring control variables (heater burnout alarm) 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 CF1S

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 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 B, PtRh-PtRh	DIN IEC 584	0 + 1820 °C	0 + 3300 °F	1 °C / 1 °F

1) Switchable display unit °C or °F (DIP switch).

Input circuiting

Resistance thermometer 3 wire symmetric, max. permissible connection resistance: 10Ω each wire

Thermocouple max. permissible connection resistance: 100Ω

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 $\pm 0.3\%$ of set measuring span ± 1 digit (restrictions with thermocouples)

Type K, Type J with values $< 0 \, \text{C}$: $\pm 0.4 \, \text{\%}$ of measuring range ± 1 digit

Type R with values < 200 ℃: ±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: $\geq 10 \text{ M}\Omega$ 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, $\cos \varphi = 0.4$)

• 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)

alarm output one alarm output is part of the standard version,

optionally available is a 2nd alarm output (common contact root) 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

Outputs (continued)

heater burnout alarm optional (not available with control output in analogue current signal 4 ... 20 mA),

for 1 phase systems, max. 20 A or 50 A, current converter is supplied with controller

relay contact load: AC 250 V, 3 A (ohmic load)

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

hysteresis setable: 0.1 ... 100.0 K

Ambient conditions ambient temperature: 0 ... +50 ℃

storage temperature: -20 ... +50 ℃

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

Self monitoring automatic execution of initial test after connection to power supply

thereafter monitoring due to internal malefunction

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 ℃

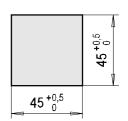
Further options

- 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

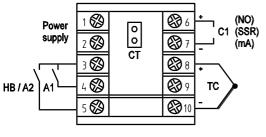
Dimensions in mm 48 10 100

Panel cutout in mm



3220 672.01

Designation of terminal connectors



8 8 9 Pt 100

3220 982.01

Legend:

Power supply
C1 control output
(NO) relay

(SSR) logic level

(mA) analogue current signal

TC input thermocouple

Pt 100 input resistance thermometer

A1 alarm output 1

optional:

A2 alarm output 2 HB heater burnout alarm

CT connection of current converter

eld No.	Code	Features
		Control output
	R	relay
	S	logic level DC 0/12 V for solid state relay
1	Α	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)
	N1	thermocouple type N (NiCrSi-NiSi), range 0 +1300 °C 1)
	R1	thermocouple type R (PtRh-Pt), range 0 +1760 °C 1)
	B1	thermocouple type B (PtRh-PtRh), range 0 +1820 °C 1)
2	11	Pt 100, range -199.9 +850.0 °C 1)
		Power supply
	Н	AC 100 240 V 50 60 Hz
3	L	AC/DC 24 V

Options:

Alarm			Alarm output 2		
4		AS	setable switching logic		
· · · · · · · · · · · · · · · · · · ·			Heater burnout alarm		
		W12	for 1 phase (max. 20 A) 2)		
4		W15	for 1 phase (max. 50 A) 2)		
•		3	Terminal connections		
4		KA	with additional terminal cover Without terminal cover as		
· · · · · · · · · · · · · · · · · · ·		_	Mounting provision		
4		FS	screw bracket Stainless steel clips as sta		
			Ingress protection		
4		IP	IP 54 3)	In front IP 50 as standard	
<u> </u>			Instrument configuration		
4		V?	to customer's specifications	Please state as additional text	

Order code:

	1	2	3 Options (Field No. 4):	4)
CF1S - 3	A - / M	-		

Additional text:

- 1) Setable input.
- 2) Not with analogue control output (4 ... 20 mA)
- 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. Example: CF1S-3 A R / M K1 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.

