Cool_Tronic_

Peltier-Controller TC2812

Operation Manual

Version 1.15, 30.01.2008

Cool_Tronic_

Contents

1. Overview

1.1 Application

The Peltier-Controller TC2812 is a temperature indicator with controlling function and PWM output for driving Peltiers. It has a housing for panel mount to DIN 43700 and is especially built for low voltage operation.
The Peltier-Controller TC2812 combines temperature indicator and -controller with a PWM output for directly driving Peltiers. All integrated in a compact housing for panel mount according to DIN 43700. It requires an external DC power supply in the range from 11 to 28V.

1.2 Zur Dokumentation

This documentation is valid from FW-Version V101.30 as of 21.08.2007. For using TCCOM for Windows with the RS232 interface option please refer to the documentation included with that program.

1.3 Supply content

To the supply content belongs:

- Controller TC2812
- 2 pcs of mounting clamps
- 1 connector Sauro CIF, grid 5.08mm, 4-poles
- 1 connector Sauro CTF, grid 3.81mm, 8-poles
- Manual TC2812 (as PDF file or printed)

for option RS232-Interface in addition

- TCCOM for Windows on data carrier
- Manual TCCOM for Windows (as PDF file or printed)

2. Connections and Key functions

2.1 Overview

The keys are positioned on the visible front of the TC2812 Peltier Controller.. The connections of the instrument will occur via two or three connectors on the rear of the controller and are not accessable after installation. The instrument will be installed via its two snap clamps with fastening screws.

2.2 Display and Keys

The instrument has a 4-digits 7-segement-display. The temperature indication range is -75.0 ... + 175.0. The nominal temperature range is -50.0 ... + 150.0. The unused decimal points are used for displaying the operation modes.
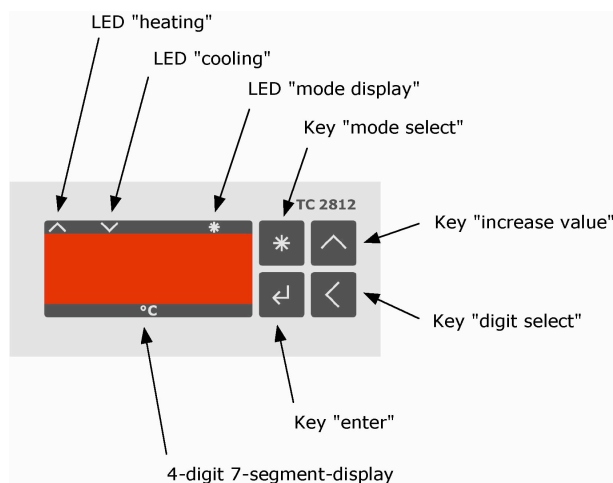
View of the front panel

Function of the 3 LEDs:

LED "Heating"	Controller heats
LED "Cooling"	Controller cools
LED "Mode-Display"	Programming mode and other special displays

The 4 Keys have the following functions:

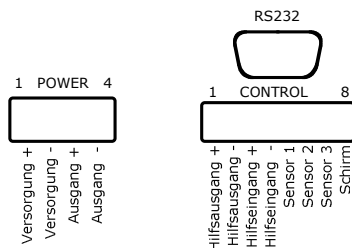|	
Key "Mode-Switch"	changes the operation mode
Key "increase value"	increases the value of the selected digit
Key "Digit selection"	changes the activated digit
Key "Enter"	stores the value or the item changed

The function details are described under the chapter „Firmware".

2.3   In- and Outputs

2.3.1   Overview

The connection is made with two or three connectors.

View of the terminals

The connection will be made with a 4-pole connector with a grid of 5.08 mm for the supply and power output. An 8 pole connector with a grid of 3.81 mm makes the connection for the signal voltages with the following pin configuration:

Voltage supply and power output

Pin configuration		
	1	Power supply (plus)
	2	Power supply (minus)
	3	Power output (plus)
	4	Power output (minus)

Signal voltages

Pin configuration		
	1	Signal output (plus)
	2	Signal output (minus)
	3	Control input (plus)
	4	Control input (minus)
	5	Input positive (Sensor)
	6	Input negative (Sensor)
	7	GNG (Sensor)
	8	GND (optional shiel for sensor leads)

2.3.2   Sensor Input

The Sensor input can be configured for Pt100, Pt1000 and for a special defined sensor (e.g. PTC or NTC). The measuring current for Pt100 is 2.0 mA, for Pt1000 it is only 0.2 mA. The measuring current for the special defineded sensor is selectable in the range of 0.05 … 2.0 mA.

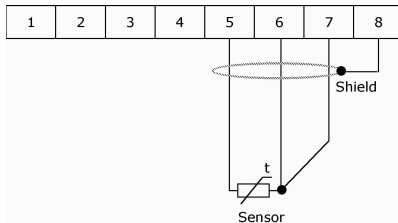|	
Range of input voltage	50..350mV
Range of maesuring current	0.05 .. 2.0 mA

Sensors
Pt100
Resistance range approx. 70 .. 167 Ohms (according to - 75.0 ... 175.0 °C), measuring current approx.. 2.0 mA
pt1000
Resistance range ca. 700 .. 1670 Ohms (according to - 75.0 ... 175.0 °C), measuring current approx. 0.2 mA
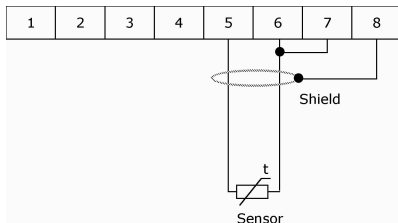Special
Resistance range and measuring current according to customized configuration
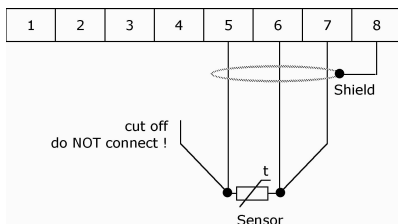

Wiring of a 3-wire sensor

The measuring principle is standard 3-wire technique, that is the wire resistance and its changes within reasonable limits does not affect the measuring. Wiring see above

Wiring of a 2-wire sensor

For 2-wire sensors the GND has to be linked with the negative input terminal. The wire resistance will not be compensated, this leads to the following errors:

-   permanent shift as a function of the wire resistance resulting a higher temperature reading
-   variable error as a function of the temperature change of the cable environment with its temperature coefficient

Wiring of a 4-wire sensor

For 4-wire sensors one lead may not be connected in order to maintain the resistance constant in the forth and back wire. The prinicple corresponds to a 3-wire system. It should be cut off to avoid picking up noise.

The shielding is for all versions optional, its necessity depends on the conditions of the equipment:

Lead length of the sensor > 1m   Shielding recommended in general

pt1000   Shielding recommended in general

Noise occurs, reading disturbed   Shielding is necessary

The maximum length of the sensor leads is limited by the resistance of max. 10 Ohms at 25°C for one leg. Dissimilar leads cause measuring errors (e.g. different wire diameters or materials).

Sensor leads with larger cross section than 0.5 mm2 or 0.75 mm2 lower the error influences.
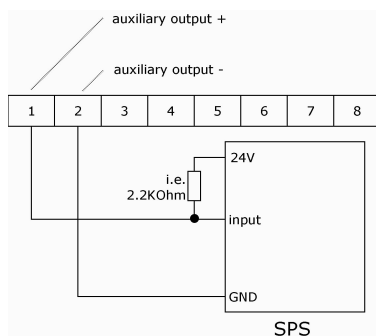
2.3.3 Auxiliary Output

The instrument has a digital output which serves the signalization of the process status. According to the configuration the output becomes active at:

- "OK"-function, the target temperature is balanced, that is within the selceted temperature tolerance range

- "Alarm"-function, the temperature strongly deviates, that is outside of the selected temperature Alarm range

Applicable voltage	max. 30V
Output current	max. 100 mA
Overload protection	limited protection against voltage pikes
Type	NPN-Transistor
Minimum Voltage	< 2V in switched-state

As an example of the application the following diagram shows the connection to the SPS input. Lower than 2 Volt at the SPS-input corresponds to the activated auxiliary output.

Wiring of a SPS to the auxuliary output (LOW-active)

The following diagram shows the wiring to the input of a SPS. Higher than > 22 V at the SPS input corresponds to the activated auxiliary output.
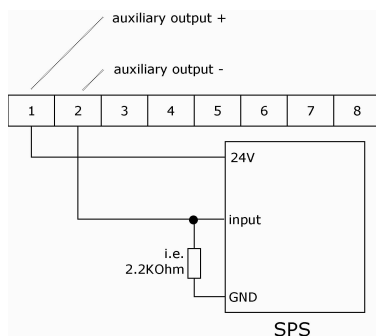
Wiring of a SPS to the auxiliary output (HIGH-active)

Auxiliary Input

The instrument has a digital input, which the power output can be optionally switched on or switched off. According to the configuration is:

- "OFF"-function, in case of activated input the power output is off

  (this option is set as default in order to have the instrument functional without connection at the auxiliary input)

- "ON"-function, only at activated input the power output is on

Maximum input voltage	30V
Input resistance	approx. 1KOhm
Voltage for „ON"	> 5V
Voltage for "OFF"	< 1V

The input works independently of the polarity. An operation with alternating current is not possible, since the power output would be modulated.

Following diagram shows the driving by a NPN-output of a SPS. When the NPN output is on (= LOW) the auxiliary input will be activated.

auxiliary input +

auxiliary input -

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

24V

NPN-output

SPS

Wiring of a SPS to the auxiliary Input
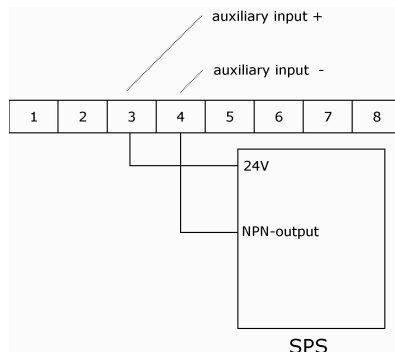
2.3.4   Auxiliary Input

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    (this option is set as default in order to have the instrument functional without connection at the auxiliary input)

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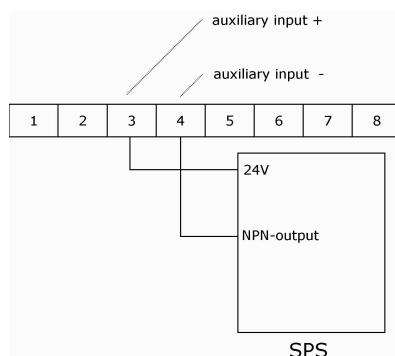
auxiliary input +

auxiliary input -

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

24V

NPN-output

SPS

Wiring of a SPS to the auxiliary Input

2.3.5   Power Output

The power output provides a PWM signal to feed the Peltier modules. The polarity will be automatically switched, it is possible to heat and to cool.

Output voltage	depending on the supply voltage, typically value of supply voltage minus 0.5 … 1.0 V
Output current	12 A max.
PWM frequency	around 2 kHz
Overload protection	Over current limitation
Connecting cable	recommended cross section 0.75 …2.5 mm2 depending on the Peltier current and lead length

The wiring marking „output +" and „output –„ refers to the polarity of the output voltage when cooling !

Attention must be paid to the correct polarity. If the Peltier Module is cooling while it should heating (or inverse) you need to change the polarity of the supply.

Regarding the EMV compatibility (radiation influence) it is recommended to use twisted leads, especially in case of long lead length.

2.3.6   Power Supply

Voltage supply	11… 28 V Direct Current
Current consumption	ca. 300 mA plus Ouput current and losses 12.5 A max.
Protection	internal melting fuse 12.5 A fast
	(may only be replaced by the manufacturer – the warranty is cancelled after opening of the case)
Supply cable	recommended cross section 0.75… 2.5 mm2 depending on the Peltier current and lead length

Regarding the EMV compatibility (radiation influence) it is recommended to use twisted leads, especially in case of long lead length.

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2.3.7   Serial Interface according to RS232C

The optional interface supports a simple report with software handshake, that is there are only existing the signals RXD and TXD.

The interface will be used for factory internal adjustments and diagnostics.

It can be used by the customers for remote control e.g. by a superior microprocessor

In addition it can be used for programming the curve of the customized sensor. In this case CoolTronic can not warrant for correct function of the device and the resulting accuracy.

The interface has the following data configuration

Data configuration	8 Data-, 2 Stop-Bits
Parity	none
Baudrate	9600 Baud

The interface signals are conducted to the connector link (DSUB9, bushing)

Pin assignment	2	RXD
	3	TXD
	5	GND

To connect TC2812 and the PC a standard 1:1 linked interface cable with 9-pol D-SUB-connector and 9-pol D-SUB bushing has to be used.

3. Operation description

3.1 Overview

The equipment has two basic modes, the operation- and the configuration mode. After the controller is switched on it is in the operation mode.

Short pressing the „Mode Switch" button indicates the actual set value.

Long pressing the „Mode Switch" button switches the controller into the configuration mode

3.2 Power on

When the controller is switched-on the display indicates the test display (all segments and decimal points are illuminated). The apparatus tries to read out a valid configuration from the EEPROM. If it fails, the controller shows the error message E100 and it is not operational.

The outputs are inactive during the initialisation process of the device and while errors are detected.

3.3 Normal Mode

In the normal mode the temperature will be consistently displayed and measured. The "Mode Switch" button is being checked. The controller processes the actual temperature and the set temperature and provides the control factor to the power output.

The LED "heating" and LED "cooling" are going to flash, if the temperature is beyond the alarm range.

The LED "heating" and LED "cooling" are consistently on, if the temperature is between the tolerance- and alarm range.

The LED "heating" and LED "cooling" are off, if the temperature is within the tolerance range.

3.4 Set Point Display

To display the set point value press the „Mode Switch" button, till the "Mode Display" starts to flash. Now you may release the button. The controller now shows the set value for 3 seconds. After that the apparatus returns automatically to the process value display.

3.5 Programming the configuration values

To program the configuration values press the „Mode Switch" button, till the "Mode Display" starts to flash and then hold it down till the controller steps into the configuration mode.

Please note, that not all internal values can be programmed by the buttons. Certain values can only be adjusted via its serial interface. In this brochure only the values alterable via the buttons are described

The adjacent description uses the following conventions:

Fat signs:	Segment flashing
normal	Segment consistent on
grey	Segment off

Step 1 – Switch over to the configuration mode

- Press button „Mode Switch"
- The LED „Mode-Display" starts to flash
- Keep pressing till the display jumps:
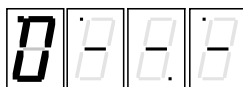
- the first digit flashes and indicates, which value can be changed
- the LED "heating" and LED "cooling" indicate furthermore the state of the controller
- a Timeout is running, which returns to the normal mode, if no button is pressed

Step 2 – Selection of the alterable value
There are the following options:

-    Press button „Input" to change the signalized value of the flashing digit
-    Press button "increase value" to select a different value
-    Press button "Mode Switch" to exit immediately the configuration mode

     (The button „digit selection" is ineffective in this state)

Step 3 – adjust value
-    You have selected the value with the button „increase value" and the button " Input/Enter"
-    The display jumps to the state of the presently programmed value, in this example the set temperature:

-    it displays the set temperature (here for instance 50.0°C)
-    the last digit flashes
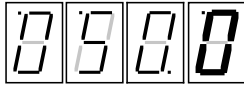-   there are the following options:
     -    Press button „increase value" to change the flashing digit (0..9, 0…)
        o Press button "Digit selection" to choose another digit

-    with the buttons „increase value" and „Digit selection" adjust the desired value

Step 4 – Value confirm or reject

-    Press button „Input" to confirm the adjusted value

-    Display generally flashes

-    After release the „Input" button the value has been transferred to the non volatile memory

-    The display indicates again, which value can be changed, see step 2

- Press button „Mode Switch" to exit immediately the configuration mode without changing the actual value

Display of the first digit and its meaning

Display	Meaning
0	Set value
1	Range of tolerance
2	Range of alarm
3	Filter-Time constant
4	Sensor selection
5	Function auxiliary input
6	Function auxiliary output
7	P
8	I
9	D
a	IL
b	PWM-Limit
o	Temperature Correction
r	Temperature ramp of the set value

3.6 Display of configuration values detailed

3.6.1 Set Value

The adjustable range is -99.0 … 199.9, whereas the nominal range is -50.0 … 150.0. Hence the highest digit changes only 0 .. 1.

3.6.2 Tolerance and Alarme Range

- the range is 0.0 .. 9.9
- the display is in 1/10°

3.6.3 Filter

- it is displayed „F" for Filter in the 3rd digit
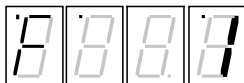
- Digit 0 und 1 show the time constants in seconds 1 - 2 - 5 - 10 - 20 - 50

3.6.4 Sensor Selection

Display „Sn" for sensor und the identification number 0 – 1 - 2 for Pt100 / Pt1000 and special

3.6.5 Control Input

The control input can optionally be used for Switching ON and OFF. Switching OFF is standard, because the apparatus is operational without external circuitry.

Display „OFF" corresponds to the Switch OFF Function, that is if the control input is activated the controller will be switched off

Display „on" corresponds to the Switch ON Function, that is if the control input is activated the controller will be switched off

3.6.6 Signal Output

The signal output has two operation modes:

- ""AL" corresponds to the Alarm-Function, that is if the temperature is beyond the Alarm Range, the signal output will be switched on

- "Go" corresponds to the Good-Function, that is if the temperature is within the Tolerance-Range, the signal output will be switched on

3.6.7 Parameter

The Parameter adjustment shows an identification letter in the first digit: (in the example a "P" for the proportional rate KP:

Meaning of the identification letter:

P: Control Parameter KP

I: Control Parameter KI

d: Control Parameter KD

The maximum value is here 63
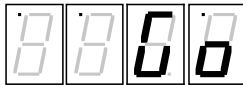
L: Control Parameter IL (Integration limit), maximum value 999

C: PWM-Limit (C = "C"utoff), maximum value 0..127, in case of exceeding the value the display returns to Zero and it must be reset. PWM-Limit Zero switches off in fact the power output .

3.6.8 Temperatur Offset Setting

The first digit shows the identification letter „o":
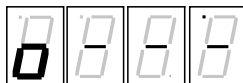
After pressing the button "Input" the actual process temperature is displayed. For the correction the desired process value must be programmed. This value can be determined, for instance, with a reference measure instrument, or you can use an ice bath as a reference.

So the tolerance of the sensor element or of the measuring configuration can be compensated.

There is no possibility by means of the buttons to reset the factory adjustments. Only with the aid of the configuration program you can set the correction value to Zero.

3.6.9 Temperatur Setpoint Ramp Function

The first digit shows the identification letter „r":
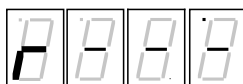
After pressing the button "input" the actual programmed value of the temperature ramp is displayed. In the e-xample it is 6.0° per minute.

This means, that the internal set point value will be achieved by a ramp of 6.0°C per minute

A selected value of 0.0 put the ramp function out of duty, that is the nominal set point temperature will be a-chieved without delay.

The „nominal set point value" is the value, which appears after short pressing the mode button.

The "actual set point value" is an internal value, which will be evaluated based on the ramp adjustment and nominal set point value, as well as on the prehistory.

When you turn on the controller the ramp starts at the actual Process-Temperature, the actual set point tem-perature align first with the process temperature. In all other cases is the starting point the actual (internal) set point temperature.

3.7 Host Mode

When the controller receives signals via the serial interface, then they are decoded and identified commands implemented. The measuring data, display and controlling keep going.

There is no visualisation on the display during the interface access. Altered values will only then be implemented, when the command u_o_o is sent. This happened automatically by using the TCCOM for Windows, but has to be considered by using your own control program.

In case of uncertainty whether all values have been implemented, it is recommendable after the al-tering of the configuration to turn off and on the controller thereafter!

3.8 Over Range Condition

If the process value falls below -75.0°C or exceeds +175°C, so the controller falls into a temporary error status. The display shows flashing "9999". The power output is switched off. The instrument checks consis-tently the measuring value. If the value returns within the allowed limits, the controller turns automatically back to the base status.

Please note, that only in the range of -50.0 … + 150.0°C the compliance with the parameter is guaranteed.

3.9 Error Messages

Nicht fatale Fehler werden als Ennn nicht blinkend für 5 Sekunden ab ihrer Erkennung angezeigt, danach geht das Gerät in den Normalbetrieb zurück. Fatale Fehler werden dauernd angezeigt.

Non fatal errors will be displayed as „Ennn" for 5 Seconds, not blinking, from its detection, thereafter the con-troller returns to the normal operation. Fatal errors are consistently displayed.

Error Number	Meaning	Error cause – and removal
Non fatal error		
E001	General error	several causes > contact factory
E002	Error of writing the EEPROM	The writing of the configuration value has failed > repeat configuration-step > contact factory

Error Number	Meaning	Error cause – and removal
E003	over-current error of the output	Short circuit at the output, Peltier module defect > check wiring / correction > check Peltier module / replace > eventually contact factory
E004	Controller overheated	Inside temperature of the controller too high Ambient temperature too high, Instrument exposed directly to the sun, output overloaded > avoid excessive external warming > eliminate overloading > reduce eventually PWM-Limit
E005	Watchdog has responded	Disturbance influence or program failure > one time appearance may be ignored > else contact factory
Fatal error		
E100	EEPROM contains no valid configuration	Current break during of a configuration action > Switch off / switch on > re-configure > contact factory
E200	Stack error	excessive electronic noise or program failure > one time appearance to be ignored > else contact factory

3.10   Communication

3.10.1   Overview

The below mentioned information will be required for the implementation of own Control-Software. Otherwise you can ignore them.

3.10.2   Block Format

It has been implemented a simple ASCII-Protocol. To simplify the use of the serial communication the program "TCCOM.EXE" has been developed. It is included with the RS232 option.

It is also possible to use a simple Terminal-Program even it's less comfortable.

Synchronisation	*
Command (only Master)	<address> _ <command> _ <parameter> _ <value>§
Acknowledge (only Slave)	. / ? / #
Response (only Slave)	<value> §

The several components are defined as following:

address	A..Z (actually only A)
command	a..z (actually only d, r, u, w)
parameter	0..65535 (no leading zeros, negative figures will be transferred as positive figures, and then accordingly interpreted "typecast")
value	0..65535 (no leading zeros, negative figures will be transferred as positive figures, and then accordingly interpreted "typecast")

3.10.3   Character Set

*	Interruption from Master (for Synchronisation)
A..Z	Address
a..z	commands
_	(underline) is separation sign between values
§	End of the message
.	acknowledge "OK"
?	acknowledge "unknown / incomplete command sequence"
#	Internal fault

3.10.4   Data Flow

Each communication is started by the Master (PC), by sending a „*" as Synchronisation. Hence the Slave (TC2812) changes to the basic communication state.

Now the Master sends address and command (in our example „A_r_0_0"). After each sign, the received sign is returned by the Slave (echo). [15] represents the end of the message "§".

Now the Slave accomplishes the command. In case of success it sends a ".". Thus at commands the communication is finish. If it's, however, a request, it follows right away the answer (in our example "65394§". [15] represents the end of the answer string "§".

Excerpt from a Log file (fat corresponds to data traffic, normal "High level"-Information, special character in [ ]):

15:46 29.07.02001 15:46 TCCOM for DOS 00103

15:46 --------------> r_50_0

15:46 > A_r_50_0

15:46 > *A

15:46 < A

15:46 > _

15:46 < _

15:46 > r

15:46 < r

15:46 > _

15:46 < _

15:46 > 5

15:46 < 5

15:46 > 0

15:46 < 0

15:46 > _

15:46 < _

15:46 > 0

15:46 < 0

15:46 > [15]

15:46 < [15]

15:46 < .

15:46 < . (OK)

15:46 < 65394[15]

15:46 < 65394

15:46 --------------< -142

3.10.5   Debug Mode

Initiated with the command d_1_0 the TC2812. Then the module starts to send continuously internal values till to the receipt of the command d_0_0. These values are recorded by the TCCOM and can be monitored for instance by the function "Recorder".

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A   Command Set

Read/Write Command r_ .. _ / w_ .. _	Parameter	Structure	Data	Index	Description
0	0	cfgTable	setValue	--	
1	0	cfgTable	tolRange	--	
2	0	cfgTable	alarmRange	--	
3	0	cfgTable	filter	--	
4	0	cfgTable	cfg	--	xi x0 xxaa i = InputMode o = outputMode aa = SensorSelect
5	0	cfgTable	KP	--	
6	0	cfgTable	KI	--	
7	0	cfgTable	KD	--	
8	0	cfgTable	IL	--	
9	0	cfgTable	pwmLimit	--	
10	0	cfgTable	offset	--	
11	0	cfgTable	setValRamp	--	
12	0	cfgTable	ofCorrVal	--	
13	0	cfgTable	ofRefTemp	--	
14	0	cfgTable	gnCorVal	--	
15	0	cfgTable	gnRefTemp	--	
16	0	cfgTable	gnRefVal	--	
17	0	cfgTable	crtSourceVal	--	
18	0	cfgTable	linTable	0	
19	0	cfgTable	linTable	1	
20	0	cfgTable	linTable	2	
21	0	cfgTable	linTable	3	
22	0	cfgTable	linTable	4	
23	0	cfgTable	linTable	5	
24	0	cfgTable	linTable	6	
25	0	cfgTable	linTable	7	
26	0	cfgTable	linTable	8	
27	0	cfgTable	linTable	9	
28	0	cfgTable	linTable	10	
29	0	EEData	setValue	--	
30	0	EEData	tolRange	--	
31	0	EEData	alarmRange	--	
32	0	EEData	filter	--	
33	0	EEData	cfg	--	
34	0	EEData	KP	--	
35	0	EEData	KI	--	
36	0	EEData	KD	--	
37	0	EEData	IL	--	
38	0	EEData	pwmLimit	--	
39	0	EEData	offset	--	
40	0	EEData	setValRamp	--	
41	0	cfgTable	ofCorrVal	--	
42	0	cfgTable	ofRefTemp	--	
43	0	cfgTable	gnCorVal	--	
44	0	cfgTable	gnRefTemp	--	
45	0	cfgTable	gnRefVal	--	
46	0	cfgTable	crtSourceVal1	--	
47	0	EEData	linTable1	0	
48	0	EEData	linTable1	1	
49	0	EEData	linTable1	2	
50	0	EEData	linTable1	3	
51	0	EEData	linTable1	4	
52	0	EEData	linTable1	5	
53	0	EEData	linTable1	6	
54	0	EEData	linTable1	7	
55	0	EEData	linTable1	8	
56	0	EEData	linTable1	9	
57	0	EEData	linTable1	10	
58	0	cfgTable	ofCorrVal	--	
59	0	cfgTable	ofRefTemp	--	

Read/Write Command r_ .. _ / w_ .. _	Parameter	Structure	Data	Index	Description
60	0	cfgTable	gnCorVal	--	
61	0	cfgTable	gnRefTemp	--	
62	0	cfgTable	gnRefVal	--	
63	0	cfgTable	crtSourceVal2	--	
64	0	EEData	linTable2	0	
65	0	EEData	linTable2	1	
66	0	EEData	linTable2	2	
67	0	EEData	linTable2	3	
68	0	EEData	linTable2	4	
69	0	EEData	linTable2	5	
70	0	EEData	linTable2	6	
71	0	EEData	linTable2	7	
72	0	EEData	linTable2	8	
73	0	EEData	linTable2	9	
74	0	EEData	linTable3	10	
75	0	cfgTable	ofCorrVal	--	
76	0	cfgTable	ofRefTemp	--	
77	0	cfgTable	gnCorVal	--	
78	0	cfgTable	gnRefTemp	--	
79	0	cfgTable	gnRefVal	--	
80	0	cfgTable	crtSourceVal3	--	
81	0	EEData	linTable3	0	
82	0	EEData	linTable3	1	
83	0	EEData	linTable3	2	
84	0	EEData	linTable3	3	
85	0	EEData	linTable3	4	
86	0	EEData	linTable3	5	
87	0	EEData	linTable3	6	
88	0	EEData	linTable3	7	
89	0	EEData	linTable3	8	
90	0	EEData	linTable3	9	
91	0	EEData	linTable3	10	
100	0	intData	rawValue	rawValue	read only
101	0	intData	linValue	linValue	read only
102	0	intData	actValue	actValue	read only
103	0	intData	actP	actP	read only
104	0	intData	actI	actI	read only
105	0	intData	actD	actD	read only
106	0	--	FWVersion	FWVersion	read only
107	0	--	actChipTemp	actChipTemp	read only
108	<nnnn>	--	Mess-Strom	--	current source adjustment
109	0	--	actSetValue	--	set value for ramp function
150	<nnnn>	testPWM	--	--	sets constant pwm value > **controller is OFF !!**
151	<nnnn>	testMinTemp	--	--	lower temperature limit with constant pwm value
152	<nnnn>	testMaxTemp	--	--	upper temperature limit with constant pwm value
160	0	--	dispVal	--	displayed value, delayed against actual value because of additional filtering

ATTENTION. misuse of caommand 150 to 152 can cause overheating or fire hazard, use on your own risk

Meaning of the structure column

cfgTable   internal data strucure, any change will be valid until power off only

EEData   same values as cfgTable, but will be saved to nonvolatile memory, therefore unchanged after power off / on cycle

Attention:

Excessive usage of EEDATA commands can lead to wear out of the memory cells used. This can cause the loss of information.

Values from EEDATA have to be transfered to cfgTable by the command u_0_0 to be effective !

intData   internal data structure for variables

B   Declaration of Conformity

Cool_Tronic_

Konformitätserklärung

Wir erklären, dass das Produkt

Peltier-Controller TC2812

mit den Anforderungen folgender Normen übereinstimmt

DIRECTIVE 2002/95/EC OF THE EUROPEAN PARLIAMENT
AND OF THE COUNCIL ON THE RESTRICTION OF THE USE OF CERTAIN
HAZARDOUS SUBSTANCES IN ELECTRICAL AND ELECTRONIC EQUIPMENT
(RoHS -Richtlinie).

Elektrische Betriebsmittel zur Verwendung innerhalb bestimmter
Spannungsgrenzen 73/23/EWG (Niederspannungsrichtline)

DIN EN 61010 / IEC 1010 Sicherheitsbestimmungen für elektrische Mess-,
Steuer- und Regelelektronik

Elektromagnetische Verträglichkeit 89/336/EWG (EMV-Richtlinie)

EN61000-6-3 (2001) Störaussendung, Wohnbereich

EN61000-6-2 (2001) Störfestigkeit, Industriebereich

und damit den Bestimmungen entspricht.

Rossrüti, den 30.08.2007

Leo Högger, Geschäftsführer   Frank-Peter Jagdt, Geschäftsführer

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