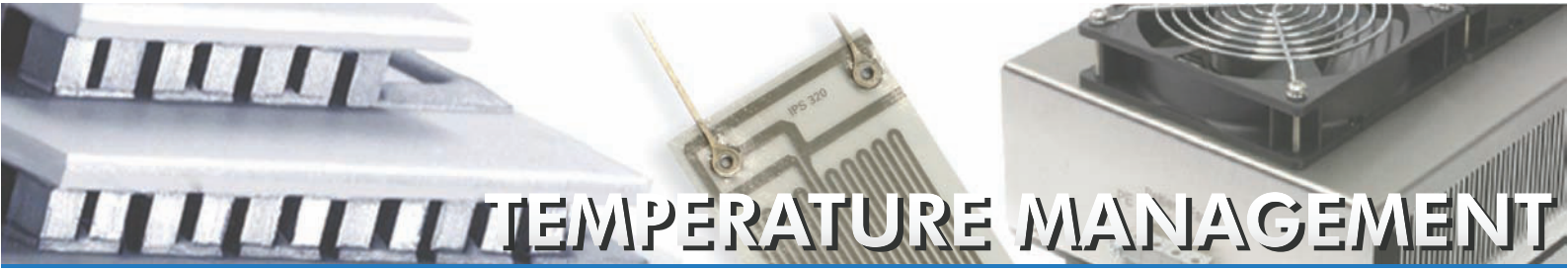

Thermoelectric Cooling–Controller UETR-MOST-16A

Content

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Scope of Delivery and Inspection

1 Piece	UETR-MOST-16A	Controller
2 Piece	THERMISTOR NTC 10K OHM	Detecting Element
1 Piece		Manual

Validity of Documentation/ Field of Application

The ***UETR-MOST-16A*** is a Thermoelectric Cooling – Controller designed for commercial and industrial use at normal ambient temperatures. The ***UETR-MOST-16A*** is a state of the art product and complies with the effective regulations, which are listed under „Standards and Directives“. According to EN61010 and EN61326 the ***UETR-MOST-16A*** belongs to Gerätegruppe 1 and covers Klasse A as well as Klasse B.

Use of Product

The ***UETR-MOST-16A*** is to be used as a Two-Step-Controller or a Difference-Controller with a programmable hysteresis for cooling and heating.

The ***UETR-MOST-16A*** is designed for the use together with a ***Peltier-Cooling Unit*** (Thermoelectric Cooler) with a max. rated power of 380W and a nominal voltage of 24V at a max. ambient temperature of 40°C with sufficient ventilation. For more information, please read our data sheet

Switching of power is done by MOS-FETs

Depending on the application up to 2 pieces THERMISTOR NTC 10K OHM temperature sensors are used. These temperature sensors are provided with the controller.

The ***UETR-MOST-16A*** is equipped with special features such as:

1) Adjustable overtravel time for the fans on hot and cold side of the unit.
2) Controllable temperature at connected ***Peltier-Cooling Unit***, switch-off is adjustable up to max. 144.9°C (factory setting: 79,9°C).
3) Remote inquiry via interface RS232.
4) Remote programming via interface RS232.

The ***UETR-MOST-16A*** is ideal for tempering control cabinets. It can be mounted without any tools on a top hat rail according to DIN 50022 35mm x 7,5mm.

Standards and Directives

1) Maschinenrichtlinie 98/37/EG
2) Niederspannungsrichtlinie 2006/95/EG
3) Elektromagnetische Verträglichkeit 2004/108/EG
4) RoHs COMPLIANT 2002/95/EC
5) EN 61010-1:2001 Sicherheitsbestimmungen für elektrische Mess-,Steuer-, Regel- und Laborgeräte
6) EN 61326-1:2006 EMV-Anforderungen für elektrische Mess-,Steuer-, Regel- und Laborgeräte
7) EN 55011:2009 (IEC/CISPR 11:2009, modifiziert) Industrielle, wissenschaftliche und medizinische Geräte – Funkstörungen – Grenzwerte und Messverfahren
8) EN 61000-4-2 Elektromagnetische Verträglichkeit (EMV) - Teil 4-2: Prüf- und Messverfahren - Prüfung der Störfestigkeit gegen die Entladung statischer Elektrizität
9) EN 61000-4-3 Elektromagnetische Verträglichkeit (EMV) - Teil 4-3: Prüf- und Messverfahren - Prüfung der Störfestigkeit gegen hochfrequente elektromagnetische Felder

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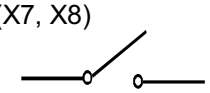
Data Sheet

Current Supply Powerside Connections: GND (X16), (+) 10V up to (+) 24V rated power (X15)	Nominal: Direct Current 10V up to 24V Maximal: 30 V Fuse: 20A fast acting
Fuses	Exchange only at uwe electronic
Current Supply Logicside Connections: GND (X10), +24V Elektronic (X9)	Is only of importance, if current supply of Powerside differs from the nominal 24 Volt. The supply is 24V (maximal 30V) and max. 150mA. An operation with less than 24V is possible as an option.
Fans Connections: FAN –LH (X11), FAN-LC(X12)	Semiconductor switch on GND. Max. current 1A. Excess voltage protection via Suppressor Diode. Nominal switching voltage 24V. Max. 30V
Alarm outlet (X7, X8) Connections:  Alarm	Relay contact (closing contact) Nominal switching voltage 24V DC/ AC Nominal switching current 1A Unsecured outlet
Serial Interface Connections: GND (X4), RS232-RX (X1), RS232-TX (X2)	EIA-232 conform 9600 Baud No parity 1 Stop Bit No flow control
Temperature sensor input Connections: GND (X4), Sensor T0 (Lead sensor) (X6), Sensor T1 (only neccessary for difference controller use) (X3)	Provided and tested Sensors, which are CE-compliant. NTC R_{25}-10 kOhm Temperature resolution at 25°C: 0.1°C
Peltier-Colling Unit Connections: (-) Peltier (X14), (+) Peltier (X13)	Nominal 24V/ 16A up to an ambient temperature of 40°C with sufficient ventilation. If used up to max. 45°C a lower performance has to be taken in calculation
Controller Application range and measurement resolution	The application range starts from Set-Point minus 34.9°C up to plus 144.9°C. This huge application range requires two areas with different measurement resolution areas. This controller is designed for a measurement resolution of 0.1°C from 0°C up to 59.9°C (normal range). From -34.9°C up to 144.9°C (extended range) the measurement resolution is 1°C. Both ranges are equipped with two switch-hysteresis.
Emergency shutdown temperature for Peltier-Cooling Unit	The unit is programmable up to max. 144.9°C. (Err 1)
Controller internal thermal emergency shutdown	In case the inner controller temperature exceeds 85°C the Powerside will be shut down and an error is shown. (Err 2)
Normal ambient conditions	a) Indoor use only; b) Altitude up to 2,000m; c) Ambient temperature from 5°C up to 40°C; d) max. relative humidity 80% at temperatures up to 31°C, linear decreasing down to 50% relative humidity at 40°C; e) Power supply deviation up to ± 10 %.

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Notice:

1) All installation steps e.g. mounting and programming are only to be carried out by a trained professional.
2) All other modifications and applications than described in this manual are not covered and therefore not intended.
3) Assembly of the controller only without voltage supply.
4) Sufficient ventilation of the UETR-MOST-16A has to be provided. Non-consideration will result in severe impairment. Do not cover the louvres of the UETR-MOST-16A within 25cm. Please note that warm exit air of other applications may cause impairment as well and may result in overheating.
5) Assemblies and programming have to be carried out according to this manual. Incorrect or faulty connections may result in demage or destruction of the ***UETR-MOST-16A*** or its connected ***Peltier-Cooling Unit***.
6) Für die aus nicht bestimmungsgemäß durchgeführten Montagen und Anwendungen folgenden Schäden haftet der Anwender und folglich erlöschen alle Ansprüche an den Hersteller. Im Übrigen gilt dies auch insbesondere bei Nichtbeachtung der Betriebsanleitung, wie vorliegend.
7) Manipulating the ***UETR-MOST-16A*** is prohibited. Opening the device is only allowed to the manufacturer or the customer service. Unauthorised alterations of the device will result in an exclusion of any liability and warranty.
8) The ***UETR-MOST-16A*** will only be repaired at the manufacturer's premises in exchange of a controller.
9) Auxiliary equipment is also CE compliant and shall only be procured from the manufacturer or its representative. If used with other products the CE-conformity will be no longer valid.

Inspection and Maintanance

In general the UETR-MOST-16A is maintenance free.

In case of dust pollution in the area of use, please check frequently the heatsinks of the power amplifier. (visual check). Soiled power amplifiers have influence on the device and may cause over heating. The controller will shut down earlier than expected, because the inner heat will exceed the critical level. Due to the fact that an internal cleaning can only be undertaken by the manufacturer or its representative dust pollution shall be avoided by appropriate precautionary measures.

At applications with higher precision it is recommended to regularly check the thermal sensors in the course of ISO 9000:2005 ff provisions.

Assembly/ Disassembly

1) All connection cables have to be drilled (Necessity for EMC).
2) Connection cables' max. length is 3 metes. If longer the EMC-measurements according to EN61326 have to be retaken with the individual specifications of the application.
3) The diameter of the connection cables has to be adapted to the maximum power of the application. The correct choice falls to the user.
4) The enclosed thermal sensors are specially designed for the UETR-MOST-16A. Only use original thermal sensors.
5) The ***UETR-MOST-16A*** is ideal for the use with control cabinets. It can be mounted without any tools on a top hat rail according to DIN 50022 35mm x 7,5mm
6) For disassembling the ***UETR-MOST-16A*** you simply need a 3.5mm screwdriver
7) For fixing the connecting cables the same screwdriver is applicable.

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Terminal Connection/ Screw Terminals

Function	Clamps X
RS232-RX	1
RS232-TX	2
Sensor T1 (Difference controlling)	3
GND (Sensor / RS232)	4
N.C. (Not Connected)	5
Sensor T0 (Leadsensor)	6
Alarmcontact 1	7
Alarmcontact 2	8
(+) 24V electronic supply	9
GND (control)	10
FAN –LH / Hot Side	11
FAN –LC / Cold Side	12
(+) Peltier-Colling Unit	13
(-) Peltier-Colling Unit	14
(+) 12V – 24V rated Power	15
GND Power	16

Factory Setting

Function parameters	***Presetting***
Adjustment Control at start: Aus(off) / Programm 1 / Programm 2	Aus (off)
Heating (-34.9°C to 144.9°C)	20.0
Hysteresis Heating (0.1°C to 9.9°C)	1.0
Cooling (-34.9°C to 144.9°C)	24.0
Hysteresis Cooling(0.1 to 9.9°C)	1.0
System Shut Down (0 to 144.9°C)	79,9
Fan 1 overtravel (0 - 99 minutes)	5 min
Fan 2 overtravel (0 - 99 minutes)	5 min
Display brightness (1 - 4)	4
Buzzer (ein (on), aus(off))	Ein (on)

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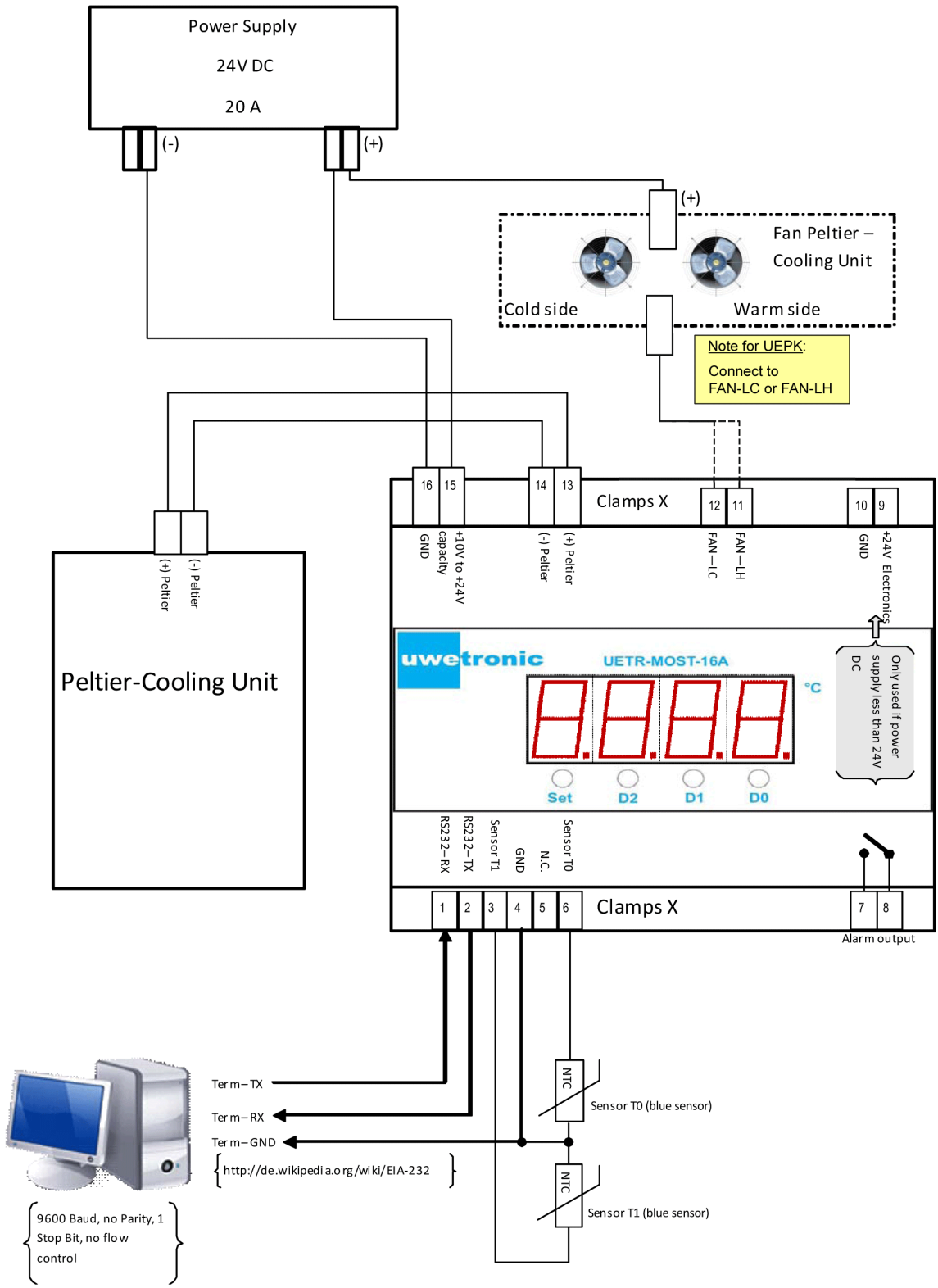
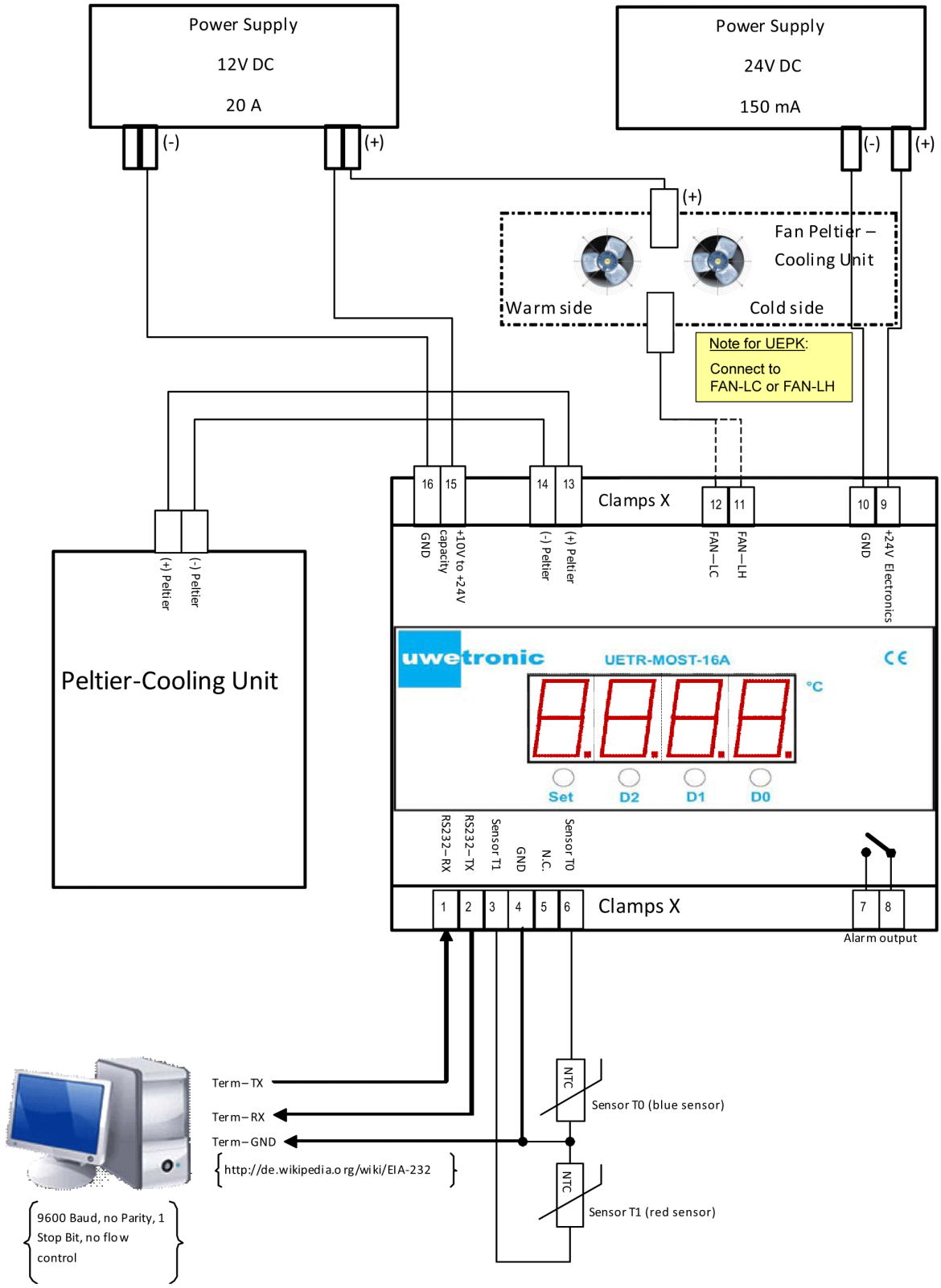
Connection Diagram Standard

Peltier-Cooling Unit and UETR-MOST-16A are both supplied with 24VDC.



Connection Diagram Special Form

Energy supply for Peltier-Cooling Unit with 12VDC and *UETR-MOST-16A* with 24VDC



Specifications subject to change without notice!.

Basic Functions

All Programs are running until they are stopped by pressing „Set“ (min. 2 Sek.) or by the Error-Funktion (Alarm). By pressing „SET“ (min. 2 Sek.) the Programmier-Mode starts.

Program 1—two-step-control [r_h1]

Displays [C] for cooling or [H] for heating and the temperature of the sensors 0 with 0.1°C steps: e.g. Display [C24.5] for Cooling-Mode and 24.5°C.
When pressing „D0“ in Run-Mode , the temperature for Sensor 1 will be shown.

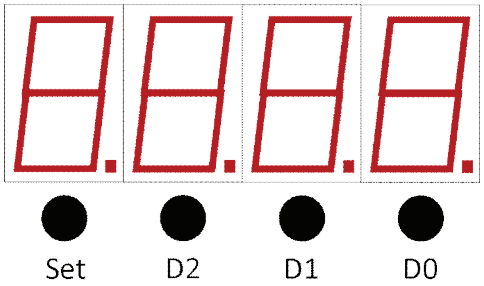
Program 2—Difference-control [r__d]

Difference value display of sensor 0 in relation to sensor 1 with accuracy of 0.1°C. Display (d.04.05) means a difference of 4.5°C.

Initial Operation

1) The programming menu will be started with the initial operation (controller will have factory settings) The factory settings can also be set by pressing „SET“ and turn on the controller. The following will be shown in the display:
2) Version of software
3) „0000“ Programming mode. Followed by...

Display and Keyboard Configuration



Run-Mode

When initial set up is completed, the controller will directly start in „run-mode“, followed by:

1) Version of software
2) „- - - -“ self control successful
3) Display of operation mode.
   See Basic Function below.

Error Indication

Err 1	Safety shut down (warm side surveillance)
Err 2	Powerside too hot
Err 3	Lead temperature sensor (Sensor 0) disturbed / defect / beyond –40 to 150°C
Err 4	Difference temperature (Sensor 1) disturbed / defect / beyond –40 to 150°C
Err 5	Voltage at powerside too low
Error confirmation:	Press „D0“

Press „SET“ to change to programming mode.

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Abridgement of Commands

Command	Format	\r ….. Return Button of PC (CR)
P	P\r	Switch to programming mode
EC	EC\r	Error Confirmation
		NOTES:

Commands in Programming Mode

rH1	rH1\r	Run H1	start 2-Point-Controlling
rd	rd\r	Run d	start Difference-Controlling
r0	r0\r	Run 0	stop controlling
SH	SHxxy\r	Set SH to xx.y °C	
H	Hxxy\r	Set H to xx.y °C	
HY	HYxxy\r	Set HY to xx.y °C	
C	Cxxy\r	Set C to xx.y °C	
CY	CYxxy\r	Set CY to xx.y °C	
dC	dCxxy\r	Set dC to xx.y °C	
dH	dHxxy\r	Set dH to xx.y °C	
LH	LHxxy\r	Set LH to xx.y minutes	
LC	LCxxy\r	Set LC to xx.y minutes	
D	D\r	Display status / show all settings	
Id	Idx\r	Adjust intensity of display (x)	
Ib	Ibx\r	Buzzer: Ein (on)… 1 Aus (off)...0	

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Terminal Program

The terminalprogram is designed as the easiest evaluation and control tool. It can be obtained from various sources, e.g. Microsoft® - HyperTerminal.

Settings:

- ⇒ 9600 baud
- ⇒ No parity
- ⇒ 1 Stop Bit
- ⇒ No flow-control

Data Output

When UETR-MOST-16A is turned on the data output starts and will be issued every second. The data can be read out immediately or saved for a later evaluation. After 65535 seconds the second count will start from 0 again (equates approx. 18,2 hours).

Showing version number at start:
„UETR-MOST-1A“
„Version 1.0“

Followed by display of e.g.:
„Sec: 945; PM Voltage: 24.3; T0: 17.2; T1: 25.3; Control: H1; Direction: heat;“

- ⇒ 945 seconds after start
- ⇒ Supply Voltage 24,3 Volt
- ⇒ Temperature Sensor T0
- ⇒ Temperature Sensor T1
- ⇒ Control Program H1
- ⇒ Function Cooling Module

Start of Programming

UETR-MOST-16A can be programmed at any time from input terminal. You do not need to push any button on the controller itself.
The controller will be set into programming mode by pressing „P“ (warning: case-sensitve) and “Return”.

- ⇒ Display Controller „CFG“
- ⇒ Display Terminal „P ok“

See „Abridgement of commands“ at the end of this manual for an overview.

Levels of Command

1) Confirmation of errors and switching to programming mode
2) Programming Commands, programming is always terminated by RUN-Commands. Display is set back to „CFG“ which is the first programming level → 1)

Syntax Errors

Incorrect or incomplete commands are ignored and no error will be indicated. The first valid character will be interpreted as start of command. A Syntax error will not lead to an undetermined function of the UETR-MOST-16A. If the controller discovers a syntax error it will not change the affected data.

Confirmation of Error Indications

Error indications can be confirmed with pushing „EC“.
Please note: If controller is in „programming mode” this is not possible!
The error indication will pop up again and again as long as the error is not eliminated.

Potential Causes of defect

Sending does not work

- ⇒ No power supply
- ⇒ RX, TX cable inverted
- ⇒ Short Circuit
- ⇒ Terminal programme not set correctly
- ⇒ Interface driver not installed
- ⇒ Commands are not accepted
- ⇒ Not entered programming mode, CFG is not displayed.
  Remedy: Enter P\r

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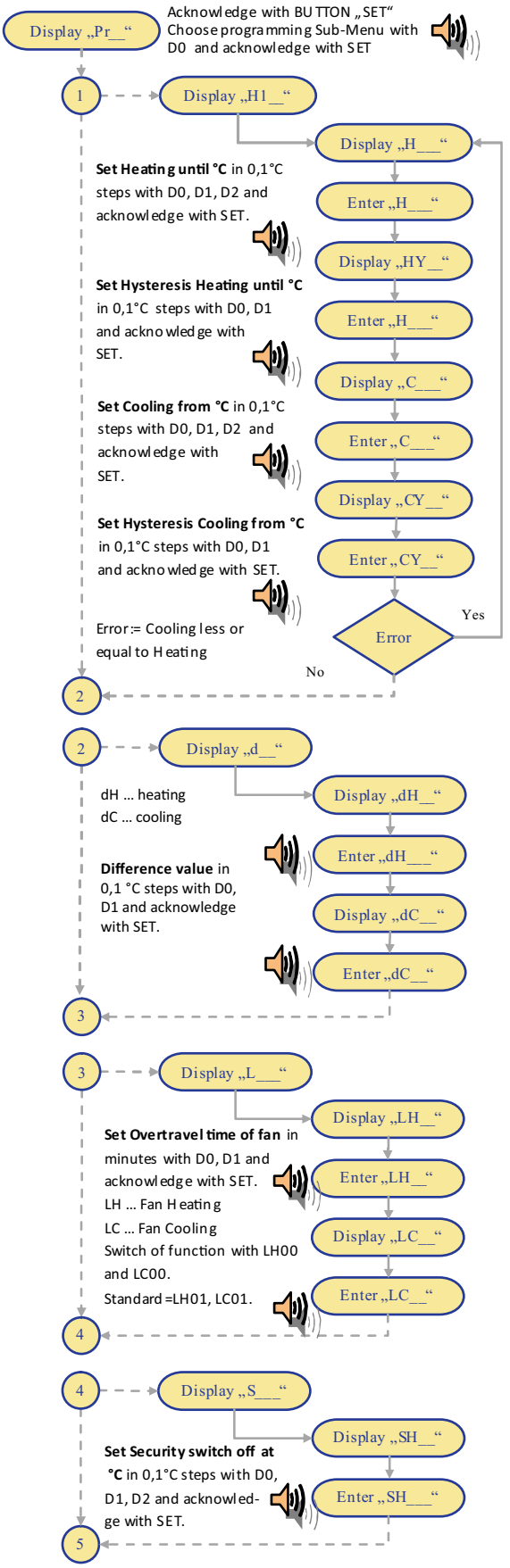
Procedure of Programming



RS232 – Interface Basic Functions

The RS232 interface enables an access for remote maintenance and status control to the UETR-MOST-16A.
All gathered data is put out every second. With a Batch File it is possible to programm several functions in a row. This automatisation may result in savings during the set up process and with the remote maintenance.
The information transfer takes place in an open protocol which will ensure an industrial and individual connection.
The programming is to be carried out with the abbreviations, displays and activities which are common and corresponding with the keys.
Adjusted settings of the UETR-MOST-16A can be read-out in programming mode (Dump-Command „D“\r)

Not included but neccessary components!

- ⇒ PC
- ⇒ Terminalprogram for PC
- ⇒ Cable with connector
- ⇒ RS232 interface at PC
- ⇒ Alternatively USB2/ RS232 converter

RS232 Activation

See procedure of programming above.

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