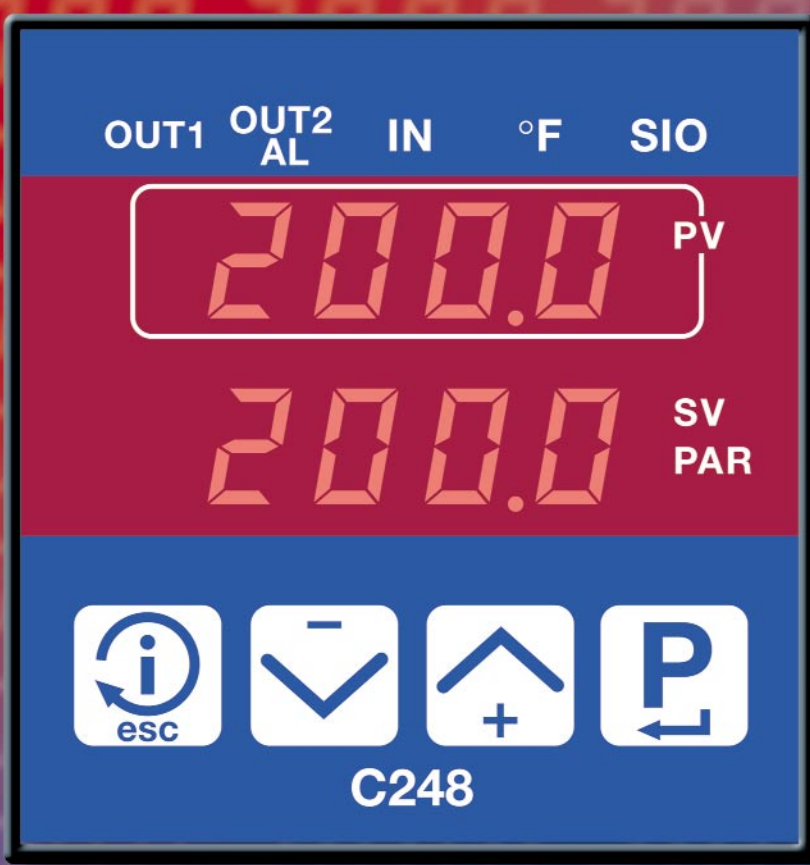


hotcontrol[®]

Temperature Controllers

Everything clearly
controlled!





Since the foundation in 1973 hotset has developed and produced heating elements and since then they have been on an expansion course. Oriented by customer demands hotset proves a special service-request with the solution of heating tasks.

With production plants in Lüdenscheid and on Malta hotset offers high production knowledge and innovation force for the future.

Starting with a large stock range via simple special heating elements up to customer-specific developments: no matter whether cartridge heaters, coil heaters or innovative products such as hotflex[®] and hotslot[®] – with a wide product range as well as high-quality customer-service hotset offers the right solution – also customer-specific.

Thus, hotset can prove its high level of innovations and can offer heating elements which are of high quality, fully developed and are suitable for different applications.

In Germany and worldwide more than 30 countries is hotset “always one step ahead”.

Motivated and qualified employees take care that hotset stands for innovation, competence and reliability also in future.

You will see and experience it – promised!

hotcontrol[®] Temperature Controllers and Thermocouples

With a wide range of temperature controllers and thermocouples hotset offers complementary products to the heating element. Aligned to the hotset-heating element the hotset-control technology can be used for numerous applications.

In the scope of the hotset-advice a unified programme of heating elements, thermocouples and temperature controllers will be offered. Thus, the process safety can be guaranteed and the interplay of the components is clearly defined.



hotcontrol[®]

Temperature controller

C 248

1 zone



Features

- Temperature controller for
 - Hot runners
 - Plastics processing
 - Packaging industry
 - Furnaces and ovens
 - Food processing
 - Dryers, etc.
- Front 48 x 48 mm
- Mounting in control or front panel, etc.
- Two 4-digit seven-segment display, 5 information/status-LEDs
- Membrane keypad with 4 buttons
- One universal input thermocouple (adjustable)/resistance thermometer
- Two digital outputs (relay and optical coupler)
- Heater circuit monitoring with external current transformer
- Options
 - Interface: RS485
 - Interface: CAN-Bus
 - Two analogue outputs 0/2 ... 10 V-DC or 0/4 ... 20 mA
 - Two digital in-/-outputs

Function

- 2-/3-point controller
- Complete standard functional range, e. g.
 - Manual mode
 - Ramp function and automatic ramp function
 - 2nd set point can be combined absolute/relative)
 - Automatic sensor break detection
 - Flexible and adjustable timer function with four timers (e. g. for start up mode)
- Identification: Automatic adaptation of control parameters of the connected zone
- Digital outputs adjustable (control outputs heating/cooling or alarm)
- Function of digital inputs and optional digital in-/outputs adjustable
- Function of analogue outputs adjustable
- Monitoring of actual value, sensor, heat current und the actuator in the heat circuit
- Information level: display and operation of important process data
- Menu controlled operation on two levels (operation level/system level)
- Remote operation: controller handling concurrently
- Controller overall function such as automatic ramp through networking by CAN-bus
- Digital data interface RS485 and CAN-bus enable communication to other controllers and computers
- Engineering tool WinKonVis: Configuration and parameter settings by RS485 and CAN-bus
- Operating hour meter
- Update of firmware by RS485

Advice:
Ready for connection in case
see page 10

Technical data

Measurement input	Number: 1 Resolution: AD conversion internal with 14 bit, resolution: temperature value 1/10 °C Input 1: thermocouple/Pt100 Sampling cycle: 200 ms/input
• Thermocouple	Type adjustable L (-50 ... 850 °C), J (-50 ... 850 °C), K (-50 ... 1200 °C) Temperature compensation included Accuracy of measurement: < 1 K Control of sensor break, reversed polarity and short circuit
• Resistance thermometer	Pt100 (-50 ... +700 °C) Connection: 3-wire without adjustment Connection: 2-wire, internal actual value correction or external terminating resistor Accuracy of measurement: < 1 K Control of sensor break, short circuit
Measurement input Heat current monitoring	With external current transformer Input voltage independent of current transformer 42 mV/A Measurement range 0 – 60 A, resolution 1/10 A, tolerance 1% of final value of measurement range Control of current tolerance and short circuit of the actuator
Digital inputs	Number: 1; Function adjustable Activation by external dry contact
Digital outputs	Number: 2 Output 1: optical coupler Output 2: relay output Function adjustable: control output, alarm output, timer output, ...
• Optical coupler TS	Suitable for solid state relays (SSR) Output active: 12 V, 100 mA
• Relay output R	Dry contact 250 V, 2 A, ohmic load Life cycle 100,000 switching cycles
Continuous output (option)	Number: 2 Optionally DC voltage 0/2 ... 10 V-DC or DC 0/4 ... 20 mA Function adjustable: degree of operation, actual value, ... Resolution 8 bit
Data interface	
• RS485	2-wire Transfer rate 1200/2400/4800/9600/19200 Baud Number of data bits 8; number of stop bits 1/2; parity bit none/odd/even Protocol: MODBUS
• CAN	Transfer rate 125/250/500/1000 kBaud CANopen – DS401
Electrical security	Protection class 2 Contamination class II Over voltage category II
Power supply	85 ... 250 V-AC, 45 – 65 Hz, power consumption approx. 6 VA, external fuse protection 200 mA/delay-action fuse
General information	Display: 2 x seven-segment display, 4-digits, display height 10 mm, 5 information/status LED
• Operating device	4 buttons, mebrane keypad
• Data back-up	Data back-up of all parameters in EEPROM (power failure safe)
• Dimensions	Housing 48 x 95 x 94 mm; control panel cutout 45 x 91 mm
• Environmental conditions	Operating temperature 0 ... 60 °C, storage temperature -20 ... 60 °C 0 ... 90 % relative humidity, no condensation
• Protection mode	Front side IP65; Housing IP20; Terminal IP20
• Mounting	Front mounting
• Housing	Plastic plug-in modules
• Weight	0.2 kg
• Standards	EN 61326-1 Interference resistance, EN 61010-1 Electrical security

hotcontrol[®]

Temperature controller

C 296

1 zone



Features

- Temperature controller for
 - Hot runners
 - Plastics processing
 - Packaging industry
 - Furnaces and ovens
 - Food processing
 - Dryers, etc.
- Front 48 x 96 mm
- Mounting in control or front panel, etc.
- Two 4-digit seven-segment display, 8 information/status LED
- Membrane keypad with 4 buttons
- Three inputs
 - one universal input for thermocouple (adjustable)/resistance thermometer
 - Two inputs
0/2 ... 10 V-DC/0/4 ... 20 mA
- Four digital outputs (relay and optical coupler)
- Heater circuit monitoring with external current transformer
- Options
 - Interface: RS485
 - Interface: CAN-Bus
 - Two analogue outputs
0/2 ... 10 V-DC or 0/4 ... 20 mA
 - Two digital in-/outputs

Function

- 2-/3-point controller
- Complete standard functional range, e. g.
 - Manual mode
 - Ramp function and automatic ramp function
 - 2nd, 3rd, 4th set point (can be combined absolute/relative)
 - Automatic sensor break detection
 - Flexible and adjustable timer function with four timers (e. g. for start up mode)
- Identification: Automatic adaptation of control parameters of the connected zone
- Analogue inputs: Configuration e. g. as external set point assignment
- Digital outputs adjustable (control outputs heating/cooling or alarm)
- Function of digital inputs and optional digital in-/outputs adjustable
- Function of analogue outputs adjustable
- Monitoring of actual value, sensor, heat current und the actuator in the heat circuit
- Information level: display and operation of important process data
- Menu controlled operation on two levels (operation level/system level)
- Remote operation: controller handling concurrently
- Controller overall function such as automatic ramp through networking by CAN-bus
- Digital data interface RS485 and CAN-bus enable communication to other controllers and computers
- Engineering tool WinKonVis: Configuration and parameter settings by RS485 and CAN-bus
- Operating hour meter
- Update of firmware by RS485

Technical data

Measurement input	Number: 3 Resolution: AD conversion internal with 14 bit, resolution: temperature value 1/10 °C Input A: thermocouple/Pt100; Input B: DC voltage; Input C: DC Sampling cycle: 200 ms/input
• Thermocouple	Type adjustable L (-50 ... 850 °C), J (-50 ... 850 °C), K (-50 ... 1200 °C) Temperature compensation included Accuracy of measurement: < 1K Control of sensor break, reversed polarity and short circuit
• Resistance thermometer	Pt100 (-50 ... +700 °C) Connection: 3-wire without adjustment Connection: 2-wire, internal actual value correction or external terminating resistor Accuracy of measurement: < 1K Control of sensor break, short circuit
• DC voltage 0/2 ... 10 V-DC	Display range adjustable Control of line interruption (for 2 ... 10 V-DC and 4 ... 20 mA)
• DC 0/4 ... 20 mA	Display range adjustable Control of line interruption (for 2 ... 10 V-DC and 4 ... 20 mA)
Measurement input Heat current monitoring	With external current transformer Input voltage independent of current transformer 42 mV/A Measurement range 0 – 60 A, resolution 1/10 A, tolerance 1% of final value of measurement range. Control of current tolerance and short circuit of the actuator
Digital inputs	Number: 2; Function adjustable Activation by external dry contact
Digital outputs	Number: 4 Output 1: optical coupler Output 2 ... 4: relay output Function adjustable: control output, alarm output, timer output, ...
• Optical coupler TS	Suitable for solid state relays (SSR) Output active: 12 V, 100 mA
• Relay output R	Dry contact 250 V, 2 A, ohmic load Life cycle 100,000 switching cycles
Continuous output (option)	Number: 2 DC Optionally DC voltage 0/2 ... 10 V-DC or DC 0/4 ... 20 mA Function adjustable: degree of operation, actual value, ... Resolution 8 bit
Data interface	
• RS485	2-wire Transfer rate 1200/2400/4800/9600/19200 Baud Number of data bits 8; number of stop bits 1/2; parity bit none/odd/even Protocol: MODBUS
• CAN	Transfer rate 125/250/500/1000 kBaud CANopen – DS401
Electrical security	Protection class 2 Contamination class II Over voltage category II
Power supply	85 ... 250 V-AC, 45 – 65 Hz, power consumption approx. 6 VA, external fuse protection 200 mA/delay-action fuse
General information	Display: 2 x seven-segment display, 4-digits, display height 10 mm, 8 information/status LED
• Operating device	4 buttons, membrane keypad
• Data back-up	Data back-up of all parameters in EEPROM (power failure safe)
• Dimensions	Housing 48 x 95 x 94 mm; control panel cutout 45 x 91 mm
• Environmental conditions	Operating temperature 0 ... 60 °C, storage temperature -20 ... 60 °C 0 ... 90 % relative humidity, no condensation
• Protection mode	Front side IP65; Housing IP20; Terminal IP20
• Mounting	Front mounting
• Housing	Plastic plug-in modules
• Weight	0.25 kg
• Standards	EN 61326-1 Interference resistance, EN 61010-1 Electrical security

hotcontrol®

Multi channel temperature controller CM

- 6, 12, 18, 24 and 30 zones
- Compact design
- Complete functional range
- Precise temperature control
- Process control function
- Diagnosis function
- Operator friendly
- Supplied complete
- Easy to service



CM 06



CM 12



CM 24

Features

- Control series in compact design
- Up to 30 control zones in 6 zone units
- Easy reading LED display
- Direct operating keys:
fast and direct access to all important parameter
- Precise control with self adaptation to process
- Heating current control
- Load shedding for each zone
- Limit value control
- Complete functional range
- Storage of 8 complete parameter sets
- Serial data interfaces RS485 and CAN (option)
- Voltage-free alarm contacts
- Connector configuration on demand user-specific
- Service friendly design

Function

- Automatic adaption during heating up phase
- Consistent heating of all control zones by automatic ramp (adjustable)
- Continuous operation of a zone even with a defective thermocouple
- Controlled heating current (tolerance, short circuit of power controller)
- Sensor check (sensor break, sensor short circuit, sensor reverse)
- Stand by and boost mode
- Temperature tolerance band is adjustable for each zone
- Interface connection to machine or PC

Technical Data

Thermocouple inputs

- Thermocouple Fe-CuNi (Type J) in accordance with DIN EN 60584, switchable in Fe-CuNi (Type L)
- Display in °C or °F
- Temperature range 0 ... 500 °C, 32 ... 932 °F
- Deviation: 1 K ± 1 digit
- Thermocouple break control, thermocouple polarity protection
- Built-in temperature compensation: Sensor – and balancing cable respectively lead to control cabinet!

Capacity outputs

- Switch capacity per control circuit: Maximum 16 A, 230 V-AC, 3680 W
- Zero cross switching
- Protected by super fast micro fuses FF 16 A, 6.3 x 32 mm
- L1, L2, L3 are distributed evenly over the heating circuits
- Zone capacity outputs are wired to standard series multi pin plugs. Different plugs and wiring upon request to customer's specifications

Collective Alarm Output

- Activation on: temperature deviation alarm, thermocouple break or thermocouple polarity alarm occurs, heating current tolerance alarm, open or short-circuit on power outputs
- Function can be configured

- Voltage-free alarm contact
- Switch capacity: Maximum 250 V-AC, 1 A

Power supply

- 400 V-AC (-10% ... +10%) 50 ... 60 Hz, 3P/N/PE
- Connecting cable 3 m with CEE plug
- Control circuit fuse 5 x 20 mm
- Power consumption: connected heating pipeline plus 26 W (CM 06) or 50 W (CM 12, 18, 24, 30)

Heating Current Control

- Heating current inductive measuring via a current transformer
- Measurement range 0.3 ... 16 A
- Accuracy 5 %
- Automatic control of the heating circuit if desired value tolerance is exceeded
- With output load separation if final load zone is short or open circuit

Communication interface

- RS485 (2-/4 wire)
- Report: switchable (ASCII-report) MODBUS rtu

Controller Action

- Micro processor multi channel control system with self adjusting control Algorithm and condition-dependent control parameter supervision
- Online control

Ambient Conditions

- Operating temperature: 0 ... 50 °C
- Limiting operation: 0 ... 60 °C
- Storage/Transport: -20 ... 60 °C
- In accordance with DIN 40040
- Humidity 75 % maximum

Protection

- IP20

Protection class

- I (protective measure with ground wire)

Equipment construction

- EN60204/DIN VDE 0113, VDE 0100 and UVV

CE-classification

- EMV according to 89/336/EWG
- EN 50082-1, EN 50082-2

Equipment Installation

- Closed cabinet metal half shell construction
- Colour RAL 3002, RAL 7001 (carmine red, silver-grey)

Standard Series

	CM 6	CM 12	CM 18	CM 24	CM 30
No. of zone	6	12	18	24	30
Mould Plug	1 x 24 pol.	2 x 24 pol.	3 x 24 pol.	4 x 24 pol.	5 x 24 pol.
Collective Alarm Plug	1 x 4 pol. HTS				
Data Interface Plug	1 x 9 pol. DSub				
Power Supply	CEE 16A	CEE 32A	CEE 63A	CEE 63A	CEE 63A
Maximal Power Output [kW]	11	22	22	43	43
Weight [kg]	9	22	24	27	29
Dimensions W x H x D [mm]	230 x 220 x 300	380 x 220 x 480	380 x 220 x 480	480 x 220 x 480	480 x 220 x 480

hotcontrol[®] Tabletop unit C 448 with C 248



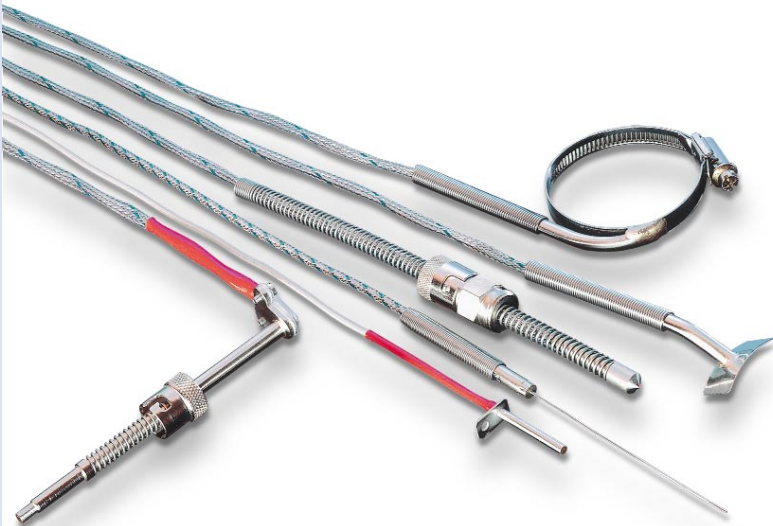
Features

- Temperature control device for 1 or 2 control points
- Easy and user-friendly operation
- Small dimensions
- Micro processor operating controller C 248
- Set point and actual value display & status LEDs
- Automatic adaptation of control system
- Manual mode
- Start up and boost mode
- Stand-by (optional)
- Alarm output or machine release by dry contact
- Interface (optional): CANBus and RS485
- Heat current supervision (optional)

Technical data

- Temperature controller:
 - Micro processor operating controller C 248 (1 zone) with automatic adaptation of control system
 - Dimensions 48 x 48 mm plug-in module
 - Separate display of set point and actual value respectively parameter values and markings by 4-digit seven-segment LED display
 - Status display by alarm and status LEDs on controller
 - Sensor inputs adjustable
 - Thermocouple: Fe-CuNi type J and L, optional NiCr-Ni type K
 - Resistance thermometer: Pt100
- Power outputs:
 - 90 – 264 V-AC / max. 3.6 KW, switched by solid state relay 25 A, Fused by ultra rapid fuse FF 16 A, 6.3 x 32 mm
- Tool connector:
 - Standard 10 pole connector
- Alarm contact:
 - Dry contact of relay
- Mains supply:
 - 90 – 264 V-AC +10 ... -10%, 50 ... 60 Hz, 1P/N/PE
- Power supply:
 - Power cord with safety plug with groundings provisions, length 3 m
- Housing:
 - Aluminium
 - Dimensions: (W x H x D) 110 x 105 x 230 mm, weight: 2 kg
- Environmental temperature:
 - Operation 0 ... +55 °C, storing -20 ... +80 °C

Thermocouples and Resistant sensors



Features Thermocouples

When using thermocouples a tension will be generated by the compound of two materials with different thermo-electric features which corresponds to the temperature difference between measuring point and reference junction. This tension is straight proportional in a certain temperature field.

As per desired category temperature different material combinations are used. The material combinations ferric copper nickel and nickel chromium nickel are normally used for thermocouples.

The following category temperatures apply in a vacuum:
 Fe-CuNi (ferric copper nickel): approx. 800 °C
 NiCr-Ni (nickel chromium nickel): approx. 1200 °C

When installing in heating elements these values decrease by embedding in heating element as follows:
 Fe-CuNi (ferric copper nickel): approx. 300 °C
 NiCr-Ni (nickel chromium nickel): approx. 750 °C

Technical data

Thermocouples and Resistant Sensors

- Thermocouple Fe-CuNi type L to DIN 43710
- Thermocouples
 Fe-CuNi type J to DIN EN 60584,
 NiCr-Ni type K to DIN 43710 or DIN EN 60584
- Resistance sensor (1 x Pt 100 Ω , 2 x Pt 100 Ω) to DIN 43710 or DIN EN 60751
- As insert surface, cylindrical, angle, clamping band or surface thermocouple
- In standardized versions or according to customer wish as per drawing or sample
- High measuring accuracy with high mechanic load

Further information can be found in the stock range brochure.

Features Resistance sensors

For resistance sensors only one material is used which shows by using alloys a temperature sequence corresponding to resistance performance. The change in resistance corresponds with the temperature change.

For the use as resistance element normally a platinum alloy is used which bears the name Pt100.

As category temperature applies:
 Pt100 (platinum 100): approx. 700 °C

When using heating elements the category temperature decreases by embedding in the heating element as follows:
 Pt100 (platinum 100): approx. 400 °C

We are looking forward to cooperating with you!

hotset develops and realises
heating solutions for

- Hot runner technology
- Packaging technology
- Die-casting technology
- Junction Technology
- Rubber-, India rubber (caoutchouc), and silicon processing
- Welding mirror manufacturing
- Extrusion technology

As well as all other industrial applications –
fast, individually and competent!



hotset – in Germany and more than 30 countries worldwide.
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