



# hotset

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## C448

### Operating instructions







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# 1 INTRODUCTION

## 1.1 ABOUT THIS MANUAL

This manual exclusively describes the functions relating to the C448 control unit.

### 1.1.1 SYMBOLS AND TYPOGRAPHICAL CONVENTIONS

The following symbols and typographical conventions are used in this document for quicker orientation:



Attention

This symbol indicates references and information which are decisive for the operation of the device. Failure to comply may result in damage to the device or personal injury.



Information / notes

This symbol indicates additional information and explanations, which serve to provide better understanding.



Example

This symbol signals the explanation of a function by means of an example.



Operation

This symbol explains the operating steps for a function.



Reference

This symbol refers to information in another document.



FAQ

FAQs (Frequently Asked Questions) are answered here.



Data on the internet

This symbol refers to additional documents on the internet.



Installation / assembly

This symbol indicates instructions for assembly and electrical installation.



Settings

This symbol provides information on the settings of the configuration parameters.

### REFERENCES IN THE OPERATING MANUAL

↗ Cross references	Cross references. In the PDF version of the document, the cross reference is accessed via the link.
Equations	Calculation specifications and examples
<View>	Menu points e.g. view are represented through a < > bracket.
{Project}	Windows (e.g. project) are represented through a { } bracket.
n.a.	Not available / not applicable

### SYMBOLS ON THE DEVICE



Warning  
Possibility of electric shock

If the adjacent symbols are visible on the device, refer to this operating manual.



General warning sign



## 2 SAFETY INSTRUCTIONS

The following safety instructions must be observed for the C448 control unit, also referred to as the device.



Before installation, handling or operating the device, please read through this start-up, service and operating manual completely and carefully.

### 2.1 SAFETY INSTRUCTIONS FOR THE USER

Everyone involved in the mounting/start-up/operation/maintenance/service of the device must

- » be suitably qualified
- » strictly observe this start-up, service and operating manual
- » regard this start-up, service and operating manual as part of the product
- » keep this start-up, service and operating manual during the lifetime of the product
- » pass this start-up, service and operating manual to all successive owners or operators of the product
- » make sure that any additions or changes received for this start-up, service and operating manual are added to it.

Please observe the following safety instructions for protection against electric shock and risks of injuries and fire.

- » Local safety regulations and instructions must be strictly adhered to during start-up.
- » In commercial establishments, the accident prevention regulations of the union of commercial trade associations for electrical systems and operating equipment must be observed.
- » Do not leave the packaging material laying around carelessly - plastic film/Styrofoam parts etc. may pose a danger to people.
- » Protect the device from moisture. Do not use in areas with high humidity.
- » Check that the specified voltage on the label is identical with the mains voltage on site.
- » Ensure that the power cord and the connecting cables are not damaged by running them over, squeezing or pulling them or the like. Protect the cables from oil, sharp edges and temperatures above 70 °C.
- » Do not touch the mains plug with wet hands.
- » Secure the contacted mating connectors on the back of the device against unintentional disconnection with the locking clips.
- » Only connect the connecting cables when the power is off.
- » Arrange the connecting cables in a way that ensures there is no risk of tripping over them.
- » Make sure that, for example, the connected injection mould is connected to the protective conductor.
- » Do not place any containers filled with liquid on the top of the device, otherwise a dangerous situation may arise.
- » The device must be set up in such a way that the main switch is easily accessible, so that the device can be shut down quickly in an emergency.
- » The feet of the device may not be removed. Make sure that there is sufficient space on the right and left sides of the housing (desktop housing at least 5 cm) to allow the waste heat to escape. Around the bottom and below the bottom of the device, air is drawn in to cool the heat sink.
- » Work such as maintenance and repair may only be carried out by authorised and qualified professionals. The device may only be used by qualified personnel who are familiar with it and have been instructed about its risks. The relevant accident prevention regulations, as well as other general occupational health and safety rules must be observed. Unauthorised modifications of the device exclude liability of the manufacturer/supplier for resulting damages.
- » Before working on this device, disconnect it from the supply voltage or make sure that the power is off. Secure the supply voltage from being switched on again.

The warranty claim is void for personal injury and damage to property caused by not observing the start-up, service and operating manual or not following these safety instructions. The manufacturer assumes no liability for such damage.



In all cases where either of the adjacent symbols are seen on the device, it is absolutely necessary to follow the safety instructions for the hot runner controller identified by these symbols/signs/labels C448.



This start-up, service, and operating manual must be consulted in all cases.

## 2.2 INTENDED USE

The C448 is to be used as a hot runner controller for heating resistive loads (e.g. heating elements in hot runners).

When used properly, the safety of the user and the device is guaranteed. The device may only be used for its intended purpose.  
If the device is not used as intended, there is a high risk of personal injury and property damage.



Uses other than those listed above are considered improper uses, and exclude the liability of the manufacturer/supplier for any related damage to persons or property and any consequential damage.

## 2.3 MAINTENANCE

Do regular checks to make sure that the ventilation openings at the bottom of the device are not dusty.



Further maintenance is not necessary. Make sure that the surfaces of the device are clean. Use a slightly damp cloth for cleaning. Avoid the use of solvents, cleaning agents and abrasives.

## 2.4 WARRANTY CONDITIONS

This product is subject to the statutory warranty periods for faults or deficiencies in the manufacturing.

### CONTENT OF THE WARRANTY

If a malfunction occurs due to a manufacturing fault, the manufacturer/supplier will repair or replace the defective product at to their own discretion.

The following repairs are not covered by the warranty and are subject to a charge:

- » Malfunctions after the legal deadlines have expired.
- » Malfunctions caused by operating error and/or incorrect parametrisation by the user (if the device is not operated as described in the start-up, service and operating manual).
- » Malfunctions caused by other devices.
- » Changes or damage to the device which do not originate from the manufacturer/supplier.

If you want to claim services under this warranty, please contact the manufacturer/supplier.

## 2.5 TRANSPORT AND STORAGE

### 2.5.1 TRANSPORT

The C448 (all individual parts together) is supplied in shockproof packaging in a sturdy cardboard box. This ensures sufficient protection under normal circumstances.

To avoid transport damage, the hot runner controllers must be transported **STANDING UPRIGHT**.



### 2.5.2 UNPACKING

Check the packaging and then the device for visible transport damage. If damage is visible, please contact the transport company.

If the device is damaged, it may not be put into operation.





### 2.5.3 STORAGE

If the device is unpacked but not used immediately, it must be stored protected from dirt and moisture. Ambient temperature limit -20...70 °C, relative humidity limit < 95% annual average, no condensation.

## 2.6 DISPOSAL

Hotset as the manufacturer in accordance with ElektroG (Electrical and Electronic Equipment), which implements the European WEEE directive 2002/96/EC into German law, is registered under the WEEE registration number DE 66448978. This also includes the components of this device.



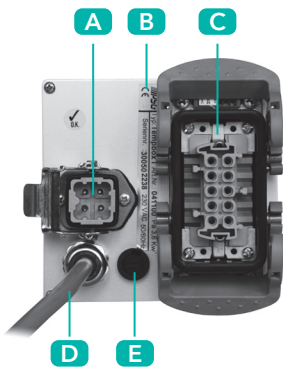


## 3 START-UP

- » Factory setting enables the controller to be directly ready-for-use at delivery.
- » Before switching on the controller check whether the pin assignment of the control device corresponds with the one on the tool and the connection cable is applicable.
- » Switching on the controller it heats according to the preset set point. To prevent this, remove the connection cable between controller and tool and set the set point to 0°C. Switch off the control device, install the connection cable again and restart the control device.



### 3.1 CONNECTIONS & PIN ASSIGNMENT



A	Alarm output
B	Type plate
C	Connector Heater / Sensor
D	Power cord
E	Steuersicherung (2A T)

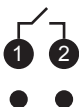
#### 3.1.1 PIN ASSIGNMENT HEATER/SENSOR (STANDARD)

Pin	Zone	Function
1	1	Sensor -
2	1	Sensor +
3	1	Heater L
4	1	Heater N
5	2	Sensor -
6	2	Sensor +
7	2	Heater L
8	2	heater N
9	-	-
10	-	-

From standard deviating customer specific pin assignment is feasible. For more information please refer to pin assignment plan.

For compact control device type with one zone zone 2 is not applicable.

#### 3.1.2 ALARM OUTOUT



Dry contact (break contact, 250V/2A, ohmic load).

Alarms for temperature limit value, sensor and heat current.



## 3.2 DISPLAYS AND OPERATING DEVICE

### 3.2.1 CONTROLLER



A	On/Off switch
B	Fuses for heaters (16A T)
C	Switch for Standby mode
D	Temperature controller

### 3.2.2 TEMPERATURE CONTROLLER



A	Info-key
B	Arrow down key (Reduce)
C	Arrow up key (Increase)
D	Parameter-key
E	LED Heating
F	LED Alarm
G	LED Standby
H	Actual value, parameter value and status
I	Setpoint and parameter name



## 4 FUNCTIONS / SETUP

### 4.1 OVERVIEW

The controller provides additional functions for e.g. hot runner control.

**Manual mode** Please refer to „Activate manual mode and adjust degree of operation“

**Start-up function** Function to heat up the zones preferable gentle. After activation the zone is adjusted to 100°C during the preset time t1 to remove the humidity of the heating unit.

**Boost function** The Boost function is started directly after the start-up function. The function clears nozzles of rests of material before start. The set point is increased by the preset value of SP3 during the preset time t2.









**Standby function** Temporary lowering of the set point by the preset value of SP2 activated by switch for stand-by mode. The function can be used for e.g. production stop to reduce the degree of operation and to save the plastic melting.

**Alarm supervision** The control performance is supervised by an adjustable limit band around the set point and the maximum temperature. The sensor and the connecting cable is controlled of line break, incorrect polarity and short circuit. With option heat current supervision the control device controls the difference between heat current and reference value (set point of current) and the status of the solid state relay.



### 4.2 CHANGE PARAMETERS AT OPERATOR LEVEL

The additional functions are configurable at operator level by the parameter button.

**Example** Increase the upper limit from 5K to 10K.

	Press the parameter button to change to the operator level. Press the parameter button repeatedly until Li.1 appears. The parameter value flashes.	
	Enter the new wanted upper limit value with arrow up/down buttons (Example: 10 K). The parameter value still flashes.	
	Confirm the change of limit value with parameter button. The zone is controlled by the new limit value. The next parameter is shown in the LED display.	
	Press info button to return to set point and actual value display.	

#### 4.2.1 PARAMETERS AT OPERATOR LEVEL

Parameter	LED-Displays	Range/Value	Description
Setpoint		0 to 500°C	Set point = 0°C: No corrective signal at control output and no alarm supervision
Manual mode		on/off	Please refer to „Activate manual mode and adjust degree of operation“




Parameter	LED-Displays	Range/Value	Description
Degree of operation		0 to 100 %	The degree of operation can only be changed during manual mode. In control mode the degree of operation is calculated by the controller and can only be read.
Status of zone		on/off	Activation/Passivation of zones. For a passive zone there is no corrective signal at control output and no alarm supervision.
Upper temperature limit value		0 to 1500 K	Exceeds the actual temperature value the upper tolerance value above the set point an alarm is generated. Set value always greater than 0.
Lower temperature limit value		-999 to 0 K	Falls the actual temperature value below the lower tolerance value beneath the set point an alarm is generated. Set value always less than 0.
Lowering value for Stand-by function		-999 to 0 K	Set value always less than 0.
Increasing of temperature for Boost function		0 to 1500 K	Set value always greater than 0.
Startuptime for Startup Mode		0 to 9999 seconds	Start-up function starts automatically after start of controller. Start-up time starts as soon as actual value reaches 95°C. Setting = 0: Start-up function deactivated.
Boost time for Boost function		0 to 9999 seconds	Boost function starts automatically after end of start-up function. Setting = 0: Boost function deactivated.



### 4.3 ADJUST SETPOINT




**Example** Change setpoint from 200 °C to 250°C.


Starting from the set point/ actual value display ...



  Choose function adjust set point directly and enter the wanted set point with the up/down buttons  
(Example: new set point 250°C).



The change of the set point is automatically accepted 3 seconds after the latest data entry. The controller works with the new set point.



### 4.4 ADJUST DEGREE OF OPERATION IN MANUAL MODE

**Why manual mode?** What is manual mode for? In manual mode a constant degree of operation is provided at control output. 0% means that the control output is permanently OFF, 100% means that the control



output is permanently ON. The manual mode can for example be used to maintain the operation of the controller in case of a damaged sensor in one zone until the exchange of the sensor.

**The manual** mode is activated on info level. Additional to the direct data entry the degree of operation can be changed.

**Example** Activate manual mode and set degree of operation to 25%.



	2x Press info button twice to change from set point/actual value display to degree of operation display.	
	Press the parameter button, to release the input interlock. The manual mode is deactivated. The upper LED display flashes	
	Activate manual mode by arrow up/down buttons	
	Confirm the activation of the manual mode. Now enter the degree of operation. The controller displays the last output of degree of operation during control. The degree of operation flashes.	
	Enter the degree of operation with arrow up/down buttons (Example: new degree of operation 25%). The degree of operation still flashes.	
	Confirm the change of degree of operation with parameter button. Now the controller starts to work with the constant degree of operation at controller output..	
	Press info button to return to the set point and actual value display. In the upper LED display alternately degree of operation value and information message mAnU are displayed.	

The manual mode can be activated in the same way. For this in step 2 and 3 set manu from on to oFF.

## 4.5 STATUS- AND ERROR MESSAGES

Status messages provide an indication of the operating status of the zones. In case of alarm messages the reason for the error has to be searched for and corrected. Status and alarm messages will be alternately displayed in the upper LED display.



**Example** Controller in phase of identification and adapt the control parameters to the zone.

### 4.5.1 STATUS MESSAGES

Display	Meaning
Id	The controller is in the 'phase of identification'. During heating up the control parameters adapt automatically to the connected zone.
mAnU	The controller is in manual mode.
SP2	The controller is in stand-by mode.
SP3	The controller is in boost mode.



Display	Meaning
SP4	The controller is in start-up mode.

#### 4.5.2 ERROR MESSAGES



To correct the errors disconnect the power supply necessarily of the controller!

Display	Cause of error	Methods of error corection Fehlerbehebung
tCbr	Sensor break The wiring of the thermocouple is interrupted.	Check resistance at the tool. Display of thermocouple approx. 4 Ohm. If there is no pass, the sensor is damaged. Connect cable with the tool and check cable from pole to pole. If there is no pass, the cable is interrupted. If there is no problem recognized, change the controller or send the controller back to the supplier for repair.
tCrC	Sensor incorrect polarity Thermocouple with incorrect polarity. The thermocouple is connected in the wrong way	Error can only be checked by visual control (not measurable). Only wires of the same polarity should be connected. For thermocouple type J this is black/black and black-and-white/black-and-white. For thermocouples of other standards other colors are feasible. Correct wrong wiring.
tCSC	Sensor short-circuit The thermocouple is squeezed.	Indirect error detection: An alarm is generated after 5 minutes when there is a heating output of 100% and no increase of the actual temperature value about 5°C. (The time is adjustable on request by the supplier). Check whether the cables of the thermocouple at the sensor in the tool or in the cable are squeezed and have contact. Then the controller identifies less temperature and the zone is overheated. Furthermore check: Heating output for heater sufficient? If not, exchange heating unit.
drl	Temperature drift The automatic parameter determination („Identification“) can not be started.	Actual temperature value is strongly influenced by another zone. Wait until interference is eliminated or zones are heated simultaneously.
AL	Maximum temperature exceeded The actual temperature value has exceeded the upper temperature limit of 500°C.	Check corresponding assignment of sensor and heater. Solid state relay damaged? Control output permanently ON although the controller provides no degree of operation. Send the controller back to the supplier for repair and get the SSR exchanged by specialized staff.



## 5 APPENDIX

### 5.1 VERSIONS OF THIS DOCUMENTATION

Date	Version	Modification
01.04.2021	1.00.00	New Layout

