USER MANUAL
HOTRUNNER CONTROLLER
DP1 /DP2

HOTRUNNER SOLUTIONS
FOR YOUR INDUSTRY

GÜNTHER®
HOT RUNNER TECHNOLOGY

CONTENTS

1 GENERAL NOTES

The one- / two-zone control unit DP1/DP2 is designed for temperature regulation of one / two hot runner nozzles. It may be applied for the control of any 230V-load circuit of hot runner systems. The unit's output of up to 3500W allows the operation of different 230V-loads by means of the Pulsgruppensteuerung (Switching Power Control).

Attention:
Please note that this unit is not designed for temperature control of low voltage nozzles (5V or 24V).

On the rear the illuminated master key, the modular plug and the fuse are positionized. Each heating circuit is controlled via solid-state-relays in Pulsgruppenbetrieb (Switching Power Control mode).

Caution!
The load fuse F1 may not exceed a maximum current of 16A!

The one-zone control unit DP1 is a smaller version of the two-zone control unit DP2. It is basically constructed like the DP2, yet it operates only one circuit.

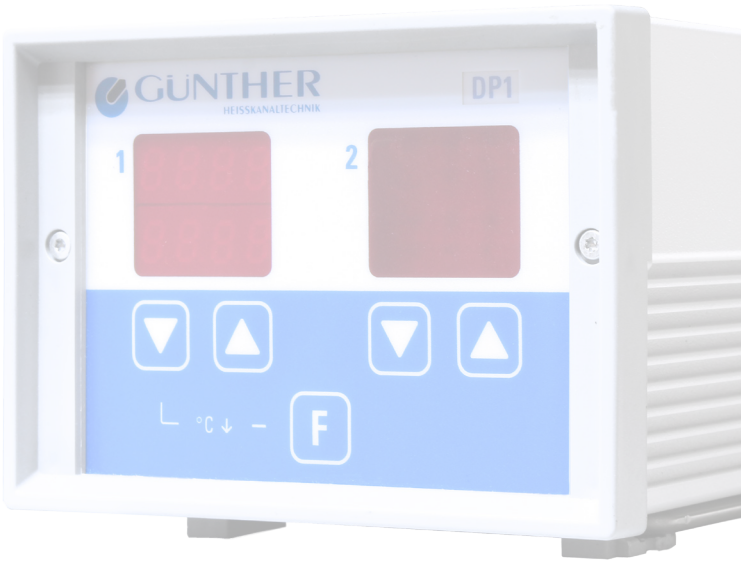
1.1 SAFETY INFORMATION

The DP1/DP2 is built and tested according to safety standards declared by the European Council of Assimilation of Legal Regulations (cf. appendix) and has left the factory in perfect condition. In order to maintain this standard and for safe operation, please read this user manual carefully and follow all instructions.
Before switching on, ensure that your local supply voltage corresponds to the unit's nominal voltage. For safe operation, the unit must be plugged into an earthed socket. Any disconnection of the earthed conductor, e.g. by using an extension flex without earthed conductor, may cause severe danger!

Caution:
Always disconnect the unit before opening! Pull mains plug!
This control unit contains hazardous voltage. Any repair and service work must be carried out by qualified and authorised personnel only. The components inside the unit are maintenance-free for our customers. They are exclusively serviced by Günther Hot Runner Systems.

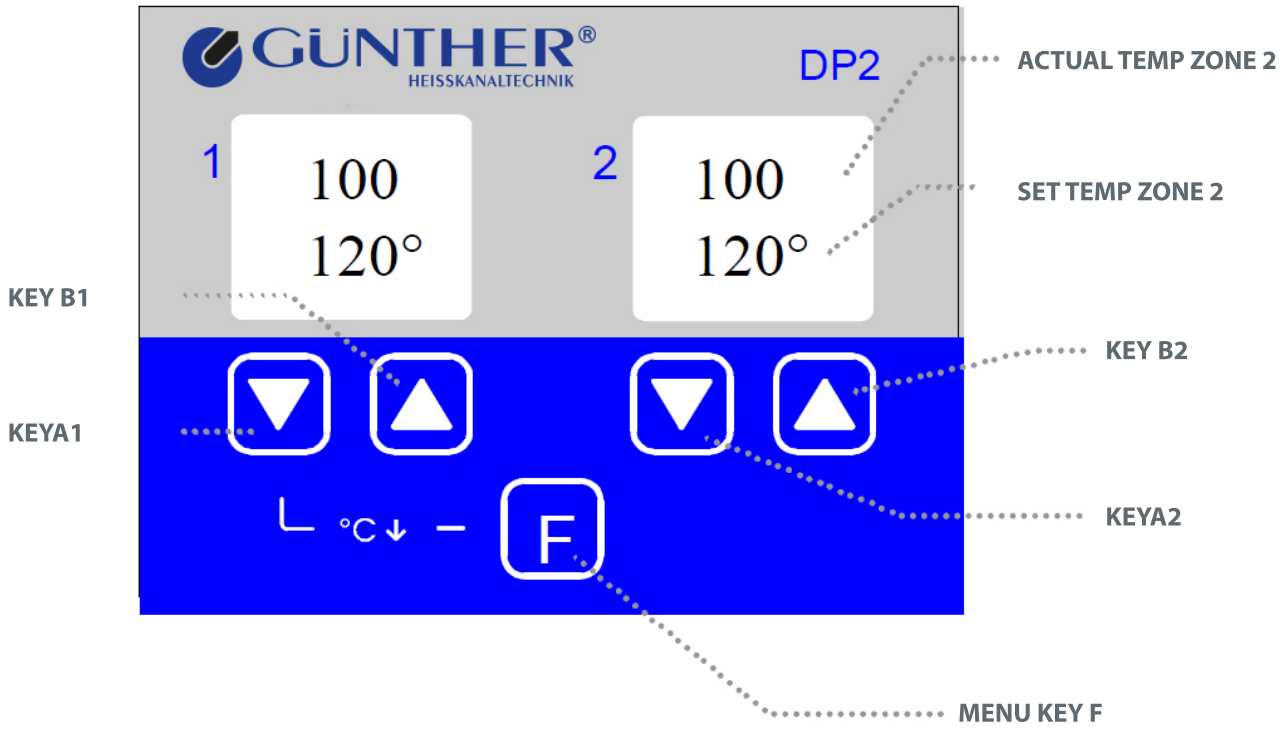
To operate the control unit, a fuse protected socket must be used. Both, the DP1 and DP2 are equipped with a one phase 16A-plug. Please ensure that the sockets used are protected sufficiently.

Note:
Refer to the chapter on installation and start-up for further information. Always unplug the unit before touching the components inside! (Pull mains plug!)



2 OPERATION

Fig. 2.1 Operating the DP1/DP2



The set temperature can be adjusted by pressing the up- and down-keys at each zone. By pressing the two **keys (A_ and B_)** of a zone simultaneously, it is possible to switch between the three operation modes.

When changing settings in the parameter menu, the left display shows the parameter settings for all zones.

The fault reports of each zone are displayed on the defect zone display.
By pressing **key 'F'** the parameter menu is entered (see chapter 3).
Within the one-zone version DP1, the second zone and the right display do not have any function. Besides that, the functions do not differ.

2.1 START UP

After switching on, the controller's left LED display (zone 1) shows the start report: the top line indicates the number of zones connected to the controller (DP2 – two zone controller); the bottom line indicates the software version. After the start report, the DP1/DP2 automatically runs a system check before starting the operating mode.

Fig.. 2.1 Starting message of DP1/DP2

2.2 DISPLAY OF TEMPERATURE

The temperature controller displays temperatures on two 4-digit LED displays. During thermocouple control mode, the first line shows the actual temperature and the second line displays the set temperature (max. 500°C).

The DP1/DP2 offers the opportunity to choose between the temperature units °C and °F. A set value of 570°F, for example, would be displayed as „570F“ on this set value indicator.

2.3 DISPLAY DURING PERCENTAGE CONTROL MODES

The DP1/DP2 can operate in percentage control mode in order to avoid a long-term production halt in the event of a thermocouple failure.
Within the percentage control mode a range of 0-100% is possible.
Key A1,A2: Decreasing the percentage value (set value current control)
Key B1,B2: Increasing the percentage value (set value current control)

2.4 CHANGING THE CONTROL MODES

By pressing **keys A1** and **B1** for zone 1 (or keys A2 and B2 for zone 2) simultaneously, switching between the control modes thermocouples, percentage control mode and zone off is possible.

Note:
If the DP1/DP2 detects a damaged or disconnected thermocouple during operation, it disconnects the heater circuit and displays a fault report. After confirming this report, the unit switches into percentage control mode automatically.

2.5 LOADING DEFAULT VALUES

The system parameters of the DP1/DP2 can be set in the parameter menu. In case of an error in your parameter configuration, it is possible to load the standard default values again. For that purpose, press **keys A1, B1** and **F** simultaneously during power-on of the control unit.

display	meaning
LOAd dEF.	The display ´load defaults´ appears after choosing to load the default values for approx. 5 sec.

2.6 FAULT REPORTS

During its operation, the controller DP1/DP2 runs several diagnostic routines, including a check of thermocouples. Any fault or defect is indicated by a short report. If a fault or defect is identified, the heater circuit will always be disconnected.

Note:
System faults can be confirmed by pressing **key ‚F‘**.

display	meaning
No Sens	**Thermocouple failure** A thermocouple is unconnected or interrupted on one wire. Please check the wiring of your thermocouple!
Pol. tH.1	**Polarity error at thermocouple connection** Polarity error at the connection of thermocouple of control circuit 1. The thermocouple seems to be connected with wrong polarity. Please check the wiring of your thermocouple!
Note	After confirming the fault report “thermocouple failure” or “polarity error at thermocouple connection” with key F, the DP1/DP2 switches into percentage control mode automatically. If the user solves the problem before confirming with key F, the controller remains in thermocouple control mode..
Err. tH.1	**Thermocouple short circuit** A short circuit in control circuit 1 has occurred. This fault can be detected after a period of min. 90 sec.. Please check the wiring of your thermocouple!
t.Hi Ch1	**Over temperature** The temperature of control circuit 1 crosses the security mark. The max. allowed temperature can be adjusted as system parameter and is standardly set to 500°.
Err. Temp	**Ambient temperature above limit** The unit detected an ambient temperature of above 70°C.

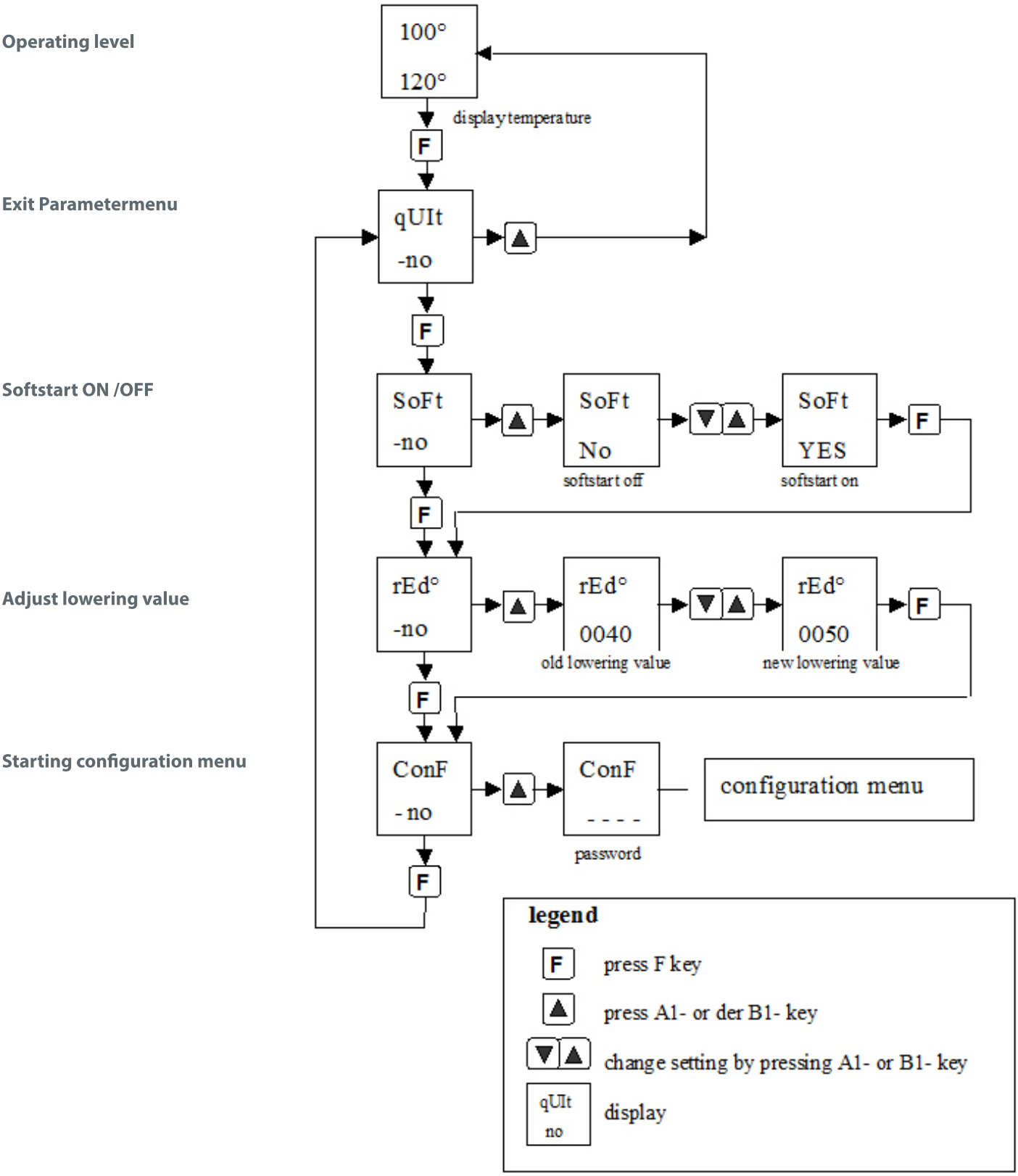
3 PARAMETER SETTING

The controller’s operation depends on the setting of the parameters. For easy access, the most important parameters are displayed in a menu. This parameter menu is divided into an user menu and a configuration menu, to which the access is restricted by a password. In the user menu only non-critical system parameters can be changed.

Attention:
The access to configuration data is protected by a password. The configuration should only be changed by authorised and qualified personnel. Inexpert configuration may cause damages on the hot runner system. The person who sets the unit into operation is responsible for the correct configuration of the controller.

3.1 PARAMETER MENU

Flow chart of parameter menu

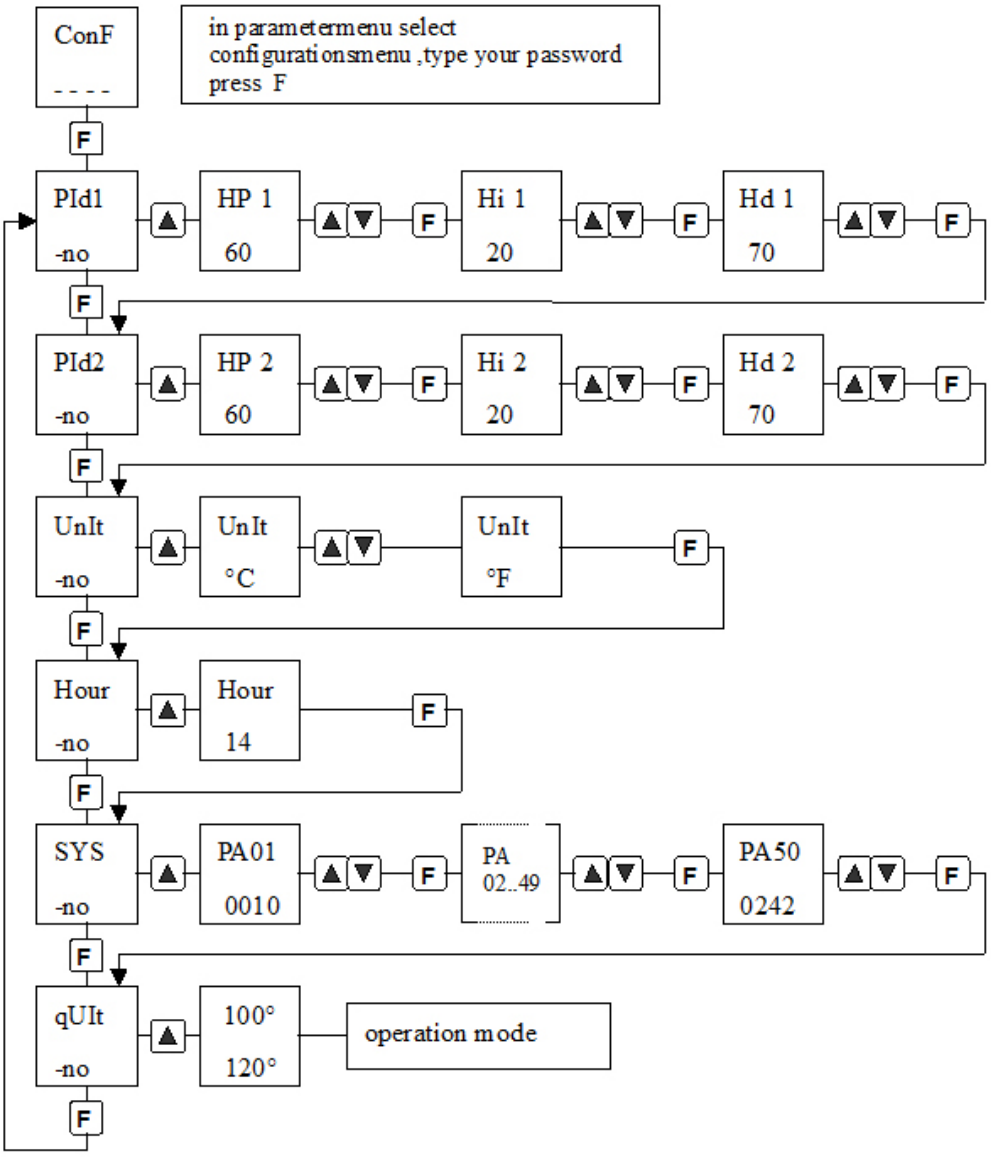


By pressing **key F,** the parameter menu is entered. Each further use of **key F** leads to the next menu item. With **keys A1** or **B1** each menu item can be activated. The display then switches from **“NO”** to **“YES”**.
Please refer to chapter 3.2 “Configuration menu” for further information on the configuration menu.

display	meaning
qUIt	**exit menu** By selecting **quit** the parameter menu is closed. To return to the normal operating level, press **key A1** or **B1**. If for approx. 10 seconds no key is pressed, the parameter menu is quit automatically..
SoFt	**softstart** By entering the menu “SOFT” the softstart function for 230V nozzles is selected. Within this parameter it is possible to enable or disable the softstart function.
rEd° **rEdA**	**set value lowering** The menu item ‚set value lowering‘ („rEd.°“ or „rEd.A“) enables the user to set the lowering temperature or the lowering current. The function is switched on by pressing **keys A1** and **F** simultaneously.
ConF	**configuration menu** The menu item ´configuration menu´ **(„CONF.“)** enables the user to enter the configuration menu. This menu is protected by a password. Please refer to the chapter 3.2 for further information on the configuration menu.

3.2 CONFIGURATION MENU

Flow chart of parameter menu



Adjust PID parameter of zone 1

Adjust PID parameter of zone 2

Temperature unit °C / °F

hour meter

adjust systemparameter

Exit menu

In the configuration menu, the system parameters of controller DP1/DP2 can be set. In addition to the various items for frequently used parameters, the menu item ‚system' enables the access to all parameters. Therefore this menu item is protected by an additional password.
Changes to the system parameters must be carried out by authorised and qualified personnel only.

display	meaning
ConF ------	**Konfigurationsmenü** The parameter menu leads to the configuration menu (‚CONF.'). To start the configuration menu, the password has to be entered. Consider that the digits of the password have to be entered starting right (!) by pressing **key A1** or **B1**. Enter by pressing **key F**.
PId 1 **PId 2**	**PID-parameters** The item PID1 allows to change the PID regulation parameters for each zone manually. At the two zone controller DP2 there is a second menu item to select the PID parameters for the second zone.
Unit	**temperature unit** In this menu item the temperature unit can be chosen (°C or °F).
Hour	**counter operating time** In the menu item 'hour' the operating hours are listed.
SYS	**Systemparametermenü** After entering the menu item ‚sys', the system parameters of the DP1/DP2 can be changed. The menu is protected by a password and enables the user to set and change all system parameters. Changes of the system parameters should only be carried out by authorised and qualified personnel. If the manual configuration of the system parameters is inadequate or faulty, it is possible to load the standard default values as described in chapter 2.5 "Load defaults".
qUIt	**exit menu** By selecting quit, the parameter menu is closed. To return to the normal operating level, press **key A1** or **B1**. If for approx. 10 seconds no key is pressed, the parameter menu will be quit automatically.

4 FURTHER FUNCTIONS

4.1 SOFTSTART

When using 230V-nozzles a softstart is necessary in order to remove the moisture from the thermoelectric couples. Therefore the set value increases in a so-called ramp time from 0 to 50% during the first phase of the softstart. The ramp time should guarantee that a temperature of 105°C is reached at its end. During the following hold time the DP1/DP2 regulates the temperature to 105° independent from the set value selected.
During the hold time, the nozzles are dried out adequately with a low thermic load. This start-up procedure occurs automatically, when switching the controller on. After the hold time the unit switches into normal operating condition immediately.
The softstart-function can be activated in the parameter menu.

4.2 STARTING RAMP

For heating up a cool zone, it is highly recommended not to use the max. power for reaching the desired operating temperature. The DP1/DP2 limitates the power output at the initial start-up and afterwards increases it to 100% over four steps, in order to keep the thermic stress as low as possible. After approx. 60 seconds the max. heating capacity is available

4.3 TEMPERATUR LOWERING

During any long-term production halt it is advisable to lower the temperature of the zones. It is not necessary to adjust the temperature for each regulation zone. The user can control the temperatures of all zones simultaneously by pressing a lowering-hotkey. By pressing **key A1** and **key F** simultaneously, the set temperatures of all zones are lowered by a preset value. By pressing the lowering key again, the lowering is cancelled.

4.4 SWITCHING POWER CONTROL

The above mentioned phase control mechanism for continuous power control is created for hot runner nozzles specifically. To operate 230V-nozzles with very high output, the DP1/DP2 provides a "switching power control". The switching power control triggers a solid state relay. This way 230V-heater circuits with just about any load can be controlled, too. The Switching Power Control ensures that the desired output at the 230V-nozzle will be activated continuously. Opposite to a traditional controller the switching power control ensures an improvement of heating capacity, and thus better quality control.

4.5 COUNTING OPERATING TIME

The operating time of the DP1/DP2 is saved with resolution of one minute and may be read via the parameter menu.

operating time < 10 hours	display : hours.min
operating time 10 hours	display: hours

5 CONNECTION OF CONTROL CIRCUITS

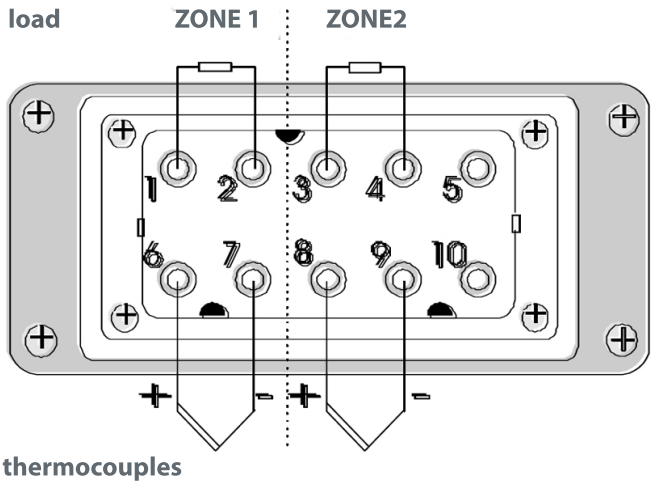


Fig. 5.1 Load connection plug on the DP1/DP2's rear

On the control unit's rear a load connection plug is positioned. Depending on the version (DP1 or DP2), up to two load connection modules can be assembled on this modular plug. Each 230V-load circuit will be connected using these solid 20A-contacts. Refer to fig. 3.2 for information about the assignment of the connection points to the corresponding modules.

zone	1	2
load 1 (phase)	1	3
load 2 (neutral)	2	4
thermo +	6	8
thermo -	7	9

Fig. 5.2 Load and thermoelement-connection plug on the DP1/DP2's rear

6 INSTALLATION AND START-UP

a) Installation

- Please ensure that the unit has a position where no heat accumulates.
- Ensure that the sockets are sufficient for connecting.
  The DP1 and DP2 needs a 16A-Schuko mains plug.
  The load fuse may not exceed 16A.

b) Start-up

- To connect the heating circuit and the thermocouples, plug in the load connectors.
- Plug in mains plug for power supply.
- Press power switch.
- Set the desired set temperatures of all zones.
- During initial start-up you should activate each control point separately for detecting possible faulty connections of either load or thermoelectric couple.
- After switching on the control unit, please wait for a few minutes until all tools are heated up evenly.

7 TABLE OF FAULTS AND DEFECTS

During operation, the DP1/DP2 checks the control circuit on faults and defects continually. Any fault/defect detected is indicated on the display.

		fault/defect	possible cause	countermeasure
A	Fault report "no sensor 1"	Thermocouple of zone 1 or 3 defect	Thermocouple not connected or interrupted	Check connection plug and -cable of thermoelectric couple
B	Fault report "no sensor 2"	Thermocouple of zone 2 or 4 defect	Thermocouple not connected or interrupted	Check connection plug and -cable of thermoelectric couple
C	Fault report "Pol. TH 1"	Polarity error at thermocouple of zone 1 or 3	Polarity error at thermocouple	Correct the polarity
D	Fault report "Pol. TH 2"	Polarity error at thermocouple of zone 1 or 3	Polarity error at thermocouple	Correct the polarity
E	Significant fluctuation of temperature (+/- 100 °C)		Thermocouple defect or load circuit not earthed	Check earthing of load circuit
F	Temperature increase not satisfactory		Load circuit (swapped)	Check assignment of heater circuit to thermoelectric couple

Attention:
With 230V-runners the heater circuits must be earthed sufficiently. Lack of earthing or insufficiently earthed tool/heating element may cause severe errors in the temperature reading. .

Attention:
During initial start-up the **zone's assignment** must be checked. For that purpose the user should heat up the control circuits **one by one** and monitor the temperature rise.

8 SPECIFICATIONS

Nominal Voltage:	220V – 240V AC, 50/60Hz
Nominal Capacity:	3500W, 1 x 16A
Stand-by Capacity :	approx. 10 VA
Load Connection DP1:	1 x heater circuit 230V / 16A, amphenol modular connector series C146...
Load Connection DP2:	2 x heater circuit 230V / 16A, amphenol modular connector series C146...
Mains Plug DP1/DP2:	3m, 16A-plug
Thermocouple Connection:	thermoelectric couple type L (FeCuNi), amphenol modular connector series C146...
Fuse:	FF 16A, 6,3 x 32mm, type Schurter SA; superfast for triacs
Regulation:	Switching power control (Pulsgruppensteuerung)
Storage Temperature:	up to 70 C
Operating Temperature:	up to 35°C
Protection Type:	IP 20
Dimensions (W, H, D):	125mm x 95mm x 290mm
Colour:	grey and blue (RAL 9018 and RAL 5015)

9 APPENDIX

9.1 APPENDIX A - ADRESSES

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Service	+49 (0) 6451 5008-58 +49 (0) 6451 5008-87	service@guenther-heisskanal.de

9.2 APPENDIX B - DECLARATION OF CONFORMITY

For the following below listed products:

Günther-Hot Runner Controller DP1 and DP2

we hereby confirm, that above listed products comply to all important (*) safety requirements that have been declared by the Council of Assimilation of Legal Regulations by the EC membership countries concerning electromagnetical conformity (89/336/EWG).

To verify these products to electromagnetical conformity the following standards were referred to:

EN 50081, Part 2
EN 50082, Part 2

The above mentioned products also comply to:

DIN EN 61010, part 1/03.94.

This declaration applies to all above listed products with the following production index:

Production Index A

The production index is the number behind the serial number on the identification label of the product. The identification label is located on the right side of the product.

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Karl-Heinz-Beckurts-Str.13
D-52428 Jülich

Bedburg, 01.06.2004

J. Marquardt
(Managing Director)

(*) Expressions recommended by „EMV-Rechtsvorschriften und ihre Anwendung in der Praxis“, Franzis-Verlag, 1993