Valid for item nos.:

68030.001 (1-zone)
68030.002 (2-zone)
68030.004 (4-zone)
68030.006 (6-zone)

HPS-C-Slot
Hotrunner controllers
Operating manual
Before working on the controller and/or the hotrunner system, ensure they are off-circuit. Turn unit switch OFF and disconnect main power. Connection, repair and maintenance work may only be carried out by qualified skilled personnel. Please be careful when replacing controller modules; sharp edges, hot or electrically charged components may cause injuries.

Before putting into service the system is to be inspected in accordance with DIN EN 60204 – 1 and the generally recognised rules of sound engineering practice. The connected components can become very hot. Appropriate precautionary measures are to be taken when putting into service and during operation.

Application range:
This EWIKON control system can be used to operate EWIKON hotrunner systems in rooms with low humidity.
Introduction

The two basic components of the controller system HPS-C-Slot are the “controller module, item no. 60040.060” as well as a system unit to display error messages or a process release. They also feature an input option to activate the increase or decrease function.

The controller components are connected via a backplate and are, therefore, exchangeable. This guarantees easy maintenance. Idle slots need to be covered by a dummy panel. The system control panel is hard-wired inside the device.

The controller is operated using the 4 keys "ON/OFF", "Selection", "Up / Increase value", "Down / Decrease value" of the respective controller module.

The parameter and configuration levels of the modules can be reached with key combinations, so that all necessary settings can be adjusted. The display consists of two 4-digit 7-segment displays, the upper one (ACT) showing the actual value or parameter setting, the lower one (SET) showing the set value or parameter description. Furthermore, 3 LEDs indicate the condition of the heater outlet as well as thermocouple and load circuit errors.
The system control panel displays messages; settings referring to all control modules of one device can be changed here as well. Furthermore, there are 3 LEDs for the “process release”, “thermal circuit error” and “load circuit error” signals as well as one switch to activate the increase (boost) or decrease (stand-by) mode. This information can also be obtained from the signal connector on the rear side of the controller in order to exchange data with the injection moulding machine.

The mains supply of the controller as well as the connections to the mould or to the controls of the injection moulding machine are accessible on the rear side of the device where also the mains switch and the fuses of the device are positioned.

For the exact assignment of the connectors pins please see the “Connector pin and terminal assignment” chapter.
Operating and setting the controller

The controller is set in different menus most of which are protected by passwords. When delivered the values in the configuration and parameter levels are preset so that changes are necessary only in few cases. No more information on access and possible settings is available in this document, for further details please see the “Concise Product Manual” (information on page 11).

ATTENTION: As settings that can be changed on these protected access levels may have serious effects on the operating behaviour of the HPS-C-Slot control modules, the values may only be changed by qualified and authorised personnel.

Operator level

An automatic self-test routine is run after the controller has been switched on. During this routine all LEDs and display segments are lit. After the self-test has been finished the controller is in the “operator level” mode displaying the actual value (upper display ACT) and the set value (lower display SET). Press the key to show further displays of the control module.

1) 25 200 Actual value temperature (or different message in case of error)
    Set value (attention: when switched on controller displays value for drying mode) which can also be modified here after the drying routine has been finished. Display  when controller is switched off.

2) 200 Actual value temperature
    0.8A Heating current in A, display  during initialisation

3) 200 Actual value temperature
    P 35 Current controller output in %

4) 200 Setting of temperature set value for normal operation
    _SP 1 Set value 1 (set point 1), _ marking active value

5) 150 Setting of decreasing value (entering absolute values)
    _SP2 Set value 2 (set point 2), _ marking activated decrease mode

6) 20 Setting of increasing value (relative to set value 1)
    _bSP Increasing value (boost set point), _ marking activated increase mode

7) 5.00 Displaying value in minutes and seconds
    55r-È Residual time for drying (soft start remaining), only displayed as long as this function is active

8) HL2 1 Current alarm messages, for description please see chapter “Error messages and trouble-shooting”
    ALSÈ Alarm status, only displayed, if problems occur
Operating conditions

The heater goes through different operating phases when heated up or operated. These operating phases partly start automatically or are activated by the operator. After the controller is switched on the self-test routine of the control modules is carried out, afterwards the controller starts heating, unless it is deactivated (off).

Drying mode
is activated, if the actual value is lower than the entered drying set value (100 °C = when delivered). The heater reaches the drying set value with reduced power (when delivered = 50 %) during the drying phase. This value is maintained until the drying time has elapsed (when delivered = 5.00 minutes). Generally, the connected load is self-optimised during this phase and the control parameters are adjusted accordingly.

Normal mode
The control module sets the normal temperature set value SP1 (when delivered = 180 °C). If the set value is reached during the predefined monitoring window (when delivered = -10 °C) the signal “process release” is set.

Decrease mode
is intended for production interruptions. The controller keeps the temperatures on a low set value (SP2, when delivered = 150 °C) in order to avoid damages to the material. The function “process release” is switched off.

Increase mode
is used to obtain a temporary increase of the normal set value (when delivered = 20 °C) in order to deblock flow channels. Increase operation is switched off after the set maximum time (when delivered = 5.00 minutes) has elapsed at the latest.

Idle control zones
Control modules which have been switched off using the front key and which display off, remain active regardless of what has been entered in the system control panel or the machine interface and do not have any influence on the process release.

ATTENTION: If all zones are inactive, the machine is released!

Manual mode

In order to use a zone in manual mode (output power in % is preset manually), its control function needs to be deactivated at first using the I/O key. Display shows off, load cut-off relay switches the output off. Using the key the manual mode can now be activated and the requested value can be entered using the and keys. The lower display shows P for control value of 20 %. The manual mode remains active until the control value is set to “0” or if the temperature control is activated again.

The temperature limit values are not monitored in the manual mode, however, monitoring of the load circuit is identical to control mode.
Error messages and trouble-shooting

In addition to the normal operating functions the HPS-C-Slot control system offers extensive monitoring functions in order to recognise problems or errors occurring in the hotrunner system or in the controller at an early stage. The two error LEDs are used to signal an error, information on the failure is displayed.

Serious problems are displayed directly on the surface of the control module:

1) **OPEN**
   - Thermocouple failure, defect thermocouple or wire failure
   - Normal display depending on what has been selected

2) **CHHJ**
   - Exceeding upper measurement range, measured value is more than 5 % above the upper limit value
   - Normal display depending on what has been selected

3) **CLLJ**
   - Exceeding lower measurement range, measured value is less than 5 % below the lower limit value
   - Normal display depending on what has been selected

4) **GObO**
   - Invalid parameters, configuration is necessary.
   - Using the [key the configuration level is reached.

5) **REErr**
   - Configuration errors for the loop alarm (control path/control process heater – thermocouple),
   - Settings need to be checked on the configuration level.

**ATTENTION:** Before carrying out further operations the error cause must be eliminated!

Further error information is provided in the alarm status display of the operator level:

- **HL2** Current alarm messages, for explanation please see list below
- **RLSt** Alarm status, only displayed in case of problems

Possible error messages in the upper display:

digit 1
- **H** Upper heat current alarm, measured current value exceeds the set upper limit value (parameter \(H_{-hb}\), 15.0 A when delivered)
- **L** Lower heat current alarm, measured current value exceeds the set lower limit value (parameter \(L_{-hb}\), 0.1 A when delivered)

digit 2
- **L** Loop alarm active (problems with the control loop heater – temperature sensor)
- **S** Short circuit, alarm active

digit 3
- **Z** Alarm 2 active, process release (parameter \(dRLZ\), when delivered = -10)

digit 4
- **I** Alarm 1 active, temperature deviation (parameter \(dRI\), when delivered = 10)

**ATTENTION:** The controllers may only be opened by a certified electrician after switching off the mains voltage or disconnecting the main power!
Connector pin and terminal assignment

1 and 2-zone controllers
68030.001 und 68030.002,
with joint connecting plug for load
and thermal circuit

<table>
<thead>
<tr>
<th>Contact</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 / 6</td>
<td>Load zone 1: L / N</td>
</tr>
<tr>
<td>2 / 7</td>
<td>- - - -</td>
</tr>
<tr>
<td>3 / 8</td>
<td>Load zone 2: L / N</td>
</tr>
<tr>
<td>4 / 9</td>
<td>Thermocouple zone 2: + / -</td>
</tr>
<tr>
<td>5 / 10</td>
<td>Thermocouple zone 1: + / -</td>
</tr>
</tbody>
</table>

4 and 6-zone controllers
68030.004 und 68030.006,
with separate connecting plugs for
load and thermal circuit

<table>
<thead>
<tr>
<th>Contact</th>
<th>Use</th>
<th>Plug 230 V (socket contacts)</th>
<th>Plug Thermo (pin contacts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 / 9</td>
<td>Zone 1: L / N</td>
<td>Zone 1: + / -</td>
<td></td>
</tr>
<tr>
<td>2 / 10</td>
<td>Zone 2: L / N</td>
<td>Zone 2: + / -</td>
<td></td>
</tr>
<tr>
<td>3 / 11</td>
<td>Zone 3: L / N</td>
<td>Zone 3: + / -</td>
<td></td>
</tr>
<tr>
<td>4 / 12</td>
<td>Zone 4: L / N</td>
<td>Zone 4: + / -</td>
<td></td>
</tr>
<tr>
<td>5 / 13</td>
<td>Zone 5: L / N</td>
<td>Zone 5: + / -</td>
<td></td>
</tr>
<tr>
<td>6 / 14</td>
<td>Zone 6: L / N</td>
<td>Zone 6: + / -</td>
<td></td>
</tr>
<tr>
<td>7 / 15</td>
<td>- - - -</td>
<td>- - - -</td>
<td></td>
</tr>
<tr>
<td>8 / 16</td>
<td>- - - -</td>
<td>- - - -</td>
<td></td>
</tr>
</tbody>
</table>

Signal socket

<table>
<thead>
<tr>
<th>Contact / wire</th>
<th>Use</th>
<th>Assignment</th>
<th>Wiring</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>“Process release” signal</td>
<td>NC contact (contacts 1, 2 und 3)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>“Process release” signal</td>
<td>Common contact (contacts 1, 2 und 3)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>“Process release” signal</td>
<td>NO contact (contacts 1, 2 und 3)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>“Load circuit error” signal</td>
<td>NO contact (contacts 4 und 5)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>“Load circuit error” signal</td>
<td>Common contact (contacts 4 und 5)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>“Thermal circuit error” signal</td>
<td>NO contacts (contacts 6 und 7)</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>“Thermal circuit error” signal</td>
<td>Common contact (contacts 6 und 7)</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>“Controller OFF” signal input</td>
<td>External NO contact (of contact 11)</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>“Increase ON” signal input</td>
<td>External NO contact (of contact 11)</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>“Decrease ON” signal input</td>
<td>External NO contact (of contact 11)</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Supply of signal inputs</td>
<td>Signal voltage for inputs (contacts 8, 9 and 10)</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>PE</td>
<td>Protective earth conductor</td>
<td></td>
</tr>
</tbody>
</table>

Each output can be used with max 2 A ohm resistive load. It is connected to the machine control using the signal line (item no. 60070.026), 3 m long, open ends on one side.
Specifications

Operating voltage: 230V +6/-10%; 50 / 60 Hz

Degree of protection: IP 33

Output power: $P_{\text{Max}} = 3500\, \text{W}$ total output

Output signal: pulse package control with intelligent timing pulse adjustment

Fuse: g-fuse insert 6,3 x 32mm; F 16A (A Type 12 BK, Schurter)

Thermocouple input: Fe-CuNi L or J type; NiCr-Ni K type (default setting: J type)

Signal input: external decrease, external increase, external switch-off

Signal output (potential-free): temperature error message, load circuit error message, enable signal

Ambient temperature: 0 – 55 °C (operation), -20 – 80 °C (storage)

Relative humidity: 20 – 95 %, non-condensing

Control behaviour: PID temperature control with self-optimisation and manual optimization facility

Control accuracy: temperature control: ±1 °C

Measurement and working ranges:

- temperature: range: 0 – 500 °C
  sensitivity: 1 °C
- current: range: 0 – 15 A
  sensitivity: 0.1 A

Measured value accuracy: temperature: ±3 °C (at 300 °C)

Additional functions:
- drying mode for 230V hotrunners with limited output power
- load circuit error detection
- thermocouple error detection
- decrease function
- increase function with maximum time limit

The HPS-C-Slot series controllers conform to the currently valid CE requirements as well as the EN 61326 (fault-free operation and radiation) and EN 60204-1 (safety of machinery) standards.
Information

Additional technical details as well as extensive explanations to the settings of the configuration and parameter level can be obtained from the "Concise Product Manual", item no. 13915, attached to each HPS-C-Slot controller.