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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

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Content

Safety instructions

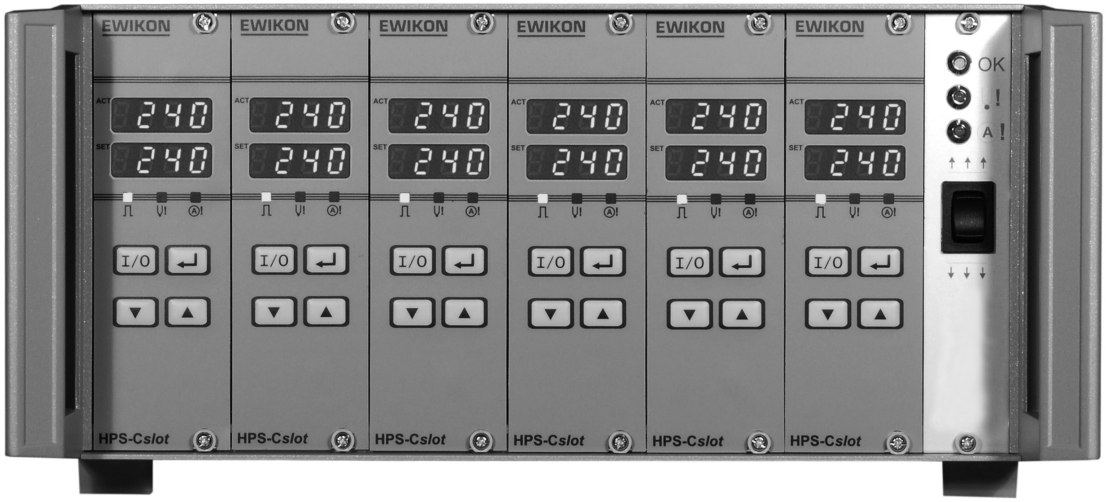
Before working on the controller and/or the hotrunner system, ensure they are off-circuit. Turn unit switch OFF and disconnect main power.
Connection, repair and maintenance work may only be carried out by qualified skilled personnel. Please be careful when replacing controller modules; sharp edges, 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.

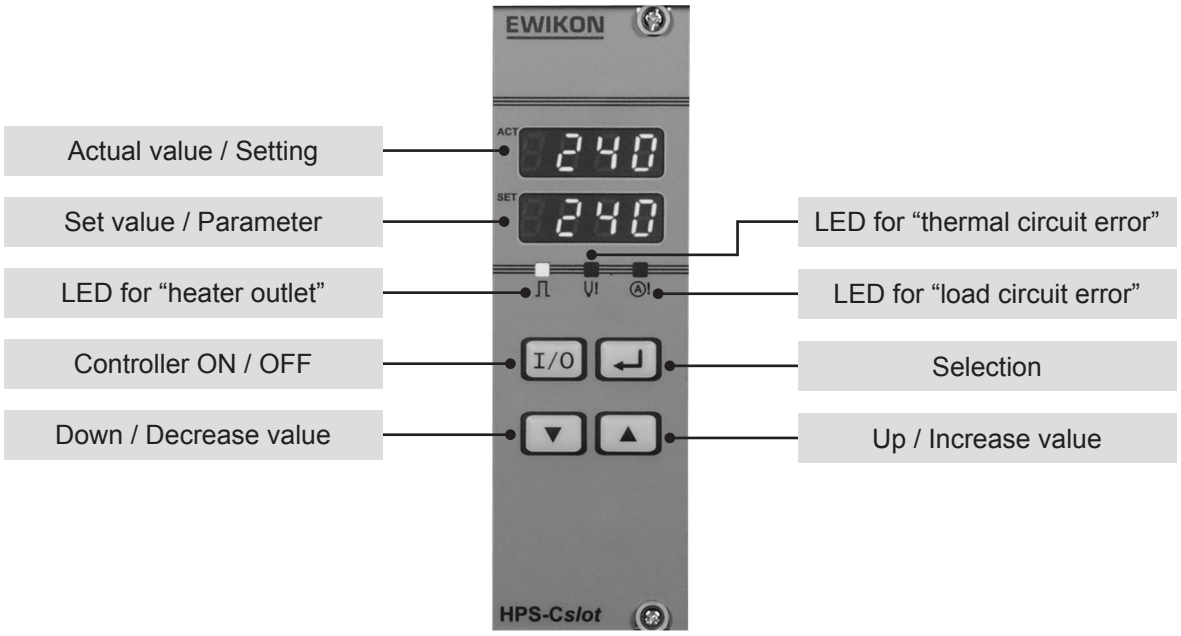
Application range:
This EWIKON control system can be used to operate EWIKON hotrunner systems in rooms with low humidity.

Introduction

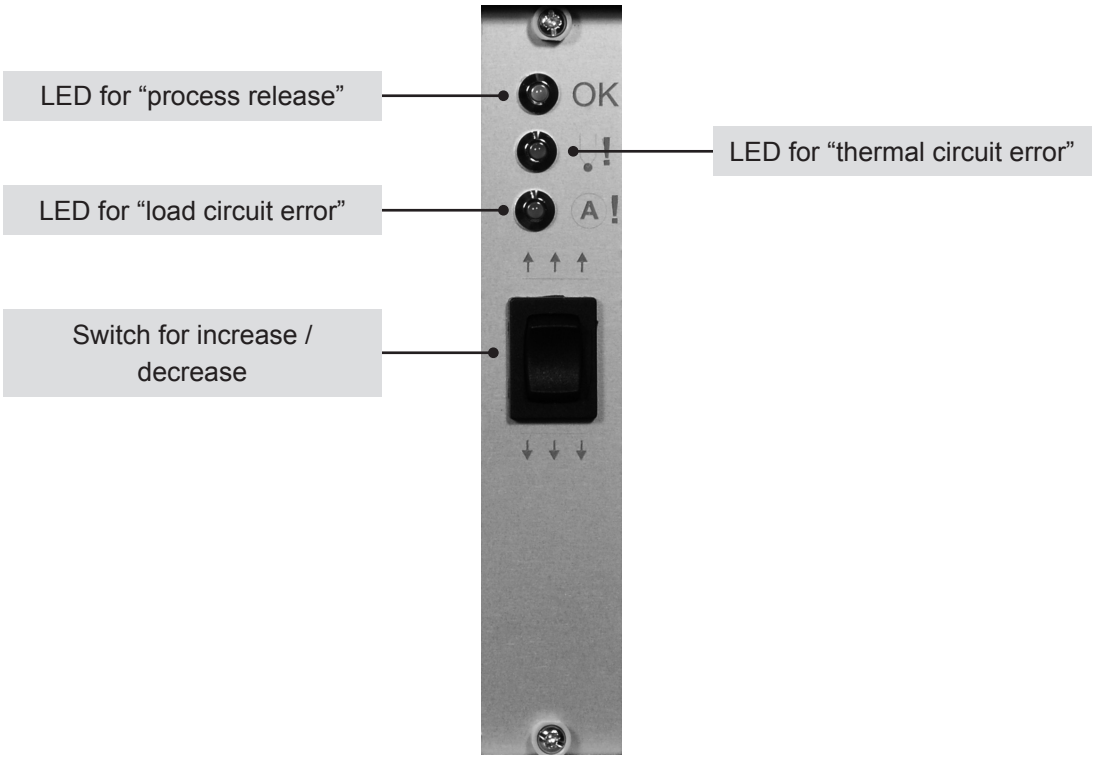
The two basic components of the controller system HPS-C-Slot are the “controller module, item no. 60040.060” as well as a system unit to display error messages or a process release. They also feature an input option to activate the increase or decrease function.
The controller components are connected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



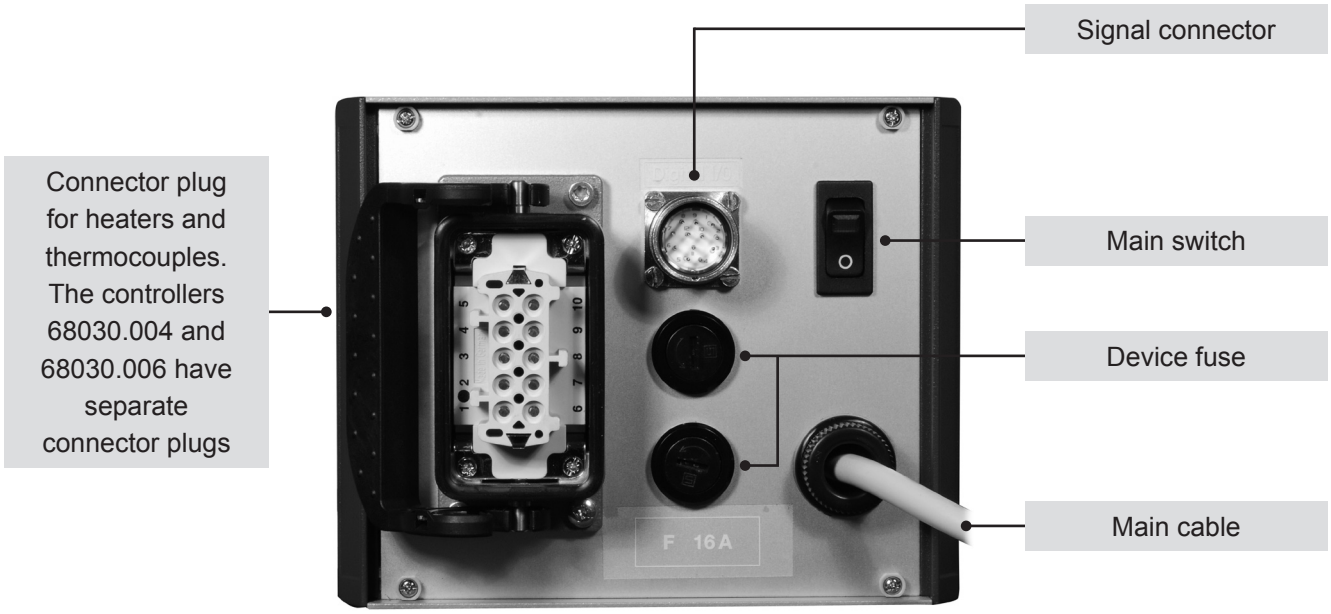
The controller is operated using the 4 keys I/O **"ON/OFF",** ↵ **"Selection",**
▲ **"Up / Increase value",** ▼ **"Down / Decrease value"** of the respective controller module.
The parameter and configuration levels of the modules can be reached with key combinations, so that all necessary settings can 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.

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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 — Actual value temperature (or different message in case of error)
200 — 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 oFF when controller is switched off.

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

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

4) 200 — Setting of temperature set value for normal operation
_SP1 — 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
SSrE — 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”
ALSt — 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 I/O 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 20 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 ocurring 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
200 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
200 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
200 Normal display depending on what has been selectedl

4) GOtO Invalid parameters, configuration is necessary.
ConF Using the ↵ key the configuration level is reached.

5) AErr Configuration errors for the loop alarm (control path/control process heater – thermocouple),
LAEn 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 1 Current alarm messages, for explanation please see list below
ALSt 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 2 alarm 2 active, process release (parameter dAL2, when delivered = -10)
digit 4 1 alarm 1 active, temperature deviation (parameter dAL 1, 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!

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Connector pin and terminal assignment

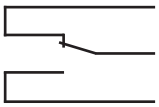
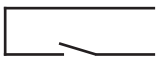
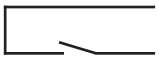
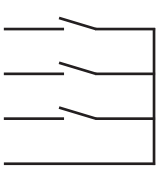
1 and 2-zone controllers 68030.001 und 68030.002, with joint connecting plug for load and thermal circuit

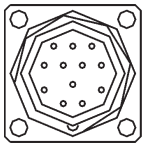
Contact	Use
1 / 6	Load zone 1: L / N
2 / 7	- - - - -
3 / 8	Load zone 2: L / N
4 / 9	Thermocouple zone 2: + / -
5 / 10	Thermocouple zone 1: + / -

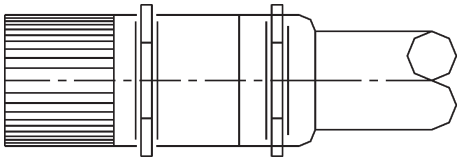
4 and 6-zone controllers 68030.004 und 68030.006, with separate connecting plugs for load and thermal circuit

Contact	Plug 230 V (socket contacts)	Plug Thermo (pin contacts)
1 / 9	Zone 1: L / N	Zone 1: + / -
2 / 10	Zone 2: L / N	Zone 2: + / -
3 / 11	Zone 3: L / N	Zone 3: + / -
4 / 12	Zone 4: L / N	Zone 4: + / -
5 / 13	Zone 5: L / N	Zone 5: + / -
6 / 14	Zone 6: L / N	Zone 6: + / -
7 / 15	- - - - -	- - - - -
8 / 16	- - - - -	- - - - -

Signal socket

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





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

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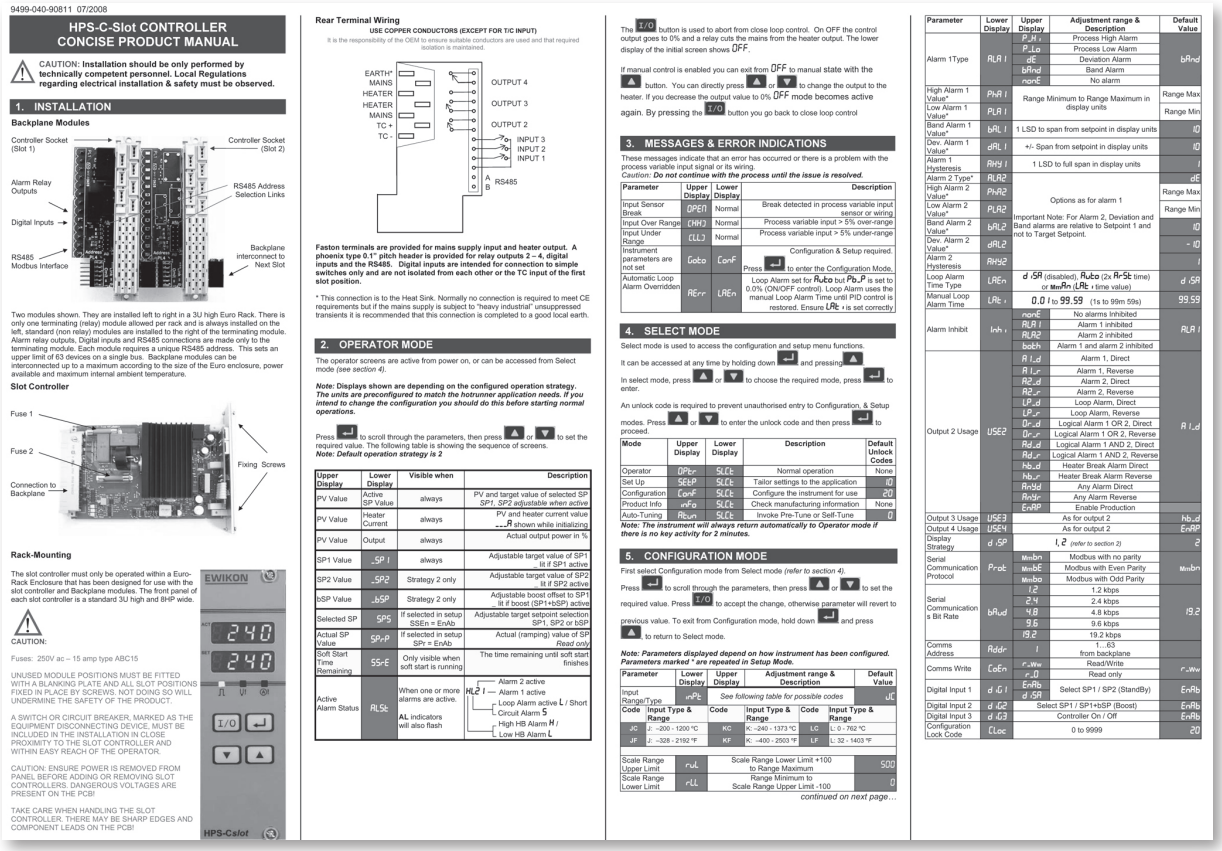
Specifications

Operating voltage	230V +6/-10%; 50 / 60 Hz
Degree of protection:	IP 33
Output power:	P_{Max} = 3500W 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.



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HPS-C-Slot CONTROLLER CONCISE PRODUCT MANUAL

CAUTION: Installation should be only performed by technically competent personnel. Local Regulations regarding electrical installation & safety must be observed.

1. INSTALLATION

Backplane Modules

Controller Socket (Slot 1) · Controller Socket (Slot 2) · Alarm Relay Outputs · RS485 Address Selection Links · Digital Inputs · RS485 Modbus Interface · Backplane interconnect to Next Slot

Two modules shown. They are installed left to right in a 3U high Euro Rack. There is only one terminating (relay) module allowed per rack and is always installed on the left, standard (non relay) modules are installed to the right of the terminating module. Alarm relay outputs, Digital inputs and RS485 connections are made only to the terminating module. Each module requires a unique RS485 address. This sets an upper limit of 63 devices on a single bus. Backplane modules can be interconnected up to a maximum according to the size of the Euro enclosure, power available and maximum internal ambient temperature.

Slot Controller

Fuse 1 · Fuse 2 · Fixing Screws · Connection to Backplane

Rack-Mounting

The slot controller must only be operated within a Euro-Rack Enclosure that has been designed for use with the slot controller and Backplane modules. The front panel of each slot controller is a standard 3U high and 8HP wide.

CAUTION:

Fuses: 250V ac – 15 amp type ABC15

UNUSED MODULE POSITIONS MUST BE FITTED WITH A BLANKING PLATE AND ALL SLOT POSITIONS FIXED IN PLACE BY SCREWS. NOT DOING SO WILL UNDERMINE THE SAFETY OF THE PRODUCT.

A SWITCH OR CIRCUIT BREAKER, MARKED AS THE EQUIPMENT DISCONNECTING DEVICE, MUST BE INCLUDED IN THE INSTALLATION IN CLOSE PROXIMITY TO THE SLOT CONTROLLER AND WITHIN EASY REACH OF THE OPERATOR.

CAUTION: ENSURE POWER IS REMOVED FROM PANEL BEFORE ADDING OR REMOVING SLOT CONTROLLERS. DANGEROUS VOLTAGES ARE PRESENT ON THE PCB!

TAKE CARE WHEN HANDLING THE SLOT CONTROLLER. THERE MAY BE SHARP EDGES AND COMPONENT LEADS ON THE PCB!

Rear Terminal Wiring

USE COPPER CONDUCTORS (EXCEPT FOR T/C INPUT)

It is the responsibility of the OEM to ensure suitable conductors are used and that required isolation is maintained.

EARTH* · MAINS · HEATER · HEATER MAINS · TC + · TC - · OUTPUT 4 · OUTPUT 3 · OUTPUT 2 · INPUT 3 · INPUT 2 · INPUT 1 · A · B · RS485

Faston terminals are provided for mains supply input and heater output. A phoenix type 0.1" pitch header is provided for relay outputs 2 – 4, digital inputs and the RS485. Digital inputs are intended for connection to simple switches only and are not isolated from each other or the TC input of the first slot position.

* This connection is to the Heat Sink. Normally no connection is required to meet CE requirements but if the mains supply is subject to “heavy industrial” unsuppressed transients it is recommended that this connection is completed to a good local earth.

2. OPERATOR MODE

The operator screens are active from power on, or can be accessed from Select mode *(see section 4)*.

Note:* Displays shown are depending on the configured operation strategy.** ***The units are preconfigured to match the hotrunner application needs. If you intend to change the configuration you should do this before starting normal operations.

Press ↵ to scroll through the parameters, then press ▲ or ▼ to set the required value. The following table is showing the sequence of screens.
Note: Default operation strategy is 2

Upper Display	Lower Display	Visible when	Description
PV Value	Active SP Value	always	PV and target value of selected SP *SP1, SP2 adjustable when active*
PV Value	Heater Current	always	PV and heater current value ‾‾.‾‾ shown while initializing
PV Value	Output	always	Actual output power in %
SP1 Value	SP 1	always	Adjustable target value of SP1 _ lit if SP1 active
SP2 Value	SP2	Strategy 2 only	Adjustable target value of SP2 lit if SP2 active
bSP Value	bSP	Strategy 2 only	Adjustable boost offset to SP1 _ lit if boost (SP1+bSP) active
Selected SP	SPS	If selected in setup SSEn = EnAb	Adjustable target setpoint selection SP1, SP2 or bSP
Actual SP Value	SP.r	If selected in setup SPr = EnAb	Actual (ramping) value of SP *Read only*
Soft Start Time Remaining	SS.t	Only visible when soft start is running	The time remaining until soft start finishes
Active Alarm Status	ALSt	When one or more alarms are active. **AL** indicators will also flash	Alarm 2 active / Alarm 1 active / Loop Alarm active **L** / Short Circuit Alarm **S** / High HB Alarm **H** / Low HB Alarm **L**

The I/O button is used to abort from close loop control. On OFF the control output goes to 0% and a relay cuts the mains from the heater output. The lower display of the initial screen shows OFF.

If manual control is enabled you can exit from OFF to manual state with the ▲ button. You can directly press ▲ or ▼ to change the output to the heater. If you decrease the output value to 0% OFF mode becomes active again. By pressing the I/O button you go back to close loop control

3. MESSAGES & ERROR INDICATIONS

These messages indicate that an error has occurred or there is a problem with the process variable input signal or its wiring.
*Caution: **Do not continue with the process until the issue is resolved.***

Parameter	Upper Display	Lower Display	Description
Input Sensor Break	OPEn	Normal	Break detected in process variable input sensor or wiring
Input Over Range	OVr.I	Normal	Process variable input > 5% over-range
Input Under Range	CLL.I	Normal	Process variable input > 5% under-range
Instrument parameters are not set	Goto	ConF	Configuration & Setup required. Press ↵ to enter the Configuration Mode.
Automatic Loop Alarm Overridden	AErr	LAEn	Loop Alarm set for AuEo but Pb.P is set to 0.0% (ON/OFF control). Loop Alarm uses the manual Loop Alarm Time until PID control is restored. Ensure LAt ≠ is set correctly

4. SELECT MODE

Select mode is used to access the configuration and setup menu functions.

It can be accessed at any time by holding down ↵ and pressing ▲

In select mode, press ▲ or ▼ to choose the required mode, press ↵ to enter.

An unlock code is required to prevent unauthorised entry to Configuration, & Setup modes. Press ▲ or ▼ to enter the unlock code and then press ↵ to proceed.

Mode	Upper Display	Lower Display	Description	Default Unlock Codes
Operator	OPtr	SLCt	Normal operation	None
Set Up	SEtP	SLCt	Tailor settings to the application	10
Configuration	ConF	SLCt	Configure the instrument for use	20
Product Info	inFo	SLCt	Check manufacturing information	None
Auto-Tuning	AtUn	SLCt	Invoke Pre-Tune or Self-Tune	0

Note: The instrument will always return automatically to Operator mode if there is no key activity for 2 minutes.

5. CONFIGURATION MODE

First select Configuration mode from Select mode *(refer to section 4)*.

Press ↵ to scroll through the parameters, then press ▲ or ▼ to set the required value. Press I/O to accept the change, otherwise parameter will revert to previous value. To exit from Configuration mode, hold down ↵ and press ▲ to return to Select mode.

Note: Parameters displayed depend on how instrument has been configured. Parameters marked * are repeated in Setup Mode.

Parameter	Lower Display	Upper Display	Adjustment range & Description	Default Value
Input Range/Type	inPt	*See following table for possible codes*		JC

Code	Input Type & Range	Code	Input Type & Range	Code	Input Type & Range
JC	J: -200 - 1200 °C	KC	K: -240 - 1373 °C	LC	L: 0 - 762 °C
JF	J: -328 - 2192 °F	KF	K: -400 - 2503 °F	LF	L: 32 - 1403 °F

Scale Range Upper Limit	ruL	Scale Range Lower Limit +100 to Range Maximum	500
Scale Range Lower Limit	rLL	Range Minimum to Scale Range Upper Limit -100	0

continued on next page…

Parameter	Lower Display	Upper Display	Adjustment range & Description	Default Value
Alarm 1Type	AL1 t	FULL SC	Process High Alarm	bAnd
		FULo	Process Low Alarm	
		dE	Deviation Alarm	
		bAnd	Band Alarm	
		nonE	No alarm	
High Alarm 1 Value*	PAR 1	Range Minimum to Range Maximum in display units		Range Max
Low Alarm 1 Value*	PLR 1			Range Min
Band Alarm 1 Value*	bAL 1	1 LSD to span from setpoint in display units		10
Dev. Alarm 1 Value*	dAL 1	+/- Span from setpoint in display units		10
Alarm 1 Hysteresis	AHy 1	1 LSD to full span in display units		1
Alarm 2 Type*	AL2t	Options as for alarm 1 Important Note: For Alarm 2, Deviation and Band alarms are relative to Setpoint 1 and not to Target Setpoint.		dE
High Alarm 2 Value*	PAR2			Range Max
Low Alarm 2 Value*	PLR2			Range Min
Band Alarm 2 Value*	bAL2			10
Dev. Alarm 2 Value*	dAL2			- 10
Alarm 2 Hysteresis	AHy2			1
Loop Alarm Time Type	LAEn	d SA (disabled), AuEo (2x At.St time) or mAn (LAt time value)		d SA
Manual Loop Alarm Time	LAt	0.0 to 99.59 (1s to 99m 59s)		99.59
Alarm Inhibit	Inh.	nonE	No alarms inhibited	AL1
		AL1	Alarm 1 inhibited	
		AL2	Alarm 2 inhibited	
		both	Alarm 1 and alarm 2 inhibited	
Output 2 Usage	USE2	A 1.d	Alarm 1, Direct	A 1.d
		A 1.r	Alarm 1, Reverse	
		A2.d	Alarm 2, Direct	
		A2.r	Alarm 2, Reverse	
		LP.d	Loop Alarm, Direct	
		LP.r	Loop Alarm, Reverse	
		Or.d	Logical Alarm 1 OR 2, Direct	
		Or.r	Logical Alarm 1 OR 2, Reverse	
		Ad.d	Logical Alarm 1 AND 2, Direct	
		Ad.r	Logical Alarm 1 AND 2, Reverse	
		hb.d	Heater Break Alarm Direct	
		hb.r	Heater Break Alarm Reverse	
		AnyA	Any Alarm Direct	
		AnyR	Any Alarm Reverse	
		EnAP	Enable Production	
Output 3 Usage	USE3	As for output 2		hb.d
Output 4 Usage	USE4	As for output 2		EnAP
Display Strategy	d SP	1, 2 *(refer to section 2)*		2
Serial Communication Protocol	Prot	Modbus with no parity		Modn
		Modbus with Even Parity		
		Modbo Modbus with Odd Parity		
Serial Communication s Bit Rate	bAud	1.2	1.2 kbps	19.2
		2.4	2.4 kbps	
		4.8	4.8 kbps	
		9.6	9.6 kbps	
		19.2	19.2 kbps	
Comms Address	Addr	1	1...63 from backplane	
Comms Write	CoEn	r.Ww	Read/Write	r.Ww
		r.O	Read only	
Digital Input 1	d.I 1	EnAb	Select SP1 / SP2 (StandBy)	EnAb
		d SA		
Digital Input 2	d.I2	Select SP1 / SP1+bSP (Boost)		EnAb
Digital Input 3	d.I3	Controller On / Off		EnAb
Configuration Lock Code	LLoc	0 to 9999		20

6. SETUP MODE

Note: Configuration must be completed before adjusting Setup parameters.

First select Setup mode from Select mode *(refer to section 4)*. Press ↵ to scroll through the parameters,

then press ▲ or ▼ to set the required value.

To exit from Setup mode, hold down ↵ and press ▲ to return to Select mode.
Note: Parameters displayed depend on how instrument has been configured.

Parameter	Lower Display	Upper Display Adjustment Range & Description	Default Value
Input Filter Time Constant	F.tC	OFF or 0.5 to 100.0 secs	2.0
Proportional Band	Pb.P	0.0% (ON/OFF) and 0.5% to 999.9% of input span	10.0
Integral Time (Automatic Reset)	Ar.St	1 sec to 99 mins 59 secs and OFF	5.00
Derivative Time (Rate)	rAtE	00 secs to 99 mins 59 secs	1.15
Manual Reset (Bias)	b AS	0% to 100%	25
Primary ON/OFF Differential	d.SP	0.1% to 10.0% of input span centered about the setpoint. *(Entered as a percentage of span)*	0.5
Setpoint Upper Limit	SPuL	Current Setpoint to Scale Range max	R. max
Setpoint Lower limit	SPLL	Scale Range min to Current Setpoint	R. min
Primary Output Power Limit	OPuL	0% to 100% of full power	100
Output 1 Cycle Time	Ct 1	0.5, 1, 2, 4, 8, 16, 32, 64, 128, 256 or 512 secs.	0.5
High Alarm 1 Value	PAR 1	Range Minimum to Range Maximum	R. max
Low Alarm 1 Value	PLR 1		R. min
Deviation Alarm 1 Value	dAL 1	±Span from SP in display units	10
Band Alarm 1 Value	bAL 1	1 LSD to span from setpoint	10
High Alarm 2 Value	PAR2	Range Minimum to Range Maximum	R. max
Low Alarm 2 Value	PLR2		R. min
Deviation Alarm 2 Value	dAL2	±Span from SP in display units	- 10
Band Alarm 2 Value	bAL2	1 LSD to span from setpoint	10
Manual Loop Alarm Time	LAt.	0.0 to 99.59 (1s to 99m 59s)	99.59
Auto Pre-tune	APt.	d SA (disabled) or EnAb (enabled)	EnAb
Auto/Manual Control Selection	PoEn		EnAb
Setpoint Select Shown In Operator Mode	SSEn		d SA
Setpoint Ramp Adjustment Shown In Operator Mode	SPr.	d SA (disabled) or EnAb (enabled)	d SA
SP Ramp Rate Value	rP	1 to 9999 units/hour or Off (blank)	Off
Setpoint Increment Value	SP.In	0 to +Input span	1
Programmable Sensor Break	PSb	d SA (disabled) or EnAb (enabled)	EnAb
Preset Power Output	PPo	0% to 100%	0
Low Heater Break Alarm Value	L.Hb	0 to 15.0	0.1
High Heater Break Alarm Value	H.Hb		15.0
Short Circuit Heater Break Alarm	S.Hb	d SA (disabled) or EnAb (enabled)	EnAb
Soft Start Setpoint	SSSP	Setpoint upper limit to setpoint lower limit*	85
Soft Start Time	SSt.	0 to 99min 59secs	3.00
Soft Start Output Power Limit	SSOL	0 to Output Power Limit	50
Boost Setpoint	BoSP	0 to 50 in display units	20
Boost Time	Bot.	0 to 99min 59secs	5.00
Setup Lock Code	SLoc	0 to 9999	10

***Note: Soft start will not run if the process variable is greater than the soft start setpoint. Soft start will be held if Pre-tune does not complete by the soft start time. The Soft start setpoint is limited by the current target setpoint**

7. AUTOMATIC TUNING MODE

First select Automatic tuning mode from Select mode *(refer to section 4)*.

Press ↵ to scroll through the modes, then press ▲ or ▼ to set the required value.

To exit from Automatic tuning mode, hold down ↵ and press ▲ to return to Select mode.
Pre-tune is a single-shot routine and is thus self-disengaging when complete.
If APt. in Setup mode = EnAb, Pre-tune will attempt to run at every entry to close loop control (i.e. power up)*.

Parameter	Lower Display	Upper Display	Default Value
Pre-Tune	PtUn	On or OFF. Indication remains OFF if automatic tuning cannot be used at this time*	OFF
Self-Tune	StUn		
Tune Lock	tLoc	0 to 9999	0

Note: Automatic tuning will not engage if the proportional band = 0. Also, Pre-tune will not engage if setpoint is ramping or the PV is less than 5% of input span from the setpoint.

8. PRODUCT INFORMATION MODE

First select Product information mode from Select mode *(refer to section 4)*.

Press ↵ to view each parameter. To exit from Product Information mode, hold down ↵ and press ▲ to return to Select mode.
Note: These parameters are all read only.

Parameter	Lower Display	Upper Display	Description
Firmware Type	FtyP		Value displayed is firmware type number
Firmware Issue	ISS		Value displayed is firmware issue number
Product Revision Level	PrL		Value displayed is Product Revision level
Date Of Manufacture	dOMm		Manufacturing date code *(mmyy)*
Serial Number 1	Sn 1		First four digits of serial number
Serial Number 2	Sn2		Middle four digits of serial number
Serial Number 3	Sn3		Last four digits of serial number

9. SOFT START FEATURE

Soft start is used when a gentle start-up phase is required before going to full working temperature. During soft-start a dedicated soft start setpoint (SSSP) is used to control the process to a lower temperature than normal. The period for which this soft start set point is applied is set by Soft Start Time (SSt.). During the soft start time the output power is limited by the Soft Start Output Power Limit (SSOL) and setpoint ramping is inhibited.

Start-up Setpoint:	Bounded by range maximum and range minimum. Setpoint point ramping is not applied
Time Remaining:	0 (Soft start disabled) – 99mins 59secs in 1 sec increments
Soft Start Power Limit:	Primary output power limit used by soft start -100% to 100%
Cycle Time:	Cycle time used during soft start equals ¼ displayed cycle time but never less than 0.5s.

10. PROGRAMMABLE SENSOR BREAK

When the Programmable Sensor Break feature is enabled, and a sensor break is detected, the output is set to an average power value calculated by the instrument. When the Programmable Sensor Break (PSb) feature is disabled, and a sensor break is detected, the output is set to the Preset Power Output value (PPo).

11. ENABLE PRODUCTION

This feature indicates that temperatures are above the minimum requirement for production. It uses the terminating backplane Output 4 NC relay contact to provide an open contact when:

- Process temperature is more than 10 degrees below SP1
- Controller is in standby mode (SP2 is active)
- Controller is off (via interface signal)

Typically, to configure this feature, set parameters as follows:
Out put 4 Usage = EnAP
Alarm 2 type = dE
Alarm 2 Value = -10

Note: Selecting Off mode by the front panel key indicates a not used loop. Those loops indicate always they are ready for production.

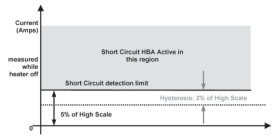
12. HEATER BREAK ALARMS

The heater current monitor is used to diagnose faults in the heater elements. A low heater break alarm is typically used for early detection of heater element failure; it detects whether the heater current is lower than it should be. A High heater break alarm can sometimes be useful for detecting partial shorts between heater elements, etc; it detects whether the heater current is higher than it should be. Short Circuit Heater Break Alarm is typically used to detect if the heater control device is stuck ON - welded relay contacts etc. This alarm is based on heater currents acquired whilst the Output is off.
Note: On very low output power combined with fast output cycle times a valid heater current reading may not be possible.
If this occurs the display indicates ___A

Low Heater Break Alarm

High Heater Break Alarm

Short Circuit Heater Break Alarm



13. SERIAL COMMUNICATIONS

An RS485 interface is provided for serial communications. The Modbus RTU protocol is provided with 0 based parameter numbers. The following Modbus parameters are likely to be useful, but many more are available. Contact your supplier if the parameter required is not listed here.

Parameter	Register	Type	Data
Process value	1	Word RO	Measured temperature
Actual Setpoint	21	Word RO	Current setpoint
Output Power	3	Word R/W	Read Only if not in manual control. 0% to 100% for one output.
Setpoint 1	34	Word R/W	Setpoint 1 (Operating Setpoint)
Setpoint 2	29	Word R/W	Setpoint 2 (Standby Setpoint)
Setpoint boost	3610	Word R/W	Offset to SP1 while boost
Setpoint Select	3200	Word R/W	1 = SP2, 2 = SP1, 3 = Sp1+bSP
Auto / Off	3620	Word R/W	1 = trigger auto, 0 = trigger off
Output Off	3621	Word RO	1 = isolation relay open

14. TECHNICAL ASSISTANCE

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35066 Frankenberg

Tel.: ++49-(0)6451-501-0
Email: info@ewikon.com

15. SPECIFICATIONS

UNIVERSAL INPUT

Thermocouple Calibration: ±0.1% of full range, ±1LSD (±1°C for Thermocouple CJC). BS4937, NBS125 & IEC584.
Sampling Rate: 4 per second.
Impedance: >10MΩ resistive.
Sensor Break Detection: *Control outputs go to a calculated average power value or to the programmable output power.*
Isolation: Isolated from all other inputs and outputs except for first module in rack where the digital inputs are not isolated from the thermocouple input. Digital inputs are intended to be connected to floating switches only.
Universal input must not be connected to operator accessible circuits if digital inputs are powered from backplane supply and are connected to a hazardous voltage source.

HEATER CURRENT MEASUREMENT

Accuracy: ±2% of input range ±1 LSD.
Sampling Rate: 2 per second.
Heater current span: 0 to 15.0A

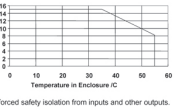
DIGITAL INPUTS

Self-energised contact closure: > 47Kohm: Open / < 100ohm: Closed
Isolation: Reinforced safety isolation from inputs and other outputs.

OUTPUTS

Control Output Triac

Operating Voltage: 120..240VAC
Current Rating: 1A to 15A (full cycle rms on-state @ 25°C); See Output Current derating chart below for operation above this temperature.



Isolation: Reinforced safety isolation from inputs and other outputs.

Output 2 and 3

Contact Type & Rating: Single pole (SP); 2A resistive at 120/240VAC.
Lifetime: >100,000 operations at rated voltage/current.
Isolation: Isolated from input and other outputs.

Output 4

Contact Type & Rating: Single pole Change Over (SPDT); 2A resistive at 120/240VAC.
Lifetime: >100,000 operations at rated voltage/current.
Isolation: Isolated from input and other outputs.

SERIAL COMMUNICATIONS

Physical: RS485, at 1200, 2400, 4800, 9600 or 19200 bps.
Protocols: Modbus/RTU.
Isolation: Reinforced safety isolation from all inputs and outputs.
Cable Screened twisted pair is recommended for optimum communication. The screen should be connected to a solid ground at each end.

OPERATING CONDITIONS (FOR INDOOR USE)

Ambient Temperature: 0°C to 55°C (Operating), –20°C to 80°C (Storage).
Relative Humidity: 20% to 95% non-condensing.
Supply Voltage and Power: 100 to 240VAC ±10%, 50/60Hz 15A Max.

ENVIRONMENTAL

Standards: CE, UL, ULC. (UL applied for)
EMI: Complies with EN61326 (Susceptibility & Emissions).
Safety Considerations: Complies with EN61010-1 & UL3121. Pollution Degree 2, Installation Category II.
Front Panel Sealing: IP20

PHYSICAL

Front Bezel Size: 40 x 130 mm
Depth Behind Panel: 210mm (including backplane)
Weight: 0.4 kg maximum.

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