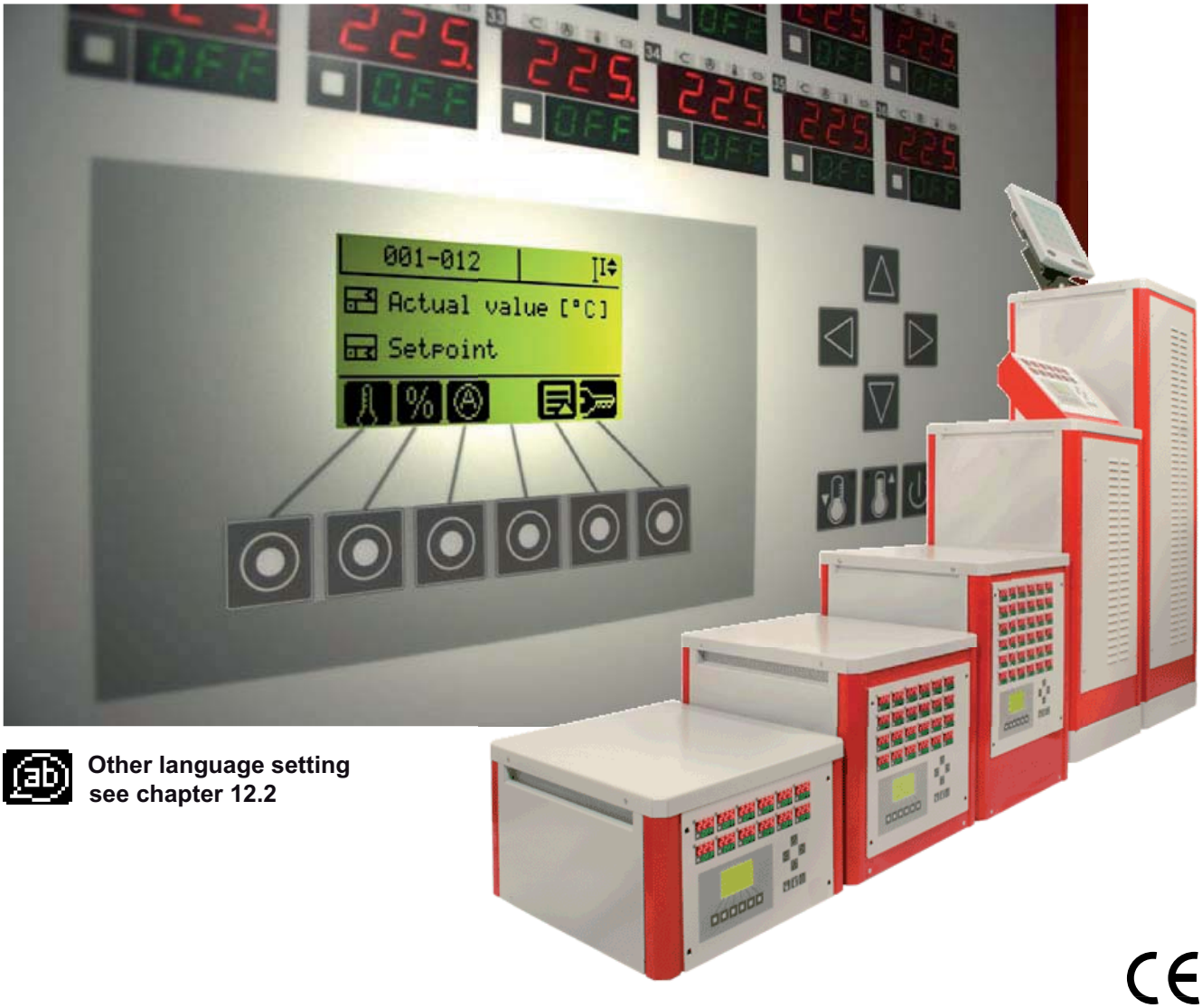
hotset

Operating Instructions

Hot Runner Controller

hotcontrol cDT



Other language setting
see chapter 12.2

CE

Rev. 1.01.01
03/2016
Translation of original
operating instructions

1 Typographical Conventions

Symbols and conventions are used in this document for faster orientation for you.

Symbols

	Caution	With this symbol, references and information are displayed which are decisive for the operation of the device. In case of non-compliance with or inaccurate compliance there can result damage to the device or injuries to persons.
	Note	The symbol refers to additional information and declarations, which serve for improved understanding.
	Example	With the symbol, a function is explained by means of an example.
	Reference	With this symbol, information in another document is referred to.
	FAQ	Here FAQ (Frequently Asked Questions) are answered.
↗		Cross references are marked with this character. In the pdf version of the document the objective of the cross reference is reached via the link.
`Equations`		Calculation specifications and examples are represented in this way.
<View>		Menu points (e.g. view) are represented in this way.
|Project|		Windows (e.g. project) are represented in this way.
n.a.		Not applicable, not existing

1.1 Additional and continuative documents

Operation	Information on this topic see document **Brief instruction Operation hotcontrol cDT**
Operation	Information on this topic see document **Operating instructions hotcontrol cDT Parameter**
Protocol PSG II	Information on this topic are in the protocol description **PSG II** and the corresponding object lists.
Protocol PSG II Ethernet	Information on this topic are in the protocol description **PSG II Ethernet** and the corresponding object lists.
Protocol Modbus	Information on this topic are in the protocol description **Modbus** and the corresponding object lists.
Protocol Modbus/TCP	Information on this topic are in the protocol description **Modbus/TCP** and the corresponding object lists.
Protocol CANopen	Information on this topic are in the protocol description **CANopen** and the corresponding object lists.
Data sheets and operating manuals	Available by Internet see www.hotset.com

2 Applications

hotcontrol cDT has a uniform and clear build- and operating concept from the smallest desktop with 6 zones up to the biggest tower with 250 zones.

In this document

Hot Runner Controllers hotcontrol cDT
with control panel DU

are described.

Desktop
36 zones

Tower
96 zones

The hot runner controllers hotcontrol cDT control hot runner nozzles as well as manifolds for particular plastics in an optimal adapted temperature range..

The available functions are described in the following chapters.

3 Security References

Before installation, handling or operation of the device, please read through this operating instructions completely and carefully.

3.1 Security References for User

All persons, responsible for the mounting/start-up/operation/maintenance/servicing of the device, have to

- be skilled appropriately
- consider this operating instructions exactly
- regard this operating instructions as part of the product
- maintain the operating instructions during lifetime of the product
- pass the operating instructions to all successive owners or operators of the product
- make sure, that every obtained amendment is integrated in the instructions

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

Before start-up, adhere strictly to the local safety regulations as well as the safety instruction.

Consider the regulations for prevention of industrial accidents for electrical installations and equipment by government safety organization in industrial facilities.

Do not throw packaging material careless away, thermoplastic foil/ styrofoam parts etc. may get dangerous for children.

Position the device exclusively on planes of stable and solid ground.

Protect device against moisture. Do not use in areas with high humidity.

Check, that the specified voltage on the type plate is identical with the mains voltage on-site.

Before each use check device, power supply cord and connector.

Ensure that the power cord and the connecting cables are not damaged by overrun, squeezing, tearing or suchlike. Protect the cords/cables against oil, sharp edges and temperatures above 70 °C.

Do not touch the mains plug with wet hands.

Lock the connected counter plug on the rear side of the device with retaining brackets against accidental removal.

Connect the connecting cable only in switched-off status.
Place the connecting cable to prevent stumbling.

Assure yourself that the connected mold is linked to the protective conductor.

Do not place any tanks, filled with liquid, on the top of the device, otherwise a dangerous situation may emerge.

Keep the ventilation slots open. Do not insert any objects.

Maintenance and repair work may be carried out by authorized persons only. Only skilled and on the risks trained persons may use the device. The relevant accidental regulations as well as other general approved safety-relevant, occupational-medical norms have to be obeyed. Unauthorized modifications of the device exclude liability of the manufacturer for resultant damages.

Before opening of the device always switch-off the mains switch and unplug the mains plug or make sure that the device is de-energized. Protect against unintentional reclosing.

Parts of components or components may only be brought into operation, when they were implemented safe of contact before. During installation they have to be de-energized.

For person and property damages, resulting of not considering these operating instructions or not considering these safety instruction, warranty claim terminates. For consequential damage we assume no liability.
The safety instruction are on the right side panel/side door and/or on the covering acrylic glass of the line bars.

Note the safety instructions necessarily on the hot runner controller identified by this sign/label.

Warning

3.1.1 Intended use

The hot runner controllers are designed for temperature-dependent control of electric heaters. More specific descriptions are given in the operating instructions.
When properly used, the safety of the user and the device is guaranteed.
The device may only be used for this purpose. If used for other purposes, the manufacturer / supplier will not take any responsibility and warranty for damages and consequential damages.

3.1.2 Maintenance

No special maintenance of the hot runner controller is necessary. Maintain a clean surface of the operating unit. For cleaning use a damp cloth. Avoid the use of solvents, cleansers and abrasives.

3.2 Warranty Conditions

This product is subject to the legal warranty time periods for faults or deficiencies in manufacture.

Content of Warranty

If a malfunction relatively occurs through the manufacture, the supplier repairs or replaces the nonconforming product, according to their own discretion.
The following repairs do not fall under the warranty and are liable to costs:

- Malfunctions after the legal notice periods have expired.
- Malfunctions caused through operating error of the user (if the device is not operated as described in the manual).
- Malfunctions caused through other devices.
- Changes or damage to the device which do not originate from the manufacturer.

If you wish to use services within the framework of this warranty, please refer to the supplier.

3.3 Transport and Storage

3.3.1 Transport

The hot runner controller is packed fully-mounted in a robust carton, cushioned with foamed material. This assures sufficient protection in normal case.

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

3.3.2 Storage

If you should not put the hot runner controller into operation immediately, store it protected against dirt and moisture. Permissible temperature -20…70°C, average permissible humidity < 75 % per year, no condensation.

4 Setup hotcontrol cDT with control panel DU

Before installation, handling or operation of the device, please read through this operating instructions completely and carefully.

4.1 Scope of supply

1 Hot Runner Controller hotcontrol cDT *** (desktop)
(equipment implementation dependent on number of zones)

Operating instructions	Printout
Specifications - Pin assignment	Printout
Wiring diagrams	Printout

5 Installation

5.1 Installation References

Unpacking

The device is packed fully-mounted in a robust carton.
Check the packaging and then the device for identifiable damage incurred during transit. If damage is identified, then please get in touch with the transportation company.

In the case of damage the device may not be brought into operation.

Before beginning and during all installation/dismantling work, attention is to be paid that the system, as well as the devices, are de-energized

Only components of similar type may be exchanged. In case of replacement, it is absolutely necessary to adopt the setting adjustments of the replaced component.

5.2 Electrical Connection

The hot runner controller may be installed and put into operation by specialized staff only.
Before switch-on of the control zones it is to be ensured that the hot runner controller is configured for the application. An incorrect configuration can lead to damage to the control section or to injuries to persons.

5.2.1 Power Supply

The hot runner controller is activated/deactivated by the main switch.

Consider connected load.
Check the power supply under the terms of the wiring diagram

5.2.2 Control fuse

To protect the internal 24 VDC power supply for the electronics.

5.2.3 Sensor inputs and power outputs (Plug XA)

Connect the thermocouples TC of type J, L, K to the sensor inputs and heaters to the control outputs of the connection of hot runner mold.

Consider terminal assignment (see specifications).

Output power	Max. 3.6 kW
Rated voltage	230 VAC (ohmic load)

5.2.4 Alarm Output (Signal Plug XM1)

The alarm output for the signal for enabling of machine/alarm message is implemented as

- potential-free relay contact (output 1 relay)
- 4 pole HTS output plug type Wieland 3 pole & PE with counter plug

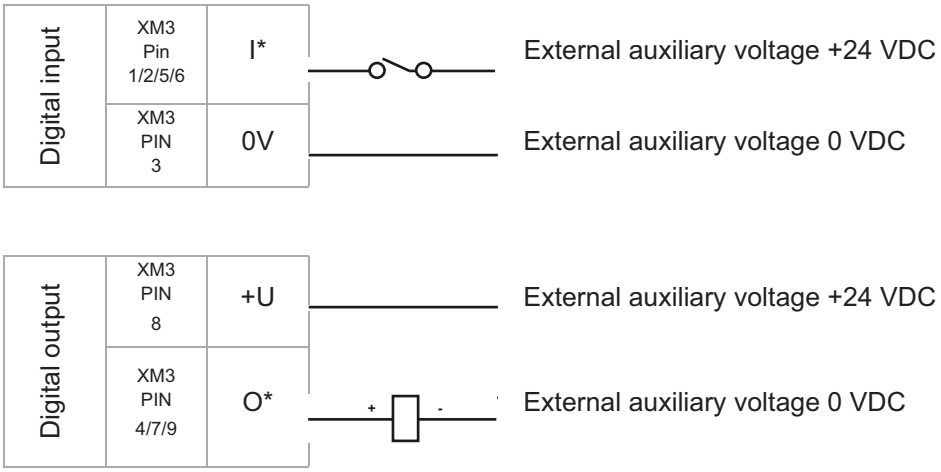
XM1	**Signal plug**
HTS Plug	
Pin	**Function and/or signal**
1	
2	
3	n.a.
4	⏚

Rated output current	1 A
Rated voltage	250 VAC (ohmic load)

5.2.5 Digital in- / - outputs

Digital input (24 VDC), digital output (24 VDC / 500 mA)

XM3 DIO	**4 Digital In- /3 Digital Outputs**	
D-SUB, socket		
Pin		**Function and/or signal**
1	I1	Digital input 1
2	I3	Digital input 3
3	0V	Reference potential I *
4	O3	Digital output 3
5	I4	Digital input 4
6	I2	Digital input 2
7	O1	Digital output 1
8	+U	Power supply output O*
9	O2	Digital output 2



Output 1 Relay see chapter ↗Alarm Output (Signal Plug XM1).

5.2.6 Interfaces

XS1 RS485	**Serial interface COM**	
D-SUB, socket		
Pin		**Function and/or signal**
1	TX+	RS422
2	TX-	RS422
3	TXD	
4	n.a.	
5	RX-	RS422
6	RX+	RS422
7	n.a.	
8	RXD	
9	0V	RS422

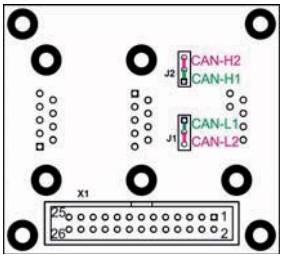
XS2 CAN	**Interface CANopen**		
D-SUB, plug			
Pin		**Function and/or signal**	
1	n.a.		
2	CAN-L	CAN 2	CAN 1
3	n.a.		
4	n.a.		
5	n.a.		
6	n.a.		
7	CAN-H	CAN 2	CAN 1
8	n.a.		
9	n.a.		

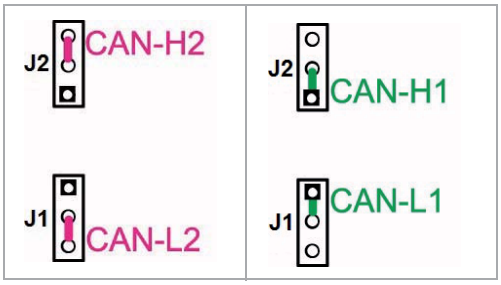
Default setting

Before opening the housing, deenergize the device and protect it against unintentional reclosing.

Warning

	External CAN-Bus e.g. for hot runner controller overall functions	**Internal** CAN-Bus e.g. when using the external reference junction





XS3 RJ45	**Interface Ethernet**
RJ45, Socket	

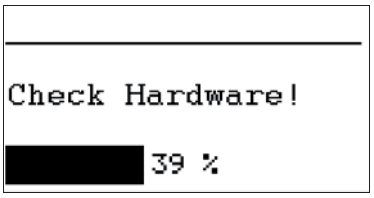
XS4 USB	**Interface USB**

6 Immediately after Switch ON

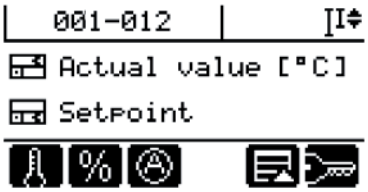
Immediately after switch ON, all segments of the LED display are light. That identifies that all LED displays are intact.

In the LCD display is the logo shown.

The first switch-on after leaving the factory asks for the language to use in the LCD display (from HEX file version pT-DC xxx3711z).



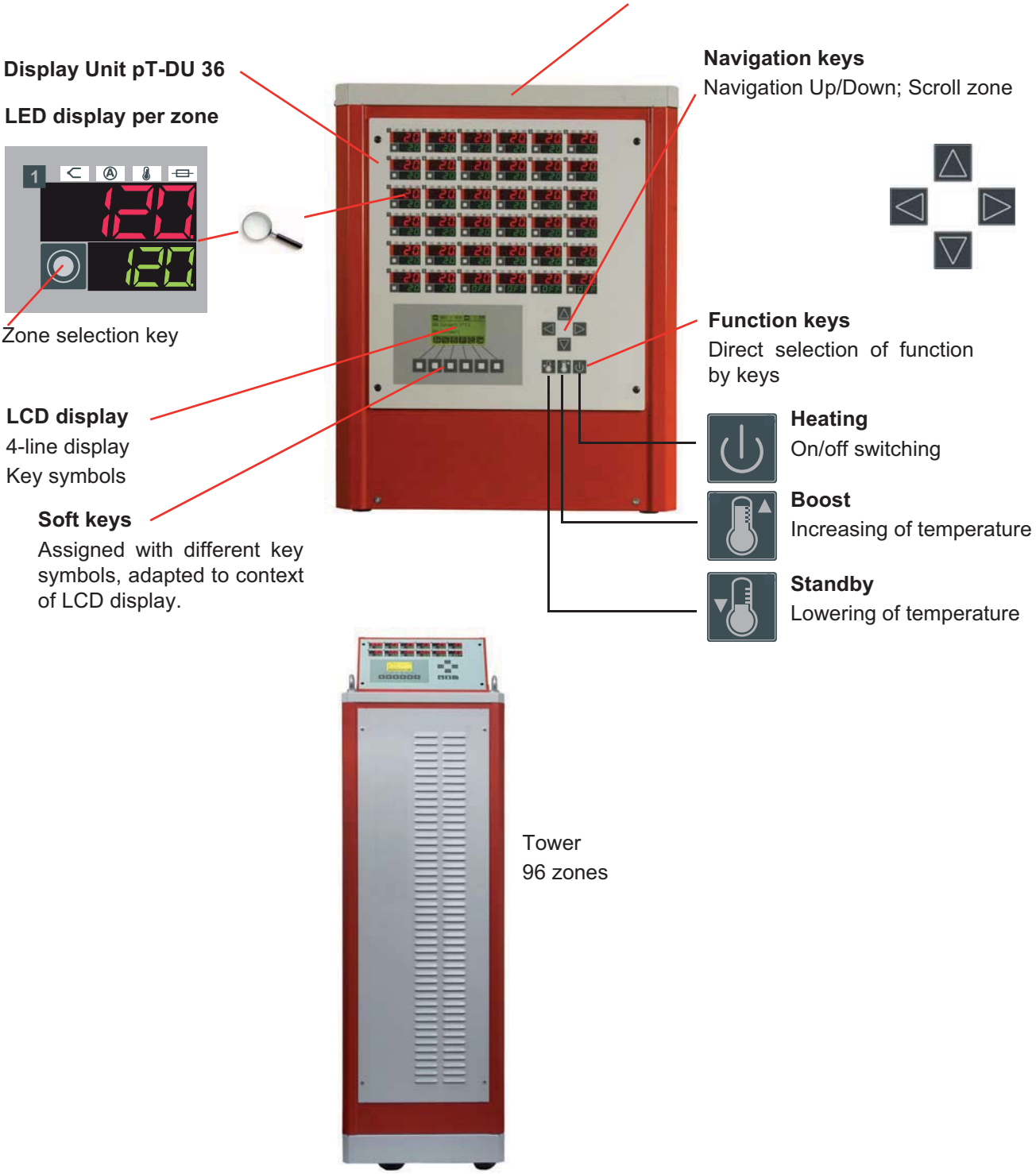
After a successful end of the hardware check, the LCD display changes to base display,



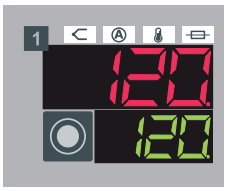
and/or is parameter [SP17] Query for MoldCheck start=ON, a dialog box can be shown after switch-on of the hot runner controller and/or after activation of the heating by key. Details see parameter [SP17] Query for MoldCheck start.

7 Operation by control panel DU - general specification

Overview of displays and operation elements for hotcontrol cDT 36.



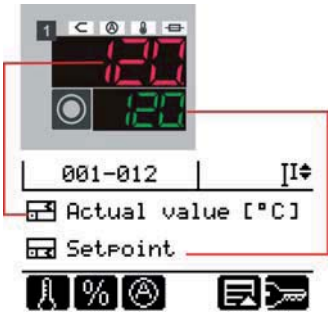
LED display per zone



Alarm LED's per zone

Sensor alarm
Current alarm
Temperature alarm
Fuse alarm

Allocation LED display / LCD display

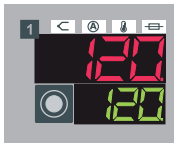


The basic menu and the menu displays are based on a .

Basic Display

If there is no operation for at least 1 minute, the display returns to basic display.

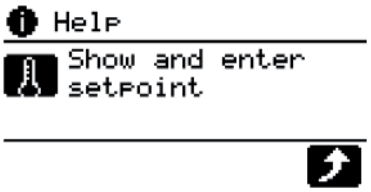
At zone selection



Selected zone

Deselected zone
(shaded)

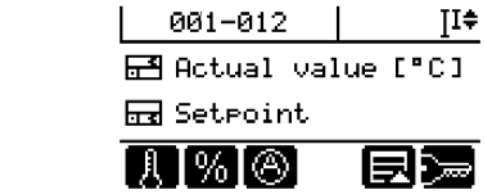
Help



When a soft key is pressed longer than 3 seconds, the deposited help text for the key symbol is shown in the LCD display.

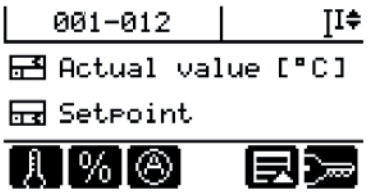
Soft key shows the following help.

Soft keys



The 6 soft keys are assigned with different key symbols, adapted to context of screen page.
Here the basic menu is displayed.

General



The soft keys, that have to be pressed next, to get to the next step in the operation, are presented in **RED** in the menus of the operating instruction.

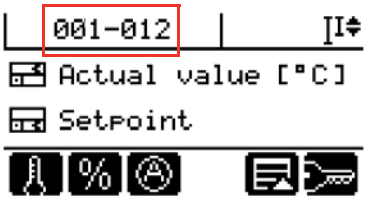
At entry of parameters by **Function selection**, the description follows according to the basic menu.

The meaning of parameters and ↗Functions is detailed described in different chapters.

Switch on/off

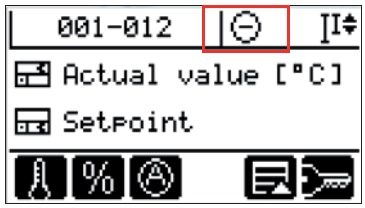
At switch on/off the last settings of the hot runner controller remain.

Scroll zones forward



Are more zones in a hot runner controller existent, than LED displays, by the left/right navigation key the zones can be scrolled. In the head line of the LCD display is shown, which zones are currently displayed.

Firmware update



At firmware update of

- Display Controller pT-DC-PCB, Logo is shown in the LCD display
- LED Bar pT-LED-PCB **, all segments of the LED display are light; the symbol (see left) is shown in the LCD display
- Hot Runner Controller Card HCC06/16, the symbol (see left) is shown in the LCD display

During the firmware update, no control mode is possible.

8 Standard Operation

To achieve an absolute process security, unauthorized input on the device is prevented by a comfortable user administration.

For hotcontrol cDT with control panel DU operation, three user levels are existing

- Standard operation without password
- Professional operation with freely selectable password
- Administrator operation with freely selectable password

where individual functions and parameters can be activated / deactivated.

The here described **Standard** operation includes all functions and parameters, as default setting, which are available for the user without login.

When the Standard user wants to access other and/or all functions and parameters, he must log in (↗Login/Logout), and/or activate/deactivate functions and parameters by the user administration.

The user of hotcontrol cDT with control panel DU has different ways to enter parameters.

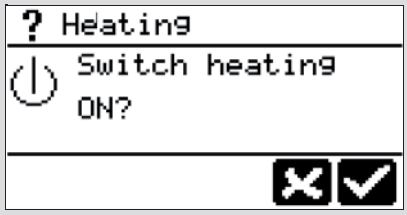
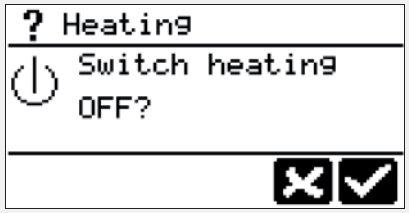
1 **Zone selection**: Select zone(s) first, function next
2 **Function selection**: Select function first, zone(s) next
3 **Quick entry for setpoint value**

The user has the advantage to choose freely, which way of data entry he uses. The once selected zones for way 1) and 2) remain selected and can be used for changes of other parameters.

The description for data entry of parameters is presented for way 1) and way 2).

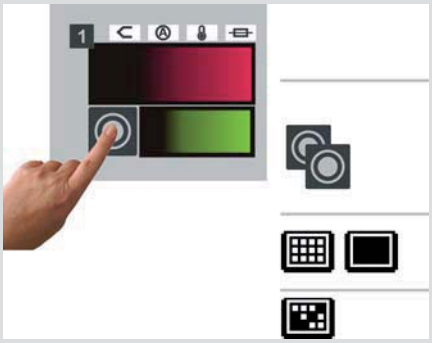
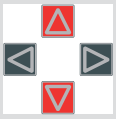
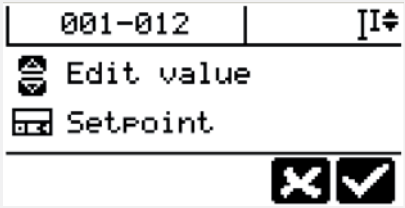
8.1 Heating

The heating is activated/deactivated by key .

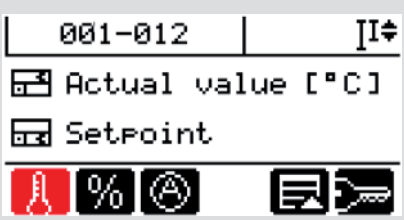
		Press key
		After switch-on of the hot runner controller and/or after activation of the heating by key a dialog box can be shown. Details see parameter [SP17] Query for MoldCheck start.
	 Confirm  Reject	The heating is switched on for all zones (parameter [P006] Zone = ON). Confirm Reject
		Is the heating on, is this signalized by a LED top right in the key.
	 Confirm  Reject	The heating is deactivated. Confirm Reject

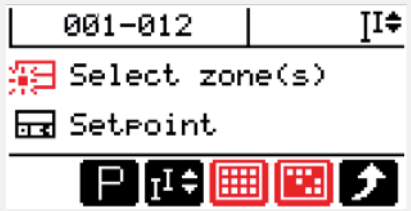
8.2 Setpoint value

8.2.1 Quick entry for setpoint value (zone selection)

		Select zones
	Single	The zones are selected/deselected by pressing the zone selection key.
	Block	Press zone selection key of the first zone of the block. Double click on the last zone of the block. All zones in between the first and the last selected zone are shown as selected.
	All	All zones are selected / All zones are deselected.
	Group	Scroll the list of available groups by navigation keys. Confirm selected group.
		Is more than one zone selected and a numerical value is changed:
		Setpoint value of all selected zones is changed to the same value (first selected zone).
		Setpoint value of all selected zones is changed by the same value.
		Current last setting see display in header top right.
		Increase / decrease value for selected zones by up-/down-key of navigation keys.
		Confirm change
		Reject change
		The selected zones are deselected.

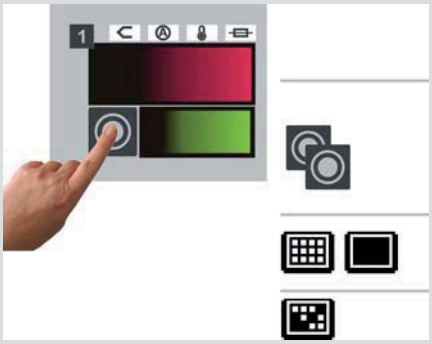
8.2.2 Set setpoint value (function selection)

Basic menu is displayed 		Select function



Execute zone selection

The zone displays for not selected zones is shaded.



Select zones

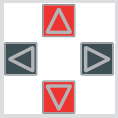
Single	The zones are selected/deselected by pressing the zone selection key.
Block	Press zone selection key of the first zone of the block. Double click on the last zone of the block. All zones in between the first and the last selected zone are shown as selected.
All	All zones are selected / All zones are deselected.
Group	Scroll the list of available groups by navigation keys. Confirm selected group.

Is more than one zone selected and a numerical value is changed:

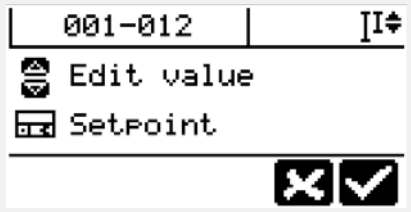
Setpoint value of all selected zones is changed to the same value (first selected zone).

Setpoint value of all selected zones is changed by the same value.

Current last setting see display in header top right.



Increase / decrease value for selected zones by up-/down-key of navigation keys.



Confirm change

Reject change

8.3 Output value

Description 	A temperature control with temperature sensor, temperature controller and heating element is possible only in case of closed control system. In case of failure of the temperature sensor, it is not possible to control the process temperature. In case of older tools without temperature detectors in the control system, the operation of the control zone is possible only in manual mode or in ↗Leading zone operation.
How it works	With manual mode, the operator can adjust the required heating capacity in percent as an output value. In case of the output value a value is involved between 0 and 100, which represents the percentage content for the switched-on control output (0% = completely switched off; 100% = continuously switched on). If a sensor defect occurs during standard operating mode, then the temperature control notes the average output value at last output in the regulation. In case of selection of manual mode, the temperature controller proposes this output value in manual mode.
What good is it	The setting of the output value in manual mode guarantees primarily operating reliability and prevents production downtimes.

Setting by parameter

[P002] Manual mode
[P003] Output value

Function preset for user

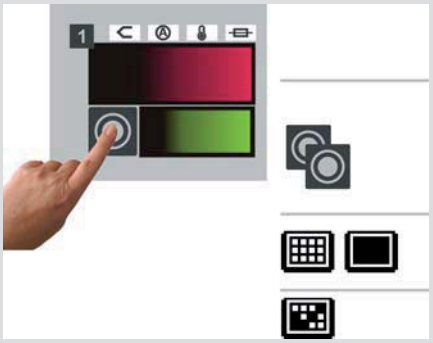
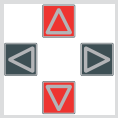
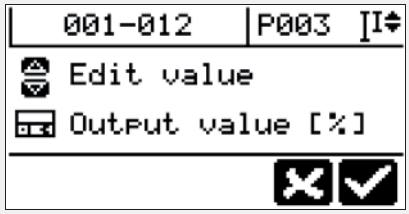
✓	Standard	✓	Professional
✓	Standard	✓	Professional

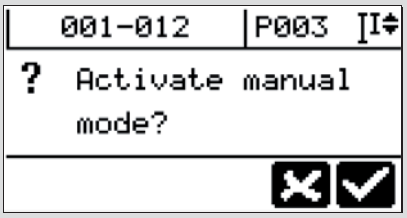
8.3.1 Change output value (zone selection)

Zones with defective sensors can continue to operated in manual mode.

Procedure:

For the affected zones an output value has to be entered manually. It is queried, whether the controller should be switched to manual mode.

		Select zones
	Single	The zones are selected/deselected by pressing the zone selection key.
	Block	Press zone selection key of the first zone of the block. Double click on the last zone of the block. All zones in between the first and the last selected zone are shown as selected.
	All	All zones are selected / All zones are deselected.
	Group	Scroll the list of available groups by navigation keys. Confirm selected group.
		Select function
	 	The parameter is selected by the scrolling with the keys. The parameter number is in the header and in the second line of the LED display is the content of the parameter shown for each zone. Scroll parameters forward Scroll parameters backward Scroll through all available parameters forward / backward starting from P001.
		Select parameter **output value**
		Increase / decrease value for selected zones by up-/down-key of navigation keys.
	 	Confirm change Reject change

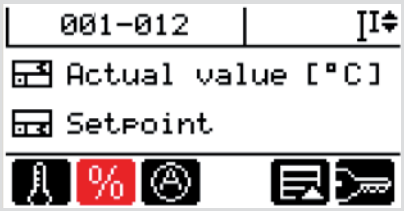
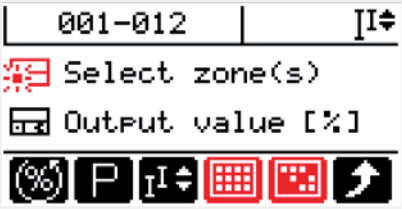
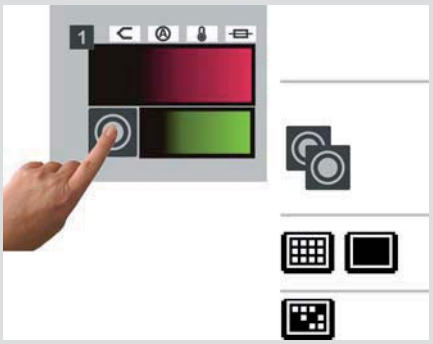
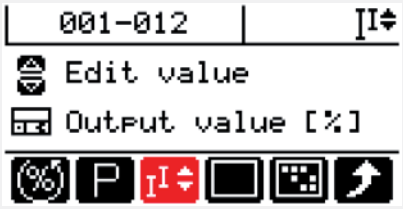
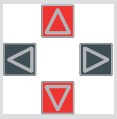
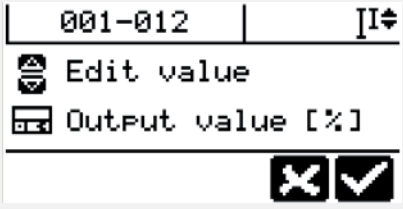


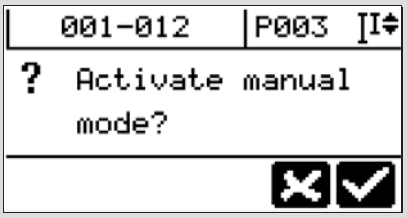
The manual mode can be activated too, when changing the output value.

Confirm change

Reject change

8.3.2 Change output value (function selection)

Basic menu is displayed 	%	Select function
		Execute zone selection The zone displays for not selected zones is shaded.
		Select zones
	Single	The zones are selected/deselected by pressing the zone selection key.
	Block	Press zone selection key of the first zone of the block. Double click on the last zone of the block. All zones in between the first and the last selected zone are shown as selected.
	All	All zones are selected / All zones are deselected.
	Group	Scroll the list of available groups by navigation keys. Confirm selected group.
		Is more than one zone selected and a numerical value is changed:
		Setpoint value of all selected zones is changed to the same value (first selected zone).
		Setpoint value of all selected zones is changed by the same value.
		Current last setting see display in header top right.
		Increase / decrease value for selected zones by up-/down-key of navigation keys.
		Confirm change
		Reject change



The manual mode can be activated too, when changing the output value.

Confirm change

Reject change

8.4 Manual mode

Description 	A temperature control with temperature sensor, temperature controller and heating element is possible only in case of closed control system. In case of failure of the temperature sensor, it is not possible to control the process temperature. In case of older tools without temperature detectors in the control system, the operation of the control zone is possible only in manual mode or in leading zone mode.
How it works	With manual mode, the operator can adjust the required heating capacity in percent as an output value. In case of the output value a value is involved between 0 and 100, which represents the percentage content for the switched-on control output (0% = completely switched off; 100% = continuously switched on). If a sensor defect occurs during standard operating mode, then the temperature control notes the average output value at last output in the regulation. In case of selection of manual mode, the temperature controller proposes this output value in manual mode.
What good is it	The function guarantees primarily operating reliability and prevents production downtimes.

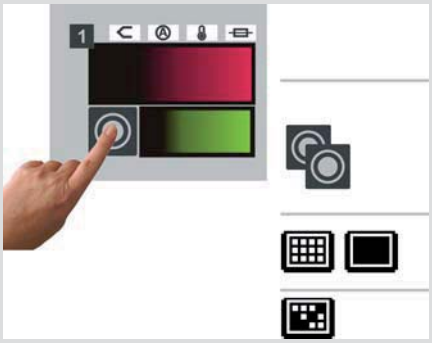
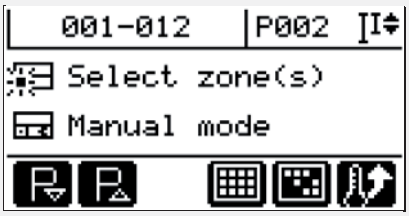
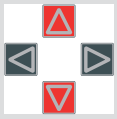
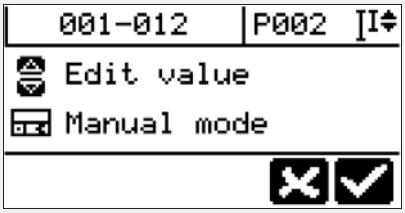
Setting by parameter

[P002] Manual mode
[P003] Output value

Function preset for user

✓	Standard	✓	Professional
✓	Standard	✓	Professional

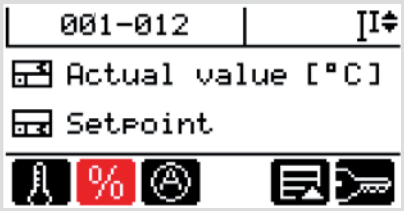
8.4.1 Switch manual mode ON/OFF (zone selection)

		Select zones
	Single	The zones are selected/deselected by pressing the zone selection key.
	Block	Press zone selection key of the first zone of the block. Double click on the last zone of the block. All zones in between the first and the last selected zone are shown as selected.
	All	All zones are selected / All zones are deselected.
	Group	Scroll the list of available groups by navigation keys. Confirm selected group.
		Select function
		The parameter is selected by the scrolling with the keys. The parameter number is in the header and in the second line of the LED display is the content of the parameter shown for each zone.
		Scroll parameters forward
		Scroll parameters backward
		Scroll through all available parameters forward / backward starting from P001.
		Select parameter **manual mode**
		Select setting for selected zones by up-/down-key of navigation keys.
		Confirm change
		Reject change

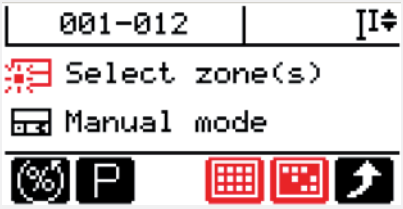
Continue with specifying output value by selection of the parameter or see chapter ↗Output value.

8.4.2 Switch manual mode ON/OFF (change mode)

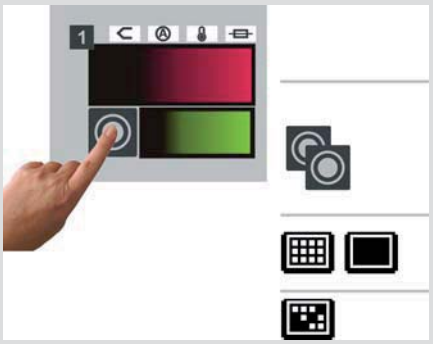
Basic menu is displayed



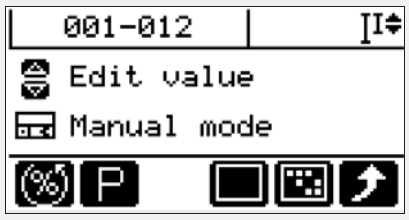
%	Select function



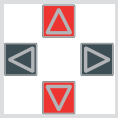
(%)	Change mode to **manual mode** Execute zone selection The zone displays for not selected zones is shaded.



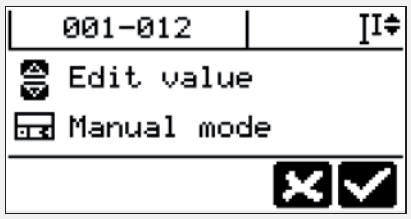
	Select zones
Single	The zones are selected/deselected by pressing the zone selection key.
Block	Press zone selection key of the first selected zone. Double click on the last zone. All zones in between the first and the last selected zone are shown as selected.
All	All zones are selected / All zones are deselected.
Group	Scroll the list of available groups by navigation keys. Confirm selected group.



Edit value



Select setting for selected zones by up-/down-key of navigation keys.



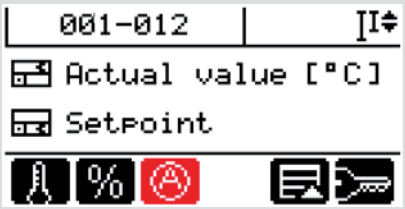
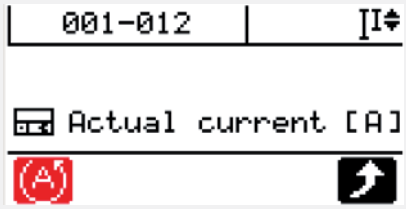
✓	Confirm change
✗	Reject change

Continue with specifying output value by selection of the parameter or see chapter ↗Output value.

8.5 Current display and execute current transfer

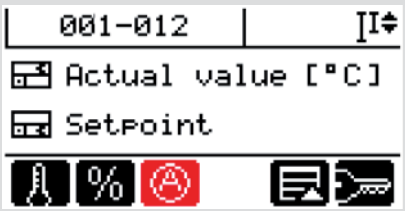
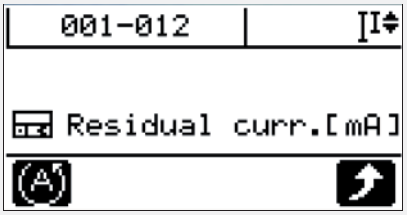
8.5.1 Current actual value display

The current actual value can be displayed for all zones.

Basic menu is displayed 		Select function
	 	The current actual value is shown in the second line of the LED display for each zone. Continue by change mode Return to previous operator level

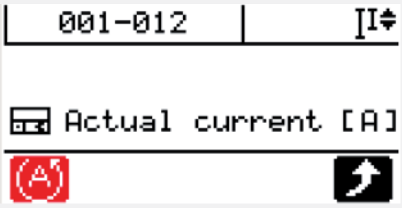
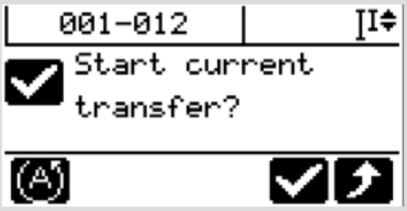
8.5.2 Residual current display

The residual current can be displayed for all zones.

Basic menu is displayed 	 	Select function Change mode to **residual current**
	 	The residual current is shown in the second line of the LED display for each zone. Return to previous operator level Continue by change mode

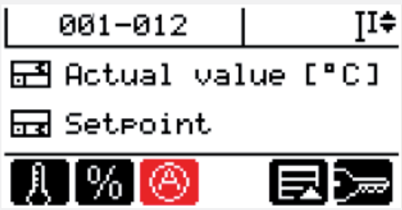
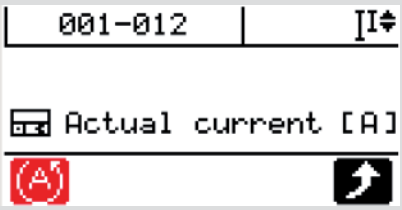
8.5.3 Execute current transfer

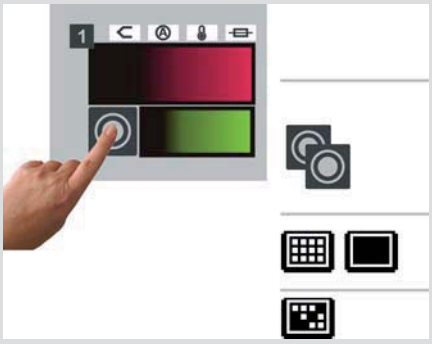
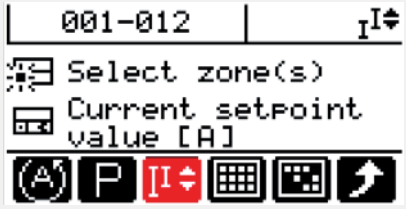
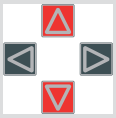
To monitor the floating current in the heater by comparison with reference values, the current setpoint value must be set automatically by current transfer and/or manually.

Basic menu is displayed 		Select function
	 	Change mode to **current transfer**. Press key twice.
		Start current transfer
		Return to previous operator level
		Continue by change mode

8.5.3.1 Specify current setpoint value manually

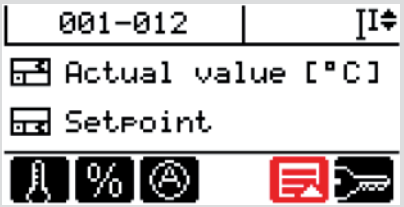
The current setpoint values can be changed after current transfer and/or be set manually for each zone.

Basic menu is displayed 		Select function
		Change mode to **current setpoint value**. Press key once.
		Execute zone selection The zone displays for not selected zones is shaded.

		Select zones
	Single	The zones are selected/deselected by pressing the zone selection key.
	Block	Press zone selection key of the first zone of the block. Double click on the last zone of the block. All zones in between the first and the last selected zone are shown as selected.
	All	All zones are selected / All zones are deselected.
	Group	Scroll the list of available groups by navigation keys. Confirm selected group.
		Is more than one zone selected and a numerical value is changed: Setpoint value of all selected zones is changed to the same value (first selected zone). Setpoint value of all selected zones is changed by the same value. Current last setting see display in header top right.
		Increase / decrease value for selected zones by up-/down-key of navigation keys.
		Confirm change Reject change

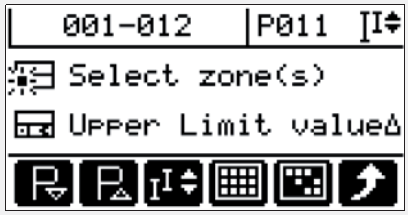
8.6 Activate functions / Show menus

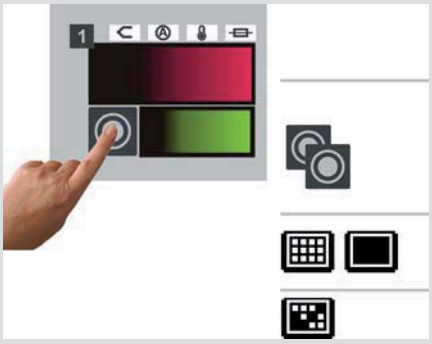
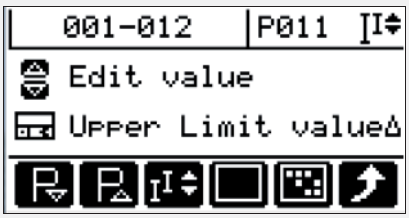
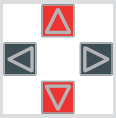
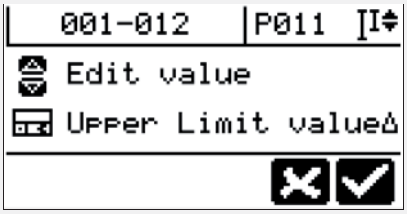
The available functions and menus for the Standard user are combined shown.
The key displays the menu.

Basic menu is displayed 		Select function
	  	By the up/down key of the navigation keys the list can be scrolled for more functions/menus. Call function / menu (color-coded) Return to previous operator level

8.6.1 Parameters

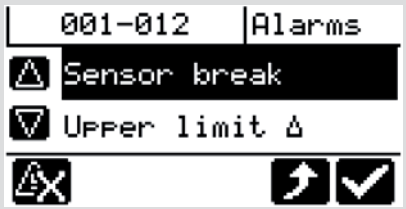
The available parameters for the Standard user are shown and can be changed.

		The function is exemplarily described for parameter **upper limit value Δ**
Menu parameter is selected 		Call menu
	 	The parameter is selected by the scrolling with the keys. The parameter number is in the header and in the second line of the LED display is the content of the parameter shown for each zone. Scroll parameters forward Scroll parameters backward Scroll through all available parameters forward / backward starting from P001.
		Select parameter **upper limit value Δ**

		Select zones
	Single	The zones are selected/deselected by pressing the zone selection key.
	Block	Press zone selection key of the first zone of the block. Double click on the last zone of the block. All zones in between the first and the last selected zone are shown as selected.
	All	All zones are selected / All zones are deselected.
	Group	Scroll the list of available groups by navigation keys. Confirm selected group.
		Is more than one zone selected and a numerical value is changed: Value of all selected zones is changed to the same value (first selected zone). Setpoint value of all selected zones is changed by the same value. Current last setting see display in header top right.
		Increase / decrease value for selected zones by up-/down-key of navigation keys.
		Confirm change Reject change
		Further procedure see all chapters for setting of parameters by zone selection.

8.6.2 Alarm list

All persistent alarms in the hot runner controller are displayed.

Menu alarm list is selected 		Call menu
		Are there no persistent alarms existing, it is signaled in the display.
 		Are there persistent alarms existing, the alarm list is displayed. By the up/down key of the navigation keys the list can be scrolled for more alarms. The zones, where an alarm exists (color-coded), are light in the LED display, the rest is shaded.
		Are the alarms gone, e.g. a sensor break is repaired, the non storing alarms are automatically deleted from the alarm list. The storing alarms must be acknowledged by the key. Which alarms are storing, because they are critical, is fixed in the system (see chapter ↗Alarm LED's / Information display).
		Return to previous operator level
		See Chapter↗MoldCheck

8.6.3 Zone Status

In the hot runner controller the status for all zones is displayed.

Menu zone status is selected 		Call menu
		All possible status are shown in a list. By the up/down key of the navigation keys the list can be scrolled for more status. The zones, where a status exists (color-coded), are light in the LED display, the rest is shaded.

8.6.4 Process Monitoring

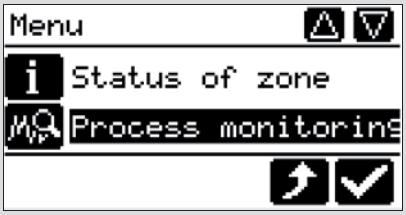
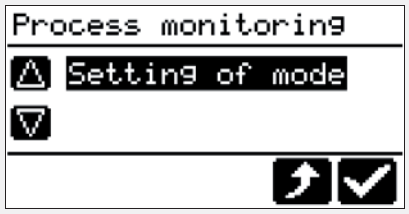
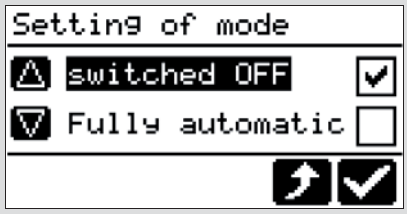
Description 	Unfortunately leakages in hot runner and hence resulting overmolding could not always be avoided. They could be caused by wear, incorrect operation, construction or production faults or by incorrect installation, leading at last to production breakdown and expensive repair. The function leakage detection in the hot runner controllers can identify an upcoming leakage at an early stage, quickly and reliably by intelligent analysis of the process parameters. It is possible that there will be false alarms and leaks can not be detected. This usually depends on structural conditions in the hot runner, as well as on a faulty operation.
How it works	The status of the zones in the hot runner is supervised by process monitoring with the help of characteristics, determined during the learning phase (operating point, tolerance band). Is the function process monitoring running in case of an error, i.e. the tolerance limit is exceeded, an alarm is output on display. At the best the alarm can be output on an output and be used for further analysis e.g. as „Stop Machine“.
What good is it	The process monitoring is an important module for operating reliability. With it, the state of the hot runner is monitored for leaks. If properly applied, unnecessary downtime, due to cleaning of the hot runner of over injected plastic, is prevented.

Recommendation

The learning phase should start, when the machine is running, i.e. after production start of the injection molding machine. Note this please, when process monitoring mode is selected. Is the learning phase started at a different point of time, the learned operating points can be adapted by greater tolerance definitions.

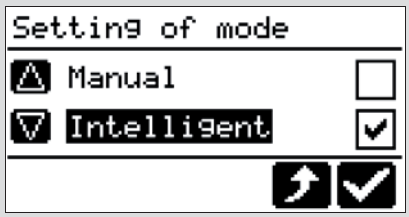
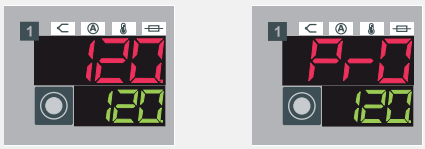
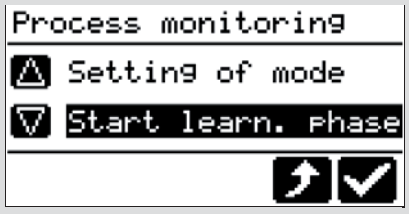
Setting by parameter	Function preset for user			
[SP07] Process monitoring mode	✓	Standard	✓	Professional
[P025] Proc.(ess) monitoring tolerance	✓	Standard	✓	Professional
[P026] Proc.(ess) monitoring operat.(ing) point	✓	Standard	✓	Professional

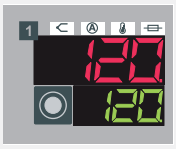
By this menu item the function process monitoring can be called.

Menu process monitoring is selected 	☑	Call menu
	☑ ↩	The mode has to be set first for the process monitoring. Call setting of mode Return to previous operator level
		As default process monitoring is switched off. The further mode settings are: ▪ Fully automatic ▪ Manual ▪ Intelligent

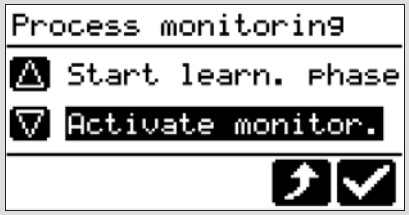
8.6.4.1 Process Monitoring Mode: Intelligent

In the process monitoring mode Intelligent, the learning phase and the monitoring has to be started manually by the operator. After termination of the learning phase, the determined parameters ([P025] Proc.(ess) monitoring tolerance, [P026] Proc.(ess) monitoring operat.(ing) point) are saved.

	☑	The mode **Intelligent** is selected (color-coded) and ticked.
		In the first line of the LED display, the display **Pro** - process monitoring is not active (see ↗Alarm LED's / Information display) alternates with the display of the current value.
	☑ ↩	After selection of the mode, the next menu item is displayed, wherewith the learning phase can be started. Start learning phase Return to previous operator level



In the first line of the LED display, the display **PLn** - process monitoring learning phase (see ↗Alarm LED's / Information display) alternates with the display of the current value.



After termination of the learning phase the monitoring can be activated.

The monitoring can directly be activated, when a terminated learning phase exists.

Activate monitoring

Return to previous operator level

When the monitoring is deactivated. the user is reminded after ca. 5 minutes in ↗InfoBoard.

Call up information.

Return to previous operator level.

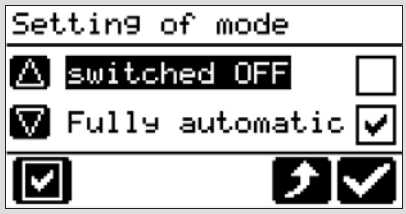
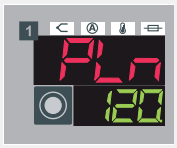
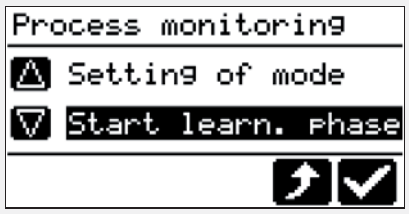
Activate monitoring

Return to previous operator level

In the first line of the LED display, the display **PAL** - process alarm (see ↗Alarm LED's / Information display) alternates with the display of the current value, when the tolerance limit is exceeded at activated monitoring. The alarm can be output on an output and be used for further processing e.g. as „Stop Machine“. The alarm message (see chapter ↗Alarms) can be acknowledged, as soon as the control characteristic returns to normal (error fixed), otherwise the alarm is activated immediately again.

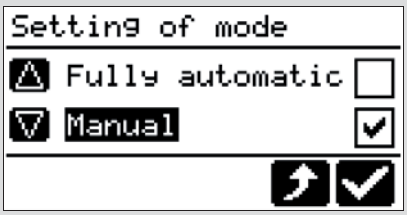
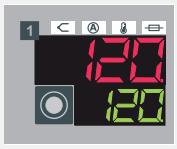
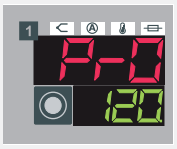
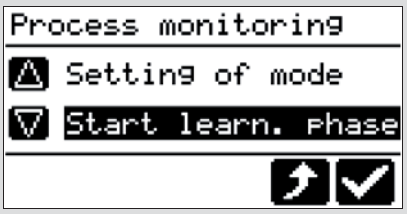
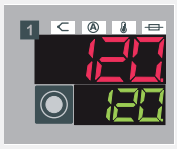
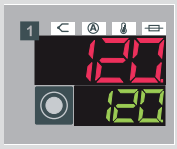
8.6.4.2 Process Monitoring Mode: Fully automatic

In the process monitoring mode Fully automatic, the learning phase and the monitoring is automatically started by the system and the determined parameter ([P026] Proc.(ess) monitoring operat.(ing)) is saved.

		The mode **Fully automatic** is selected (color-coded) and ticked.
 		In the first line of the LED display, the display **PLn** - process monitoring learning phase (see ↗Alarm LED's / Information display) alternates with the display of the current value.
 		In the first line of the LED display, the display **PAL** - process alarm (see ↗Alarm LED's / Information display) alternates with the display of the current value, when the tolerance limit is exceeded at activated monitoring. The alarm can be output on an output and be used for further processing e.g. as „Stop Machine“. The alarm message (see chapter ↗Alarms) can be acknowledged, as soon as the control characteristic returns to normal (error fixed), otherwise the alarm is activated immediately again.
	 	The learning phase can be manually started at any time in this mode. Start learning phase Return to previous operator level

8.6.4.3 Process Monitoring Mode: Manual

In the process monitoring mode Manual, the learning phase has to be started manually by the operator. After termination of the learning phase the process monitoring is automatically started by the system and the determined parameter ([P026] Proc.(ess) monitoring operat.(ing)) is saved..

		The mode **Manual** is selected (color-coded) and ticked.
 		In the first line of the LED display, the display **Pro** - process monitoring is not active (see ↗Alarm LED's / Information display) alternates with the display of the current value.
	 	After selection of the mode, the next menu item is displayed, wherewith the learning phase can be started. Start learning phase Return to previous operator level
 		In the first line of the LED display, the display **PLn** - process monitoring learning phase (see ↗Alarm LED's / Information display) alternates with the display of the current value.
 		In the first line of the LED display, the display **PAL** - process alarm (see ↗Alarm LED's / Information display) alternates with the display of the current value, when the tolerance limit is exceeded at activated monitoring. The alarm can be output on an output and be used for further processing e.g. as „Stop Machine“. The alarm message (see chapter ↗Alarms) can be acknowledged, as soon as the control characteristic returns to normal (error fixed), otherwise the alarm is activated immediately again.

8.6.5 MoldCheck

Description 	MoldCheck is a complete diagnosis of electric conditions of the hot runner and the corresponding peripherals.
How it works	The MoldCheck function is triggered by the operator. Beside the full wiring control "Is no thermocouple connected to the heating output?" a functional check of heaters and sensors is run. The function is ideal for tool makers and service departments, that have to guarantee their customers and/or colleagues a 100% function of the electrical system of the hot runner, as well as for the molders, who will control the status of the hot runner before installation of the tool on the machine.
What good is it	Early enough analysis can reduce downtimes before production. Electrical control of the hot runner is possible without specialized knowledge. The function provides concrete information for improvement and trouble shooting.

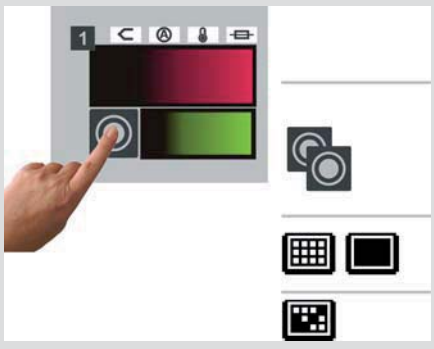
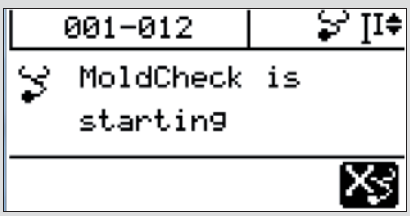
Setting by parameter

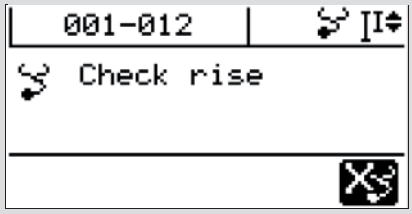
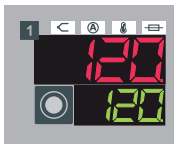
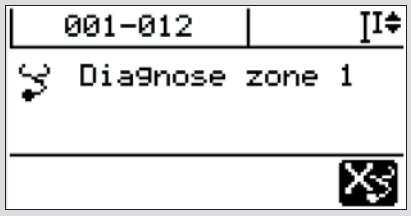
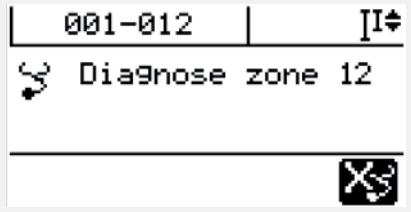
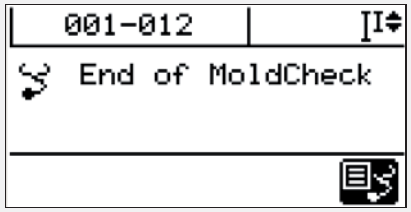
[P028] MoldCheck max. wait time.

Function preset for user

✓	Standard	✓	Professional

By this menu item the function MoldCheck can be called.

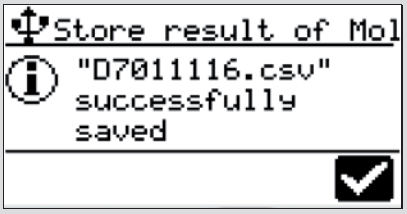
Menu MoldCheck is selected 	☑	Call menu
		Check setting of parameter [P028] MoldCheck max. wait time!
	☑ ↩	The call of the function must be confirmed. Start MoldCheck. Return to previous operator level.
		Execute zone selection The zone displays for not selected zones is shaded.
	**Single** **Block** **All** **Group**	Select zones The zones are selected/deselected by pressing the zone selection key. Press zone selection key of the first zone of the block. Double click on the last zone of the block. All zones in between the first and the last selected zone are shown as selected. All zones are selected / All zones are deselected. Scroll the list of available groups by navigation keys. Confirm selected group.
	☑	Confirm zone selection
	 ✕	MoldCheck starts MoldCheck can be stopped by operator at any time.

		... otherwise wait for end of MoldCheck function!
		In this phase the display **dIA** - MoldCheck active (see ↗Alarm LED's / Information display) alternates with the display of the current value for all selected zones.
 		
		In this phase the display **dIA** - MoldCheck active (see ↗Alarm LED's / Information display) alternates with the display of the current value for the just analyzed zone (here 1).
		In this phase the display **dIA** - MoldCheck active (see ↗Alarm LED's / Information display) alternates with the display of the current value for the just analyzed zone (here 12).
 		The MoldCheck result can be saved on USB stick. Before calling save / load on / from USB stick by key, the USB stick must be connected to the USB port, otherwise the menu items, related to USB stick, are not displayed (see ↗Save on USB stick.).
		After end of MoldCheck function, the result can be called by key.
		The MoldCheck result list is displayed. By the up/down key of the navigation keys the list can be scrolled for more results. The selected result (color-coded) is shown in the second line of the LED display.
		LED displays see also chapter ↗Alarm LED's / Information display and chapter ↗Error Messages - Trouble Shooting.

The following checks are made. The alarm LED's show all errors of the zone, at least the error in the LED display displayed.

Current [A]		Possible displays are: Numerical value See ↗General displays
Residual current [mA]		Possible displays are: Numerical value rSC (residual current, when value is greater than [SP05] Max. residual current) Alarm LED current alarm See ↗General displays
Current in status OFF [A] Current at heating off; e.g. in case of TRIAC short circuit		Possible displays are: Numerical value See ↗General displays
Short circuit		Possible displays are: IOL (Current overload Alarm) Alarm LED current alarm See ↗General displays
Phase/Fuse		Possible displays are: FUS (Fuse failure / phase missing) Alarm LED fuse alarm See ↗General displays
Potential error		Possible displays are: Pot (Potential error) Alarm LED sensor alarm See ↗General displays
Sensor incorrect polarity		Possible displays are: SP (Sensor incorrect polarity) Alarm LED sensor alarm See ↗General displays
Sensor allocation		Possible displays are: Sb (Sensor break) for analyzed zone. Alarm LED sensor alarm
		1...n - sensor of zone 1 is connected to zone 12. Alarm LED sensor alarm

		SSC - In the defined testing period see [P028] MoldCheck max. wait time no temperature rise happened. Alarm LED sensor alarm See ↗General displays
General displays		
		OK For the zone (here 1) the check was executed and no errors found.
		Not checked. For the zone (here 1) the check was not executed.
		Check aborted. For the zone (here 1) the check was aborted. The alarm LED's show the errors already detected before abort. In the lower green LED display the error reason is displayed.
Save on USB stick.		
		Before calling save / load on / from USB stick by key, the USB stick must be connected to the USB connection, otherwise the menu items, related to USB stick, are not displayed.
		The MoldCheck result can be saved on USB stick.

		Change name if necessary
		Move cursor to the left
		Move cursor to the right
		Delete character before cursor position
		Insert character before cursor position
		Select one character after the other with the keys of the navigation keys
		Confirm
		Reject
		Return to previous operator level

8.7 Leading zone operation

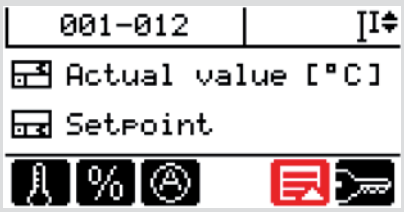
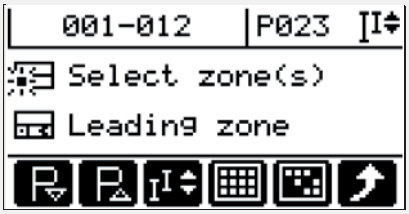
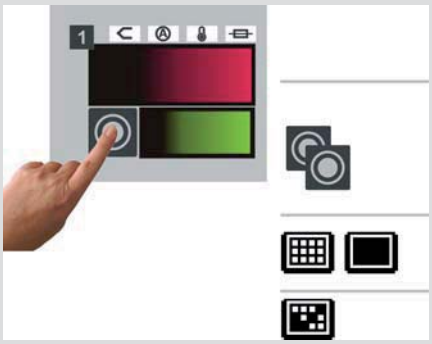
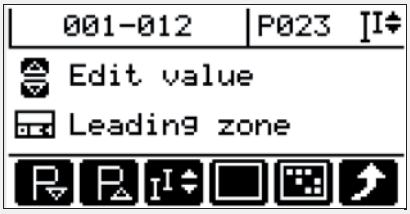
Description 	With a defective sensor, the zone must not inevitably be switched off or immediately be repaired.
How it works	There are two alternative functions for solution of the problem. The first is the ↗Manual mode, the second the leading zone operation. It provides the possibility, to get the zone with a defective sensor controlled by a similar zone with intact sensor. For this, the zone with the defective sensor must know the zone number of the leading zone, to get the zone controlled with.
What good is it	The leading zone operation has advantages compared to the manual mode because, unlike the manual mode with which a fixed ↗Output value is output constantly, the possibility exists in leading zone operation that, in case of the zone with defective sensor, external influences are further considered and controlled. The function guarantees primarily operating reliability and prevents production downtimes.

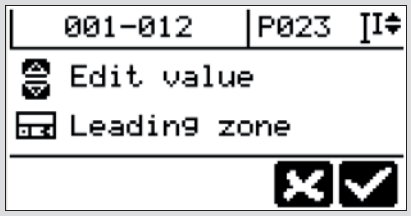
Setting by parameter

[P023] Leading Zone
[P024] Leading zone correction
[P019] Auto leading zone operation

Function preset for user

✓	Standard	✓	Professional
✓	Standard	✓	Professional
✗	Standard	✓	Professional

Basic menu is displayed 		Select function
	 	By the up/down key of the navigation keys choose **Parameter** (color-coded). Call by key.
	 	The parameter **leading zone** is selected by the scrolling with the keys. The parameter number is in the header and in the second line of the LED display is the content of the parameter shown for each zone.
		Parameter Leading zone is selected. Execute zone selection The zone displays for not selected zones is shaded.
		Select zones
	Single	The zones are selected/deselected by pressing the zone selection key.
	Block	Press zone selection key of the first selected zone. Double click on the last zone. All zones in between the first and the last selected zone are shown as selected.
	All	All zones are selected / All zones are deselected.
	Group	Scroll the list of available groups by navigation keys. Confirm selected group.
		By the up/down key of the navigation keys the number of the leading zone can be set.



	Edit
	Confirm
	Reject

8.8 Standby

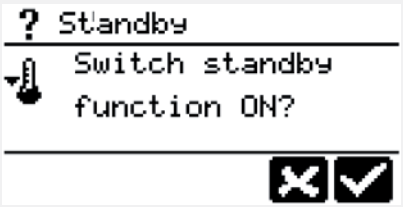
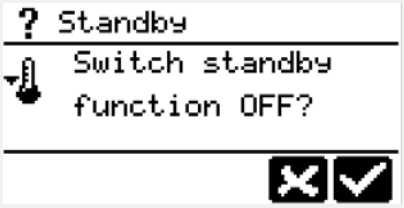
Description 	In Standby mode the setpoint values are reduced, because e.g. in production breaks it makes sense, to reduce the temperature level of the hot runner.
How it works	At operation the Standby mode is started and ended at the push of the button. The setpoint values of the zones are reduced by a freely selectable temperature value. Alternatively the function can also be activated by a digital input e.g. from the injection molding machine.
What good is it	Energy is saved and the plastic, located in the cavities, is not thermally damaged.

Setting by parameter

[SP09] Standby
[SP11] Auto standby time
[P007] Standby setpoint

Function preset for user

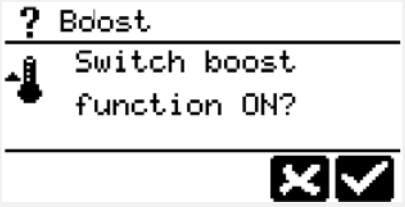
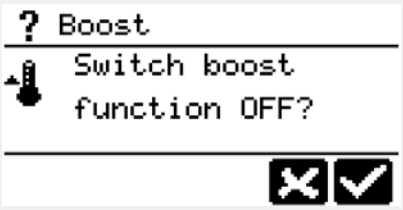
✗	Standard	✓	Professional
✗	Standard	✓	Professional
✓	Standard	✓	Professional

		Press key
	☑ ☒	After activation of the Standby function, all zones are reduced by the setpoint value under parameter [P007] - Standby setpoint value. Confirm Reject
		Standby function active is signalized by a LED top right in the key.
	☑ ☒	After deactivation of the Standby function, all zones are controlled by the setpoint value set. Confirm Reject

8.9 Boost

Description 	In Boost mode, the setpoint values are increased e.g. to heat nozzles for a short time after downtimes and to guarantee a smooth production start.
How it works	The Boost mode can be used in two situations. In the first case the Boost mode is started during operation at the push of the button. The setpoint values of the zones are increased by a freely selectable temperature value. Additionally a time period can be set, after which the Boost mode is automatically ended, otherwise the Boost mode is ended per push of the button. Alternatively the function can also be activated by a digital input e.g. from the injection molding machine. In the second case the Boost mode follows the heating-up. After the start-up time has elapsed, the zones are increased by a freely selectable temperature value. This workflow provides the operator at automated heating-up processes, because no manual interaction is necessary.
What good is it	The Boost mode provides the operator at start-up and production start and is labor-saving.

Setting by parameter	**Function preset for user**			
[SP08] Boost	✗	Standard	✓	Professional
[P008] Boost setpoint	✓	Standard	✓	Professional
[P017] Boost time at start-up mode	✓	Standard	✓	Professional
[P018] Boost time	✓	Standard	✓	Professional

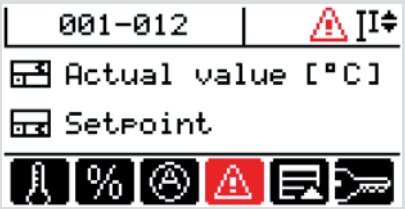
		Check setting for parameter [P008] Boost setpoint!
		Press key
	☑ ☒	After activation of the Boost function, all zones are increased by the setpoint value under parameter [P008] - Boost set-point value for the time set under parameter [P018] - Boost time. Confirm Reject
		Boost function active is signalized by a LED top left in the key. In the second line of the LED display the elapsing timer is shown.
	☑ ☒	After deactivation of the Boost function and/or after timer elapsed, all zones are controlled by the setpoint value set. Confirm Reject

8.10 Alarms

As soon, as an alarm is detected in the system, e.g. due to a sensor break, the key symbol is shown and in the header the alarm pictogram starts flashing.

Are there no alarms, the key symbol and the pictogram are not visible.

Basic menu is displayed



Select function

The alarm list is displayed

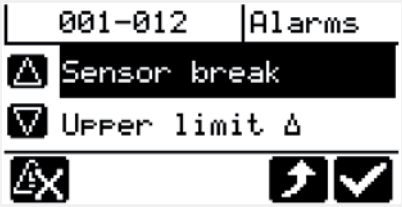
By the up/down key of the navigation keys the list can be scrolled for more alarms.

The zones, where an alarm exists (color-coded), are light in the LED display, the rest is shaded.

Are the alarms gone, e.g. a sensor break is repaired, the non storing alarms are automatically deleted from the alarm list. The storing alarms must be acknowledged by the key.

Confirm change

Return to previous operator level



Are alarms, as well as information in the system available, both is shown in the key symbol and in the pictogram in the header (see chapter ↗InfoBoard).

8.11 InfoBoard

Description 	To speak from our own experience, the potential of hot runner controllers is by far not utilized by the operator. This has to be improved. The novel InfoBoard function provides the operator of hot runner controllers with an optimal utilization of the scope of functions on the controller. Imagine the InfoBoard as pin board, where the hot runner controller pins information and messages, which the operator may take into consideration or not.
How it works	During operation the hot runner controller check continuously miscellaneous characteristics and status and determines, whether this message is shown in the InfoBoard. Due to this fact, very often monitoring functions are not active, because it needs operator interaction, the operator lacks knowledge or he has utterly overlooked them. The InfoBoard points out actively problems and status for the operator. A part of the messages can directly be acknowledged here and the open issue be solved.
What good is it	Valuable information to support the operator operating reliability Control of system functions

Setting by parameter

<not any>

Function preset for user

✓	Standard	✓	Professional

The following messages and measures are available in the InfoBoard.

Message	Current setpoint value is not set!

Proposed measure	Start current transfer?
Details	Current setpoint value = 0.0 A (see parameter [P004] Current setpoint value) See Chapter↗Current display and execute current transfer

Message	Process monitoring is not active
Proposed measure	Activate process monitoring?
Details	Is the process monitoring not activated, although the learning phase is terminated, the operator receives this message. See Chapter↗Process Monitoring

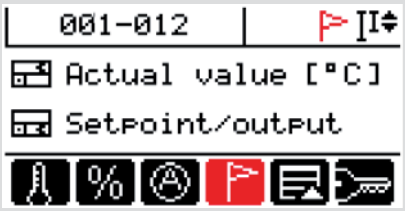
Message	Wrong zone type set
Proposed measure	Take over zone type?
Details	The zone type was identified as wrong.
Prerequisites	■ Sensor short-circuit (SSC) is activated (see parameter Digital - / Outputs) ■ the identification is terminated (see parameter [P030] Identification)

Message	Current value outside tolerance band
Proposed measure	Start current transfer?
Details	E.g. after change of tool See Chapter↗Current display and execute current transfer

Message	Sensor error existent
Proposed measure	Search and activate leading zone?
Details	At the auto leading zone operation (parameter [P019] Auto leading zone = ON) a sensor error is detected. At confirmation of the proposed measure, for the zone with the sensor errors an adequate zone is searched and set as leading zone.

In the background, the system executes analysis permanently and informs the operator of important things by the InfoBoard. Is an information available, the key symbol is shown and in the header the pictogram for InfoBoard starts flashing.

Is there no information, the key symbol and the pictogram are not visible.

Basic menu is displayed 		Select function
		The InfoBoard is displayed By the up/down key of the navigation keys the list can be scrolled for more information (see counter in LCD display down left).
	 	Beyond the information, the system recommends dedicated remedies, to support the operator solving problems. Confirm action Reject action
		Are alarms, as well as information in the system available, both is shown in the key symbol and in the pictogram in the header (see chapter ↗MoldCheck).

8.12 Login/Logout

Description 	Unauthorized input on the hot runner controller is prevented by a comfortable ↗User Administration. There are 3 different users in the hot runner controller. The user **Standard** and the user **Professional** (see chapter ↗Professional Operation) have adapted access rights. The existing system administrator **Admin** has all access rights to the system. The user Professional and the user Admin are only activated after login.
How it works	After start of the hot runner controller, the profile of the standard user is activated. The standard user is always active, if no other user is logged into the system. Which user is currently logged in, is to be identified by the key symbol for login. By a login other users are activated and/or deactivated after logout.
What good is it	By ↗User Administration and ↗Login/Logout the hot runner controller may be individually adapted at any time in terms of the enabled function scope, faulty insertions are prevented.

The standard passwords should be changed after start-up of the system by the system administrator Admin.

Directly after start-up, the system administrator Admin should check the access rights of the standard user. The standard user should be always the user who has the least rights in the system.

In addition to the entry of the password by user, by ↗USB support there exist a comfortable, because automated Login procedure.

A once saved key, on USB stick, with password, can be used for all hot runner controllers with the same password.

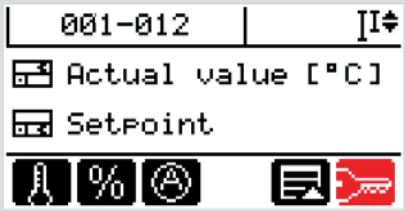
The key is tied for safety to the USB stick. A copy of the key on another drive, makes the key invalid. The key must be created for each USB stick.

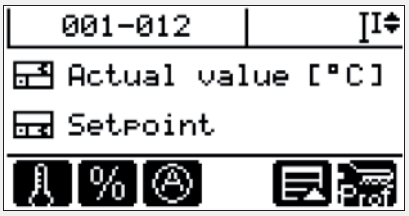
Setting by parameter

<not any>

Function preset for user

✗	Standard	✓	Professional

Basic menu is displayed 		Select function
		Automated Login procedure Is a key of a user on the connected USB stick available, this key is activated by pressing the key  in the hot runner controller (prerequisite same password). The active, logged in user can be seen in the key symbol.
		Login, as described as follows only, when NO USB stick is connected.
		Login user Professional Select one character after the other with the keys of the navigation keys.
		Move cursor to the left
		Move cursor to the right
		Delete character before cursor position
		Insert character before cursor position
		Login user Professional The Standard passwords Professional Password: prof Admin Password: admin should be changed after start-up of the system by the user Admin in the user administration.
		Confirm
		Reject

		Is a user logged in, can this be seen in the key symbol Login.
	  	A logged in user is logged off again after selection of the key symbol Login and confirmation. Confirm Reject

In case the password for user Professional and/or user Admin is unknown, see chapter ↗Reset password.

8.13 Reset password

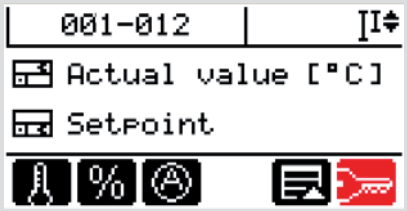
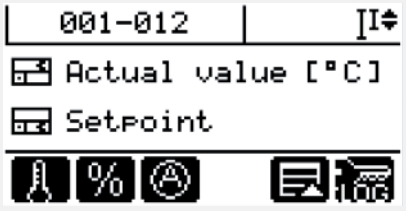
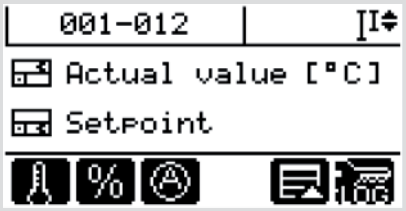
Description 	In case the password for user Professional and/or user Admin is unknown, the user can reset ALL passwords by the menu item **Reset passwords** to default (see chapter ↗Login/Logout).
How it works	Is the menu item not visible, the user can log in with the password pwreset and can reset ALL passwords by the menu item **Reset passwords** (see chapter ↗Login/Logout) to default. Thereafter the passwords should soon be changed by the user administration.
What good is it	In urgent cases, it may be necessary to operate functions, menus and/or parameters, which are not available for the operator. Is the person, that knows the password, not present, or the password was forgotten, the operation is in such an emergency possible after appropriate activation.

Setting by parameter

<not any>

Function preset for user

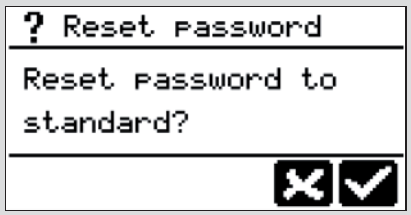
✓	Standard	✓	Professional

Basic menu is displayed 		Select function
		Select one character after the other with the keys of the navigation keys.
		Move cursor to the left
		Move cursor to the right
		Delete character before cursor position
		Insert character before cursor position
		Login with **pwreset**
		Confirm
		Reject
		The user LOG is logged in, what can be seen in the key symbol.
		Call functions / menu

By the up/down key of the navigation keys the list can be scrolled for more functions/menus.

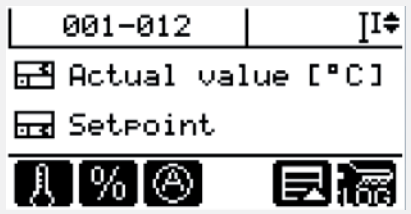
Call **Reset passwords** (color-coded)

Return to previous operator level



Confirm

Reject



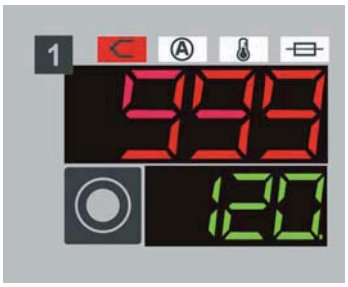
Logout user LOG.

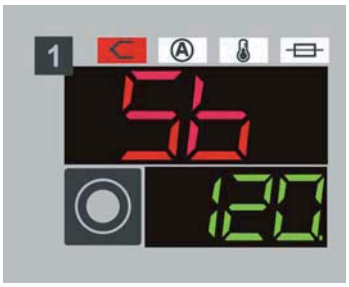
Selection of the key symbol Login and confirmation.

Confirm

Reject

9 Alarm LED's / Information display





Text display (here Sb) in the first line of the LED display alternates with current value.

Error report		Description
	Sb	Sensor break (see chapter ↗Sensor break Sb)
	SP	Sensor incorrect polarity (see chapter ↗Sensor incorrect polarity SP)
	SSC	Short circuit in sensor circuit (see chapter ↗Sensor alarm SSC) ✸
	Pot	Potential error (see chapter ↗Potential error Pot)
Ⓐ		Current tolerance error (see chapter ↗Current tolerance error)
Ⓐ	tHY	Thyristor alarm (see chapter ↗Thyristor alarm tHY)
Ⓐ	rSC	Residual current (see chapter ↗Residual current rSC)
Ⓐ	IOL	Current overload (see chapter ↗Current alarm IOL) (Heater with too high power / short circuit in heating circuit)
Ⓐ	Hb	Total breakdown of heater (see chapter ↗Total breakdown of heater Hb) / heater not connected
		See chapter ↗Temperature outside limit value range
	TrG	Temperature range above maximal value (see chapter ↗Temperature alarm trG)
	FUS	Fuse failure (see chapter ↗Fuse failure FUS) / phase missing

System error	Description
ERR	Channel data error Trouble Shooting see service manual
SYS	System data error Trouble Shooting see service manual
hSE	Heat sink temperature too high Trouble Shooting see service manual
CAn	Communication error CAN bus internal Trouble Shooting see service manual

Status message	Description
OFF	Actuator disconnected / Zone is passive (at heating release ON)
Dri	Drift error at identification
IdE	Error at identification
Id	Identification heating active
PLn	Learning phase process control active
PrO	Process monitoring not active yet
PAL	Process alarm
ErF	External reference alarm

Status message	Description
MAn	Manual mode
SbY	Zone in Standby mode
bST	Zone in Boost mode $_{1)}$
dIA	MoldCheck (diagnosis) active
HnD	Heat‘n‘Dry
StA	Startup operation active $_{1)}$
rAP	Manual temperature ramp active
Ar.	Automatic ramp active. Marking slowest zone
Ar	Automatic ramp active
CoU	Leading zone manual mode $_{2)}$

LED display second line $_{1)}$ display of time and/or $_{2)}$ display of number of leading zone

✸ Storing alarm, has to be acknowledged

10 Error Messages - Trouble Shooting

10.1 Sensor break Sb

LED Display 	A sensor break is a disconnection in the sensor circuit where the sensor wire is squeezed somewhere in between sensor and controller.
How it works	After detection of an error an error message is immediately output and the heating of the corresponding zone is switched OFF ([P003] Output value = 0).
What good is it	The alarm sensor break provides the user with a specific indication of the error in the hot runner or the wiring, and provides the ability to pinpoint errors quickly and correct it.

Remedy	Reason	Trouble Shooting
	Sensor break	Check the connected sensors ■ Check connecting cable of hot runner controller ■ Check sensor input

10.2 Sensor incorrect polarity SP

LED Display 	Sensor incorrect polarity means, that the thermocouple is connected with the wrong polarity to the controller.
How it works	Due to the incorrect wiring, the controller measures a faulty actual value. For not yet heated tool, the fault is not visible. Only when the zone is heated up, the error is immediately detected and an error message displayed.
What good is it	The alarm sensor incorrect polarity provides the user with a specific indication of the error in the hot runner or the wiring, and provides the ability to pinpoint errors quickly and correct it.

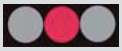
Remedy	Reason	Trouble Shooting
	Sensor incorrect polarity	Check the connected sensors ■ Check sensor connection +/-

10.3 Sensor alarm SSC

LED Display 	Under a sensor alarm, we understand the case, where a) the sensor wire is squeezed somewhere in between sensor and controller and a short circuit exists b) the sensor is not in the intended position (removed or is swapped with another).
How it works	Through the defect in the cable to the controller a low temperature value is forecast. The actual temperature is much higher than the measured temperature. If there is no rise in temperature measured in a zone type (considered nozzles and manifold) in a dependent time, a sensor alarm is displayed to the operator. To prevent damage to the appropriate zone, the heating is turned OFF ([P003] Output value = 0). A sensor alarm can be faulty, and that is when the heat output of the zone is too small. It shows an identical error image.
What good is it	The sensor alarm provides the user with a specific indication of the error in the hot runner or the wiring, and provides the ability to pinpoint errors quickly and correct it.

Remedy	**Reason**	**Trouble Shooting**
	Short circuit in sensor circuit	Check the connected sensors ■ Check connecting cable of hot runner controller
	Sensor position	Check position

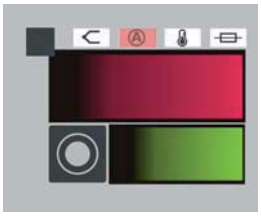
10.4 Potential error Pot

LED Display 	On the sensor input a too high voltage is detected.
	Status LED's on Hot Runner Controller Card HCC06/16: Blinking cycle **RED** ERR-LED: 1-fold blinking cycle, short pause, ... (on power controller card, that has detected the potential error) Blinking cycle **RED** ERR-LED: 2-fold blinking cycle, short pause, ... (on power controller card, that is switched-off due to a potential error on another power controller card)

How it works	Error is detected by the hardware on the power controller card.
What good is it	For protection all zones get de-energized (relay on power controller card OFF), also the zones on the other power controller cards, due to the voltage may come from any zone.

Remedy	Reason	Trouble Shooting
	Error on tool	Check sensor input Check grounding/sensor

10.5 Current tolerance error

LED Display 	A current tolerance error, indicates, that the measured heating current is outside the tolerance band for the zone compared to the reference value (current setpoint value) set.
How it works	The hot runner controller measures the currents through the heaters continuously and compares these to the reference values, the current setpoint values. This can be specified manually or automatically by call of the function current transfer. A current tolerance error indicates either a partly breakdown of the heater or that the current setpoint values were not yet set after a change of the connection controller and hot runner.
What good is it	The current tolerance error provides the user with a specific indication of the error in the hot runner or of a wrong setting, and provides the ability to pinpoint errors quickly and correct it.

Remedy	Reason	Trouble Shooting
	Ground	Check Heating
	Sensor at heating output	Check wiring system
	Tool changing without current transfer	Execute current transfer

10.6 Thyristor alarm tHY

LED Display 	A thyristor alarm indicates a defective component in the hot runner controller.
How it works	The hot runner controller checks the measurement of the heating currents, whether a power controller (thyristor) is uncontrolled heated in the hot runner controller due to a defect. Since this is a critical error case which can damage the heating circuit due to overheating, the heating circuit is immediately switched off (relay on power controller card OFF).
What good is it	The thyristor alarm primarily protects the heater against temperature excess, which causes an electric damage in the heater and replacement of the heater. It provides the user with a specific indication of the error in the hot runner and provides the ability to correct it quickly.

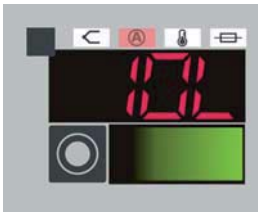
Remedy	Trouble Shooting see service manual

10.7 Residual current rSC

LED Display 	The residual current (see [SP05] Max. residual current]) set was exceeded for the Hot Runner Controller Card HCC06/16 and the Heatings were de-energized (relay on power controller card OFF).
	Status LED's on Hot Runner Controller Card HCC06/16: Blinking cycle **RED** ERR-LED: 4-fold blinking cycle, short pause, ...
How it works	On the power controller card the residual current for all 6 zones is determined.
What good is it	The residual current provides the user with a specific indication of the error in the hot runner or of a wrong setting, and provides the ability to pinpoint errors quickly and correct it.

Remedy	Reason	Trouble Shooting
	Tool humid	Check tool on humidity ■ Current to ground due to humidity
	Limit value wrong	Check settings for limit value and adjust it, if necessary

10.8 Current alarm IOL

LED Display 	On the Heating output a short circuit was detected.
	Status LED's on Hot Runner Controller Card HCC06/16: Blinking cycle **RED** ERR-LED: 3-fold blinking cycle, short pause, ...
How it works	At switch-on of the zone the heating current is controlled. Is a defined limit exceeded, there may be a short-circuit. The Heating circuit is de-energized (relay on power controller card OFF).
What good is it	A current alarm with subsequent disconnection avoids damage on the device and provides the user with a specific indication of the error in the hot runner.

Remedy	Reason	Trouble Shooting
	Heating overloaded	Check Heating Check wiring system

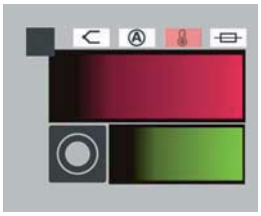
10.9 Total breakdown of heater Hb

LED Display 	Total breakdown of heater is an alarm message in hot runner controllers. It is output additional with the current alarm, when a break is detected in the heating circuit, i.e. no heating current is measured.
How it works	Indicates the user a disconnection in the heating circuit. The heating current determines a heating current of 0.0 A.

What good is it	The alarm total breakdown of heater provides the user additionally with a specific indication of the error in the hot runner or the wiring, and provides the ability to pinpoint errors quickly and correct it.

Remedy	Reason	Trouble Shooting
	Wiring	Check wiring system
	Heating	Check heating, measure resistance

10.10Temperature outside limit value range

LED display 	The actual temperature value is monitored in the hot runner controller on limits. An actual temperature value outside the set limits, generates this alarm.
How it works	The parameter [P013] Upper limit value, [P014] Lower limit value (absolute) and the parameter [P011] Upper limit Δ, [P012] Lower limit Δ (relative) define the range of the actual temperature value.
What good is it	Exceeds the actual temperature value the limits, the user gets a specific indication of the error. He can remove this without deviation and delay.

Remedy	Reason	Trouble Shooting
	Limit value too low	Check settings for limit value and adjust it, if necessary

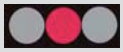
10.11Temperature alarm trG

LED Display 	A temperature alarm is generated, when the actual temperature value exceeds the parameter [P010] Upper setpoint value limit +5K for more than 5 seconds. The Heating of the concerned zones is switched-off ([P003] Output value = 0).

How it works	The parameter should be adjusted dependent on the measurement range of the used thermocouple.
What good is it	A temperature alarm with subsequent disconnection avoids damage on the device and provides the user with a specific indication of the error in the hot runner.

Remedy	**Reason**	**Trouble Shooting**
	Partial failure of sensor	Incorrect actual value display, but no sensor short-circuit ■ Check sensor, exchange if necessary

10.12Fuse failure FUS

LED Display 	controls the status of fuses in the heating circuit and output an error message in case of an defective fuse.
	Status LED's on Hot Runner Controller Card HCC06/16: **RED** ERR-LED continuous light; **RED** FUS-LED continuous light of the zone concerned.
How it works	Each zone has a LED, which shows the failure of the fuse in the heating circuit.
What good is it	The alarm fuse failure provides the user with a specific indication of the error. He can remove this without deviation and delay.

Remedy	Trouble Shooting see service manual

11 Key symbols

When a soft key is pressed longer than 3 seconds, the deposited help text for the key symbol is shown in the LCD display.

Here a selection of soft keys. In the standard setting the available functions for **S** (Standard), **P** (Professional); Admin has access to all functions.

Key symbols		Description	Visible for/Available			
		Setpoint value	Basic menu	**S**	**P**	↗Setpoint value
		Output value	Basic menu	**S**	**P**	↗Output value, ↗Manual mode
		Current	Basic menu	**S**	**P**	↗Current display and execute current transfer
		Alarms/InfoBoard	Basic menu	**S**	**P**	↗Alarms, ↗InfoBoard
		Menu	Basic menu	**S**	**P**	↗Activate functions / Show menus
		Parameters		**S**	**P**	↗Parameters
		Alarm list	Basic menu	**S**	**P**	↗Alarm list
		Zone Status		**S**	**P**	↗Zone Status
		Load setting			**P**	↗Save / Load settings
		Save settings			**P**	↗Save / Load settings
		Save program (on connected USB stick)		**S**	**P**	↗Save / Load program
		Load program (on connected USB stick)		**S**	**P**	↗Save / Load program
		MoldSnapshot (on connected USB stick)		**S**	**P**	↗MoldSnapshot
		Save group				↗Grouping (Grouping of zones)

Key symbols		Description	Visible for/Available			
		Process Monitoring		**S**	**P**	↗Process Monitoring
		MoldCheck		**S**	**P**	↗MoldCheck
		MoldStat			**P**	↗MoldStat
		Temperature Unit			**P**	↗Change temperature unit
		Language			**P**	↗Setting of language
		Inputs			**P**	↗Digital inputs & Digital-/Outputs
		Outputs			**P**	↗Digital inputs & Digital-/Outputs
		Date / Time			**P**	↗Date / Time
		System Parameters			**P**	↗System Parameters
		Export service file (on connected USB stick)			**P**	↗Export service file
		Reference junction				↗Reference junction
		Setup				↗Setup
		Default setting				↗Default setting
		Fan test				↗Fan test
		User Administration		**n.a.**		↗User Administration
		Login/Logout Reset password		**Only ADMIN**		↗Login/Logout ↗Reset password

12 Professional Operation

To achieve an absolute process security, unauthorized input on the device is prevented by a comfortable user administration.

For hotcontrol cDT with control panel DU operation, three user levels are existing

- Standard operation without password
- Professional operation with freely selectable password
- Administrator operation with freely selectable password

where individual functions and parameters can be activated / deactivated.

The here described **Professional** operation includes all functions and parameters, as default setting, which are available for the user with login.
The functions and parameters already described in chapter ↗Standard Operation, which the user Professional may execute, are not mentioned here, only the functions and parameters beyond.

The user Professional and Admin have the same user authorization to execute functions and parameters.

The user of hotcontrol cDT with control panel DU has different ways to enter parameters.
1 **Zone selection**: Select zone(s) first, function next
2 **Function selection**: Select function first, zone(s) next
3 **Quick entry for setpoint value**

The user has the advantage to choose freely, which way of data entry he uses. The once selected zones for way 1) and 2) remain selected and can be used for changes of other parameters.

The description for data entry of parameters is presented for way 1) and way 2).

12.1 Grouping (Grouping of zones)

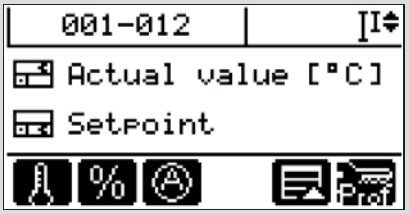
Description 	One of the advantages of a multi-loop hot runner controller compared to single-loop controllers is, the comfortable operation by a common user interface. This offers functions, which were not possible in hot runner controllers with independent single-loop controllers, e.g. the possibility of grouping of zones.
How it works	For hotcontrol cDT operation by control panel DU, zones belonging together (e.g. nozzles in a special tool area, manifold zones) can comfortable be combined in groups and saved with a freely specified name. This eases the recognition for the operator. For data entry on the hot runner controller, the defined zone groups can be called at the push of the button for selection of zones. The annoying search in plans for zones is omitted.
What good is it	The possibility of grouping of zones eases the operation extraordinarily and saves time. The groups are saved with a freely specified name and can easily be recognized by the operator.

Setting by parameter

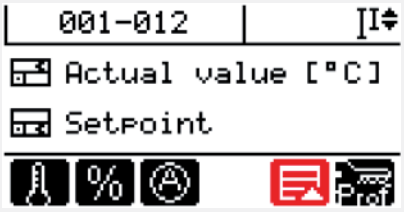
<not any>

Function preset for user

✗	Standard	✓	Professional



Login as user Professional (see chapter ↗Login/Logout).



Selecting function

By the up/down key of the navigation keys the list functions / menu can be scrolled for **Save group.**

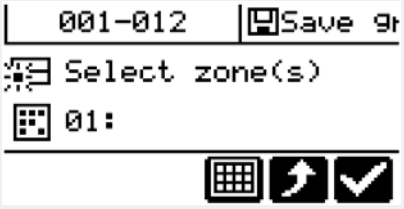
Call menu

The group 01: is selected and the name of the group is specified as ggg-01.

There are 20 groups are available for definition.
The user selects the group, which he wants to create/change by the up-/down-key of navigation keys.

Confirm group selection

Return to previous operator level

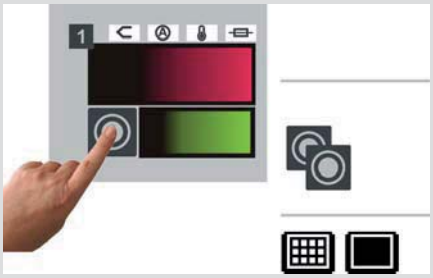


Execute zone selection

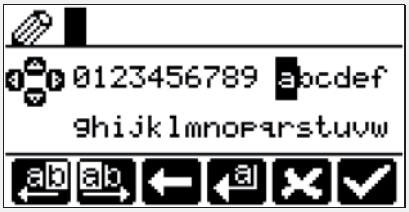
The zone displays for not selected zones is shaded.

There was one group already stored in this memory cell.

There was no group stored in this memory cell.



Single	The zones are selected/deselected by pressing the zone selection key.
Block	Press zone selection key of the first selected zone. Double click on the last zone. All zones in between the first and the last selected zone are shown as selected.
All	All zones are selected / All zones are deselected.
	Confirm zone selection



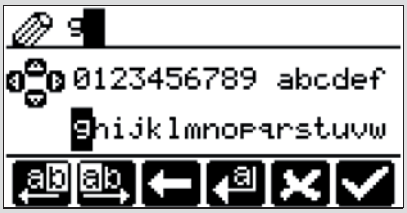
Change name of group **01**:

Move cursor to the left

Move cursor to the right

Delete character before cursor position

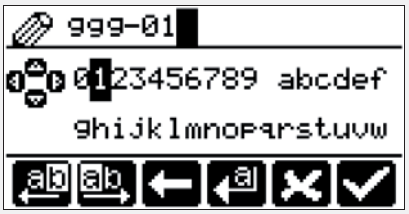
Insert character before cursor position



Enter new group name **ggg-01**.

Select one character after the other with the keys of the navigation keys

and confirm



Group name ggg-01

Confirm

Reject

The group is now available under the key for selection of zones.

Further procedure see all chapters for setting of parameters by zone selection.

12.2 Setting of language

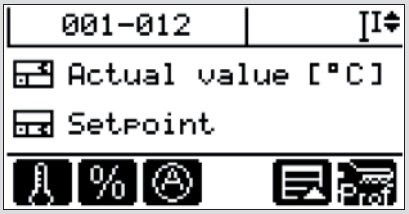
Description 	In the default the languages German and English are available. One more language can be activated.
How it works	The languages German and English in the default are selected. One more language can be activated after loading of the ASCII character set (by supplier, from HEX file version pT-DC xxx0811z).
What good is it	hotcontrol cDT is quickly customizable to the language of the operator.

Setting by parameter

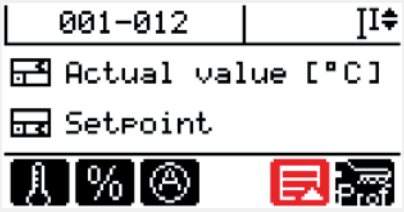
<not any>

Function preset for user

✗	Standard	✓	Professional



Login as user Professional (see chapter ↗Login/Logout).

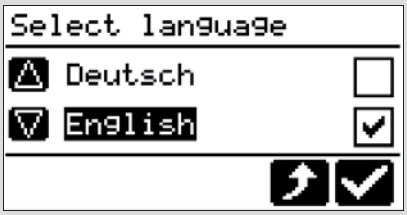


Select function

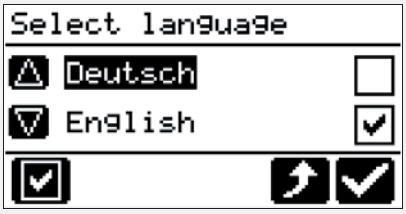
By the up/down key of the navigation keys the list functions / menu can be scrolled for **Language.**

Call menu

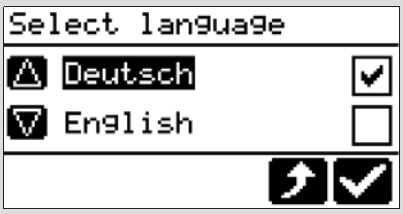
The default German is set to English.



There are 2 default languages available (activation of another language by ASCII character set by supplier).
The current settings are shown.



The user selects the language, which he wants to set by the up-/down-key of navigation keys.



The selected language is ticked and immediately activated for the system.

Return to previous operator level

Return to previous operator level

		Language English is set.

12.3 Change temperature unit

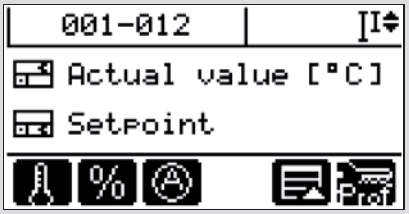
Description	All in the system implemented temperature values are changed from °C to °F and reverse due to the setting of temperature unit.

Setting by parameter

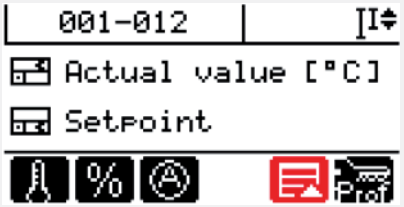
[SP01] Temperature Unit

Function preset for user

✗	Standard	✓	Professional



Login as user Professional (see chapter ↗Login/Logout).

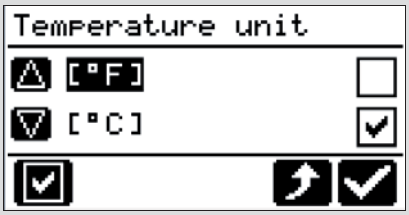


Select function

By the up/down key of the navigation keys the list functions / menu can be scrolled for **Temperature unit.**

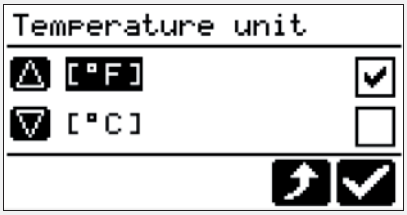
Call menu

The default °C is set to °F.



There are 2 temperature units available.

The user selects the temperature unit, which he wants to set by the up-/down-key of navigation keys.



The selected temperature unit is ticked and immediately activated for the system.

Return to previous operator level

Return to previous operator level

12.4 Save / Load settings

Description 	A setting is a data set consisting of all setpoint values and the zone status (zone on/off). Settings can be saved, loaded. Is the setting in the system unchanged active, this can be seen in the LCD display.
How it works	For the hotcontrol cDT hot runner controllers with the control panel DU, 10 settings can be saved with freely selectable name. The freely naming of the setting, eases the recognition of the data set by the operator.
What good is it	The settings support the operator at setting during often tool replacement and reduce the start-up phase.

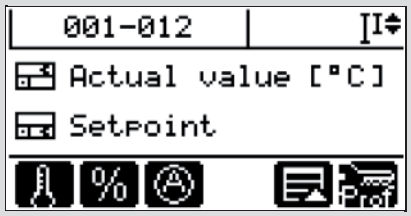
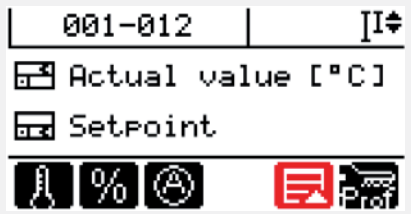
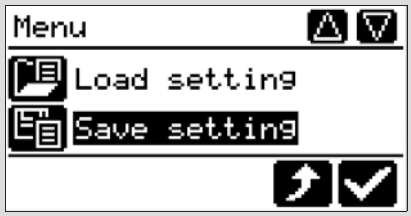
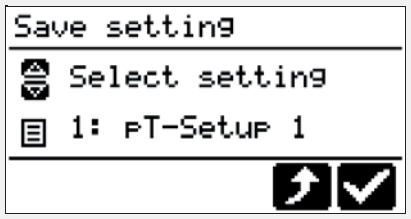
Setting by parameter

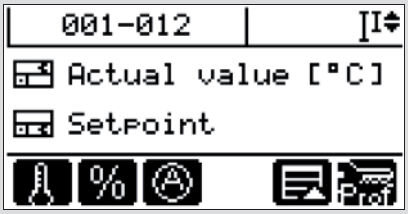
<not any>

Function preset for user

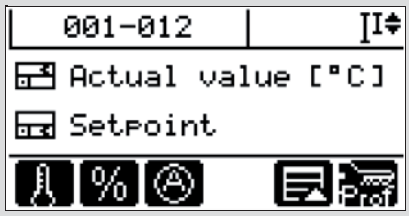
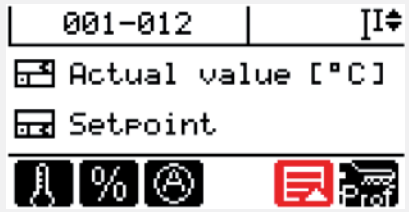
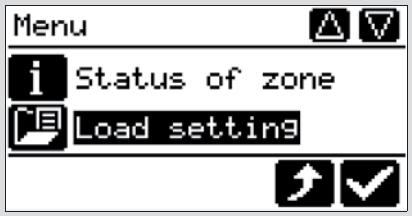
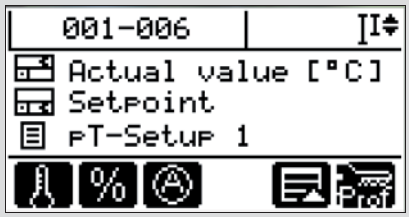
✗	Standard	✓	Professional

12.4.1Save settings

		Login as user Professional (see chapter ↗Login/Logout).
		Select function
	 	By the up/down key of the navigation keys the list functions / menu can be scrolled for **Save setting.** Call menu
	  	The user can scroll between the settings by the up/down key of the navigation keys. Select memory cell Confirm Return to previous operator level
		There was one setting already stored in this memory cell.
		There was no setting stored in this memory cell.

		Change name if necessary
		Move cursor to the left
		Move cursor to the right
		Delete character before cursor position
		Insert character before cursor position
		Select one character after the other with the keys of the navigation keys.
		Confirm
		Reject
		Setting is saved.

12.4.2Load setting

		Login as user Professional (see chapter ↗Login/Logout).
		Select function
	 	By the up/down key of the navigation keys the list functions / menu can be scrolled for **Load setting.** Call menu
	  	The user can scroll between the settings by the up/down key of the navigation keys. Select setting Confirm Return to previous operator level
		The selected and therefore active setting is shown in the basic menu. As soon as one parameter is changed, the display of the setting disappears (here: pT-Setup 1).

12.5 Save / Load program

Description 	A program means a data set with all parameters of all zones of a hot runner controller. Programs can be saved, loaded.
How it works	For the hotcontrol cDT hot runner controllers with the control panel DU, programs can be saved with freely selectable name to the USB stick connected to the USB port. The freely naming of the programs, eases the recognition by the operator.
What good is it	The programs support the customer at setting during often tool replacement and reduce the start-up phase.

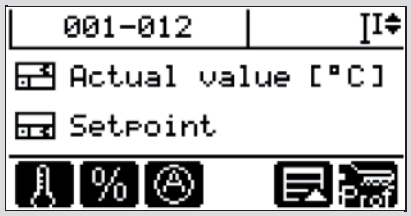
Setting by parameter

<not any>

Function preset for user

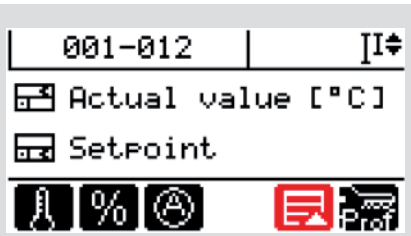
✗	Standard	✓	Professional

12.5.1Save program



Login as user Professional (see chapter ↗Login/Logout).

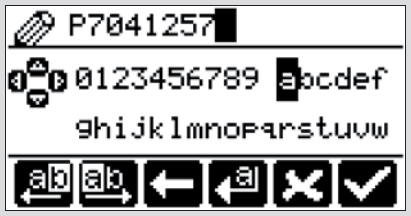
Before calling save / load on / from USB stick by key, the USB stick must be connected to the USB port, otherwise the menu items, related to USB stick, are not displayed.



Select function

By the up/down key of the navigation keys the list functions / menu can be scrolled for **Save program.**

Call menu



Change name if necessary

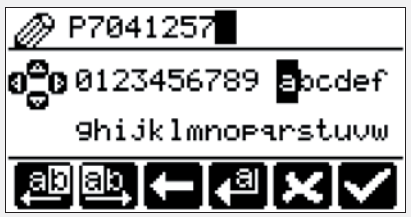
Move cursor to the left

Move cursor to the right

Delete character before cursor position

Insert character before cursor position

Select one character after the other with the keys of the navigation keys.

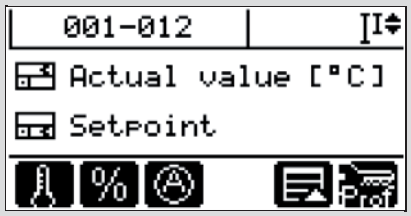
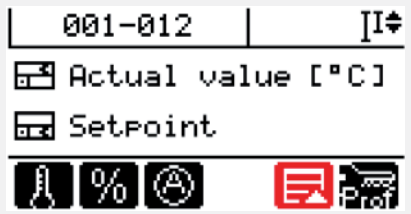


Confirm

Reject

	☑	Confirm message Back to the basic menu

12.5.2Load program

		Login as user Professional (see chapter ↗Login/Logout).
 		Before calling save / load on / from USB stick by key, the USB stick must be connected to the USB port, otherwise the menu items, related to USB stick, are not displayed.
		Select function
	 	By the up/down key of the navigation keys the list functions / menu can be scrolled for **Save program.** Call menu
	  	The user can scroll between the programs by the up/down key of the navigation keys. Select program Confirm Return to previous operator level
		Confirm message Back to the basic menu

12.6 MoldSnapshot

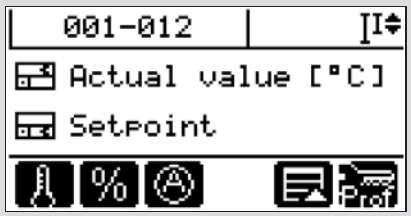
Description 	MoldSnapshot (review protocol) is important for users who need proof of the function and thus on the state of a hot runner.
How it works	MoldSnapshot takes a snapshot of the state of the hot runner. Here are the most important process data like e.g. setpoint values, actual values, output values, heating currents and control parameters saved. These data are like a fingerprint of the hot runner. These are parameters which mirror the state of the hot runner. For example, incorrect sizing of heaters are instantly recognizable, similar zones can be based on their characteristics compared directly. If all the parameters in a user-acceptable range, it can be saved as a reference for the MoldSnapshot the hot runner. For a MoldSnapshot only makes sense when you can compare it with a reference snapshot. For hotcontrol cDT hot runner controllers with control panel DU the characteristics are directly saved on a USB stick connected to USB port.
What good is it	MoldSnapshot is a very easy to use and evaluate resource for quality and condition of a hot runner. MoldSnapshot provides the user a clear picture of the hot runner and provides the ability to detect errors early and rapid and correct it.

Setting by parameter

<not any>

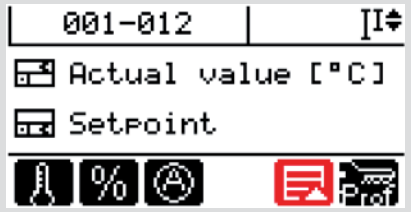
Function preset for user

✗	Standard	✓	Professional



Login as user Professional (see chapter ↗Login/Logout).

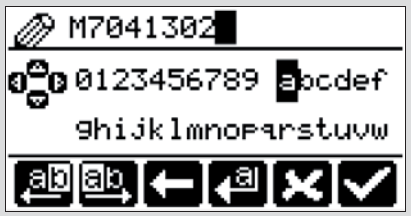
Before calling save / load on / from USB stick by key, the USB stick must be connected to the USB port, otherwise the menu items, related to USB stick, are not displayed.



Select function

By the up/down key of the navigation keys the list functions / menu can be scrolled for **MoldSnapshot.**

Call menu



Change name if necessary

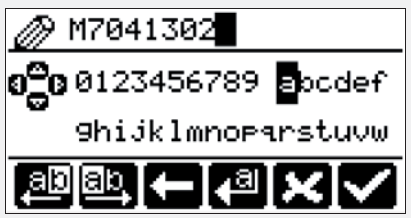
Move cursor to the left

Move cursor to the right

Delete character before cursor position

Insert character before cursor position

Select one character after the other with the keys of the navigation keys.



Confirm

Reject

		Confirm message Back to the basic menu
		The saved CSV file on USB stick can e.g. opened with Microsoft EXCEL.

12.7 MoldStat

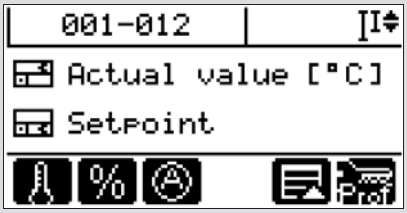
Description 	The quality of temperature control can be measured on the basis of characteristics. These characteristics provide the operator with information about the general performance of the recent past and refer to the future control quality. The characteristics are an ideal material for the QA departments of companies, because they are a component for the documentation of the production process and therefore a proper part quality. For hotcontrol cDT hot runner controllers, these characteristics are centralized in MoldStat and the operator can display them at a push of a button.
How it works	During the operation the hot runner controller calculates from the available process data automatically statistical parameters in the background. All characteristics have the objective of documenting the constancy of the temperature profile. In addition to various averages also the maximum temperature deviations from the nominal value ("outliers") are determined. The data recording starts over again, by turning on the hot runner controller, the data is not saved, when turning off. The characteristics are recorded every 5 minutes, there are maximum of 24 characteristic records. The oldest record is automatically replaced with the latest record. The characteristics are only determined for zones in control mode and/or in manual mode and/or in leading zone operation.
What good is it	The operator and the quality assurance receive statistic data, on demand. That assures more transparency in the control process.

Setting by parameter

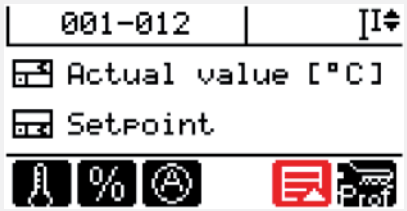
<not any>

Function preset for user

✗	Standard	✓	Professional



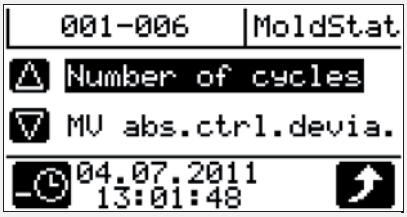
Login as user Professional (see chapter ↗Login/Logout).



Select function

By the up/down key of the navigation keys the list functions / menu can be scrolled for **MoldStat.**

Call menu



The user can scroll between the characteristics by the up/ down key of the navigation keys.

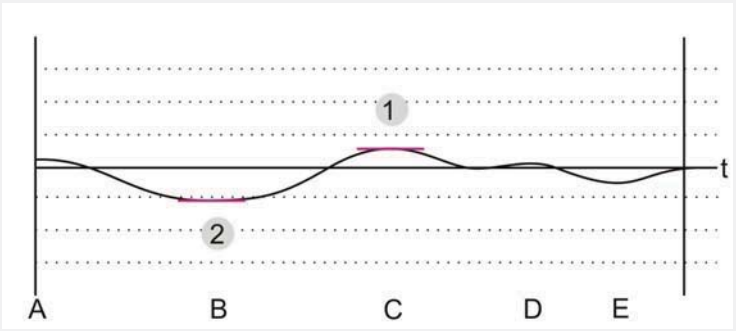
The selected characteristic (color-coded) is shown in the second line of the LED display.

Return to previous operator level

Characteristics:	Meaning:
Number of cycles	Molding cycle determined by external signal
MV abs.ctrl. devia.	Mean value absolute control deviation
MV output value	Mean value output value
MV current	Mean value current
Max pos.ctrl.devia	Maximal positive control deviation (1)
Max neg.ctrl.devia	Maximal negative control deviation (2)

$$\text{MV abs. crtl.devia.} = \frac{|A| + |B| + |C| + |D| + |E|}{5}$$

$$\text{MV ...} = \frac{A + B + C + D + E}{5}$$



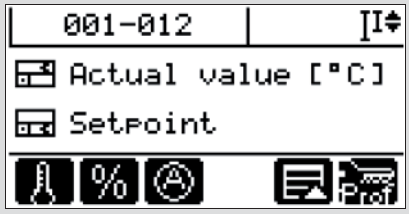
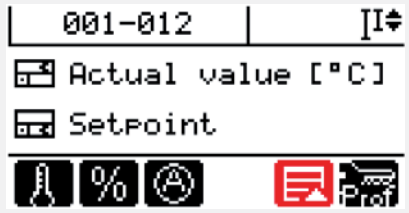
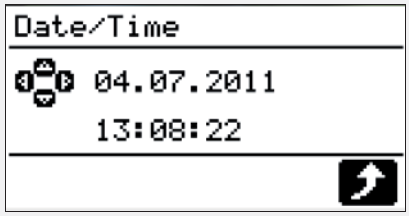
Scroll time by 5 minutes to the past, from the specified time.

		Scroll time by 5 minutes to the future, from the specified time.

12.8 Date / Time

Description	Setting of date / time for all time stamped data in hotcontrol cDT (e.g. ↗MoldStat).

Setting by parameter	Function preset for user			
<not any>	✗	Standard	✓	Professional

		Login as user Professional (see chapter ↗Login/Logout).
		Select function
	 	By the up/down key of the navigation keys the list functions / menu can be scrolled for **Date/Time.** Call menu
		Show date/time set. Return to previous operator level
	   	The user can scroll between the values by the left/right key of the navigation keys. The selected value (color coded) can be changed by up-/ down-key of navigation keys Confirm Reject

12.9 System Parameters

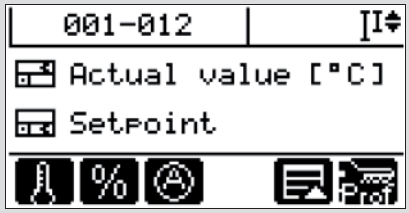
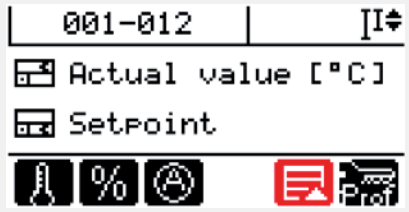
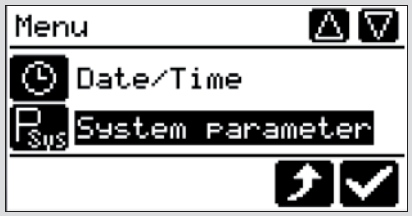
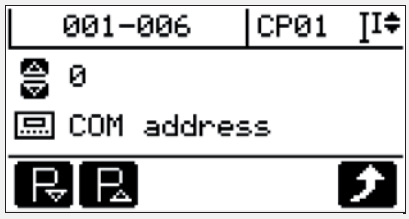
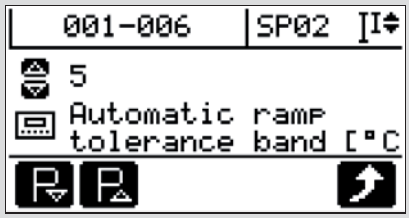
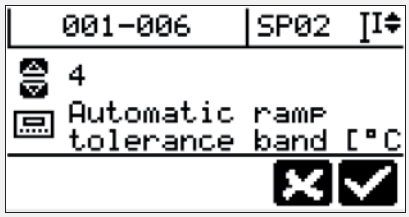
Description 	Each hotcontrol cDT hot runner controller is delivered with a standard setting of parameters. Furthermore, the user can adapt the system to individual requirements by communication and system parameters.
How it works	Specify communication parameters and system parameters, which are unique and zone independent.
What good is it	Simple adaptation of hotcontrol cDT hot runner controllers e.g. at integration in company networks.

Setting by parameter

See communication parameters, system parameters

Function preset for user

✗	Standard	✓	Professional

		Login as user Professional (see chapter ↗Login/Logout).
		Select function
	 	By the up/down key of the navigation keys the list functions / menu can be scrolled for **System parameter.** Call menu
	  	The parameter is selected by the scrolling with the keys. The parameter number is in the header of the LCD display and in the second line is the content of the parameter shown. Scroll parameters forward Scroll parameters backward Scroll through all available parameters (communication -, system parameters) forward / backward starting from CP01. Return to previous operator level
	 	The selected value (here SP02) can be changed by up-/down-key of navigation keys Return to previous operator level
	 	Confirm Reject

12.10Export service file

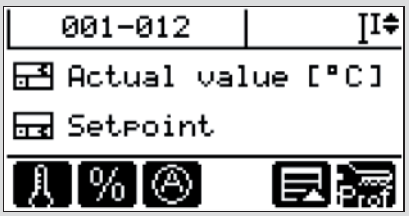
Description 	In the service file are important characteristics and data of the hotcontrol cDT hot runner controller saved, which help in error analysis.
How it works	In the case of service, export service file from the hot runner controller on USB stick and transfer to supplier.
What good is it	The service file helps to find quickly a remedy in case of problems.

Setting by parameter

<not any>

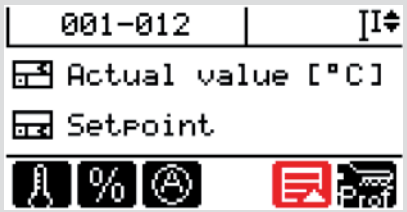
Function preset for user

✗	Standard	✓	Professional

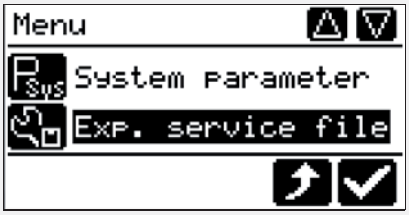


Login as user Professional (see chapter ↗Login/Logout).

Before calling save / load on / from USB stick by key, the USB stick must be connected to the USB port, otherwise the menu items, related to USB stick, are not displayed.



Select function



By the up/down key of the navigation keys the list functions / menu can be scrolled for **Exp.(ort) service file.**

Call menu

The service file is exported on the USB stick.

Return to previous operator level

Before export it is checked, whether there is already a file with the same name (pTServic.csv) on the USB stick. The file can be overwritten.

Only <u>one</u> service file is permissible per USB stick.

12.11 Reference junction

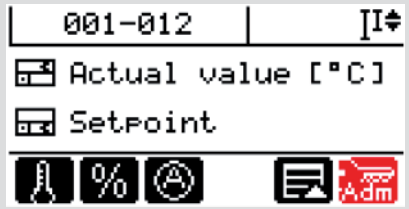
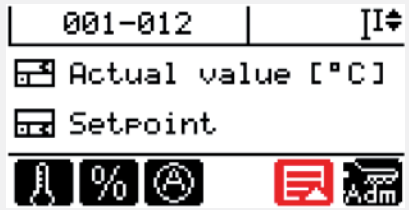
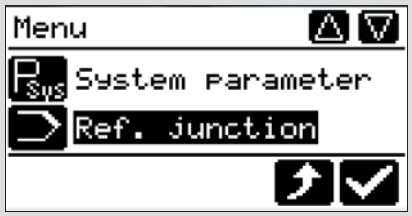
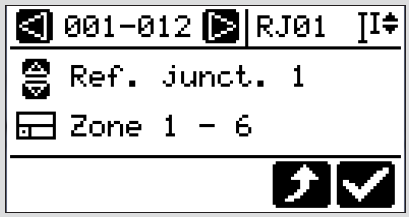
Description 	When using thermocouples for temperature measurement, great care is required in order to achieve accurate results.
How it works	Is it necessary for design or safety reasons, to arrange the reference junction of a thermocouple in a greater distance from the measuring point, an external reference junction is used, otherwise the internal one. An external reference junction is only shown in the menu, when the CAN interface (↗Interfaces XS2, setting CAN1) of the hot runner controller is connected to a pT-BC component (pay attention to power supply) and a Thermocouple Interface TCPT08 (Pt100).
What good is it	The external reference junction continuously records with a Pt 100, the precise temperature of the contacting, and returns a new, corrected voltage value.

Setting by parameter

<not any>

Function preset for user

✘	Standard	✘	Professional

		Login as user Admin (see chapter ↗Login/Logout).
		Select function
		By the up/down key of the navigation keys the list functions / menu can be scrolled for **Reference junction.**
		Call menu
		The cards/zones can be selected in steps of 6 (corresponds to the Hot Runner Controller Cards one by one) by the scrolling with the keys.
		Scroll forwards per card/6 zones
		Scroll backwards per cards/6 zones
		Return to previous operator level
		Is a card/6 zones selected, an **internal reference junction** or an (external) **reference junction** can be selected by up-/down-key of navigation keys.
		Return to previous operator level
		Confirm
		Using the component Thermocouple Interface TCPT08 (Pt100), 8 external reference junction are available. See ↗Setup

12.12Setup

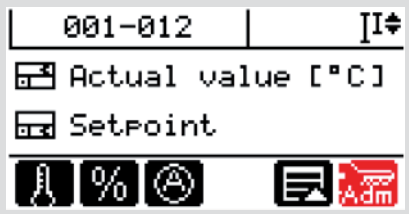
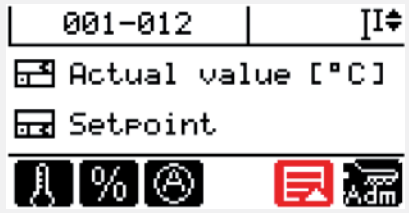
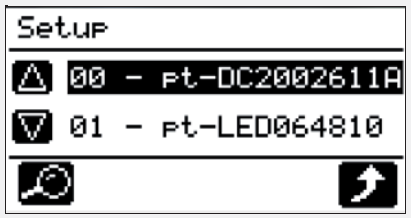
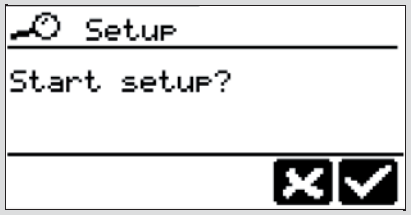
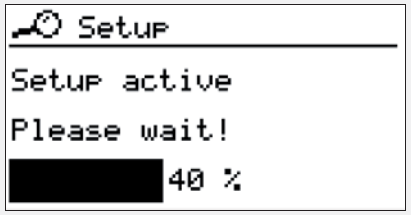
Description 	After assembling one hotcontrol cDT hot runner controller or replacement of individual components, there must be a re-addressing of the individual components of the internal CAN bus.
How it works	The setup recognizes all installed components in the hot runner controller and addresses them continuously.
What good is it	A manually and possibly erroneous setting of addresses for the individual components is avoided. After an exchange of individual components, the hot runner controller is fully functional after a short time.

Setting by parameter

<not any>

Function preset for user

✘	Standard	✘	Professional

		Login as user Admin (see chapter ↗Login/Logout).
		Select function
		By the up/down key of the navigation keys the list functions / menu can be scrolled for **Setup.**
		Call menu
		All in the hot runner controller existing components are listed with their HEX file version. The user can scroll between the components by the up/down key of the navigation keys.
		Activate setup
		Return to previous operator level
		Confirm
		Reject
		The setup is executed and a bar signalizes the progress.

		After the end of the setup, the components are shown again.
		HEX file version pT-DC xxxwwjjz pT-LED06wwjjz pT-LED12wwjjz HCC 06iiwwjjz xxx - 00 with LCD display/operation, without USB xxx - 01 without LCD display/operation, without USB xxx - 200 with LCD display/operation, with USB xxx - 201 without LCD display/operation, with USB ii - Internal characterization ww - Calendar week jj - Calendar year z - Index

12.13Default setting

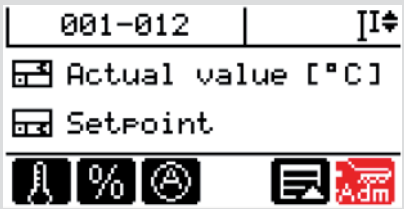
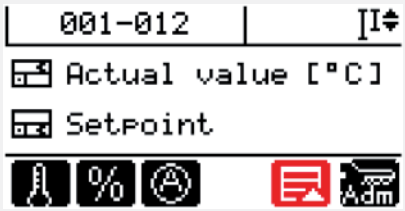
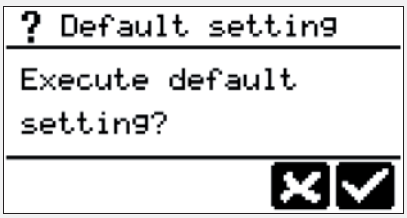
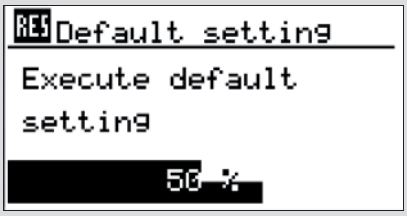
Description	All parameters, communication - and system parameters are reset to standard values.

Setting by parameter

<not any>

Function preset for user

✕	Standard	✕	Professional

		Login as user Admin (see chapter ↗Login/Logout).
		Select function
		By the up/down key of the navigation keys the list functions / menu can be scrolled for **Default setting.**
		Call menu
		Confirm
		Reject; Return to previous operator level
		The function is executed and a bar signalizes the progress.
		The function terminates oneself and returns to the basic menu.

12.14Fan test

Description 	The fans in the hot runner controllers are controlled by Power Plane Boards pT_PP_PCB. A functional check of the fans is done by the fan test.
How it works	Check as follows ■ All fans with even NodeID are activated 10 seconds by HCC06/16 ■ 10 seconds pause ■ All fans with odd NodeID are activated 10 seconds by HCC06/16
What good is it	The fans behind the front side of the hot runner controller can be checked during test for faultless function.

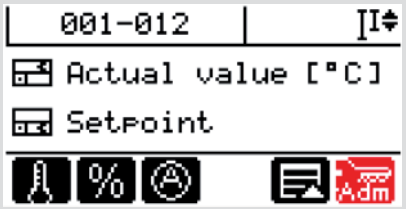
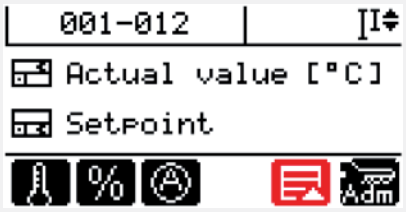
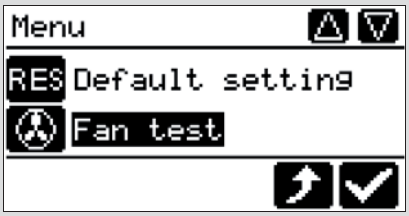
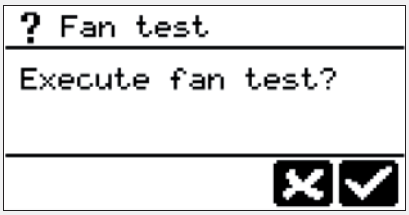
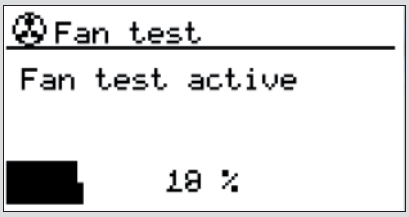
For Desktop fan implemented from hotcontrol cDT 12

Setting by parameter

<not any>

Function preset for user

✗	Standard	✗	Professional

		Login as user Admin (see chapter ↗Login/Logout).
		Select function
	 	By the up/down key of the navigation keys the list functions / menu can be scrolled for **Fan test.** Call menu
		Call function
		Fan test is executed. Wait for end of test.
		Trouble Shooting see service manual

12.15User Administration

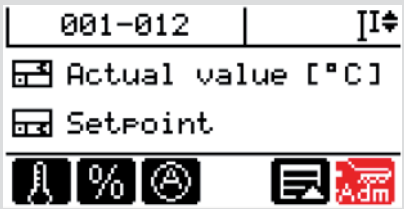
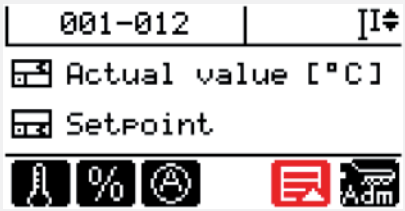
Description 	Absolute process security can be achieved by preventing unauthorized input on the device.
How it works	In hotcontrol cDT hot runner controllers are three user levels (standard user without a password, administrator and professional user with free choice of password), in which individual functions and parameters can be enabled or disabled. The hotcontrol cDT hot runner controllers have a user administration. The user administration allows the customization of the enabled functionality to the needs of each customer and can be made by himself.
What good is it	In times in which 100% quality parts must be provided, faulty insertions must be prevented. With the user management, reliability in the production process is guaranteed.

Setting by parameter

<not any>

Function preset for user

x	Standard	x	Professional

		Login as user Admin (see chapter ↗Login/Logout).
		Select function
		By the up/down key of the navigation keys the list functions / menu can be scrolled for **User adminstrat.(ion).**
		Call menu

12.15.1User Standard

		Confirm
		Return to previous operator level
		For the user **Standard** functions and parameter
		can be activated
		and/or
		deactivated.
		The user can scroll between the functions / parameters by the up/down key of the navigation keys.
		Confirm
		Reject; Return to previous operator level

12.15.2User Professional

Confirm

Return to previous operator level

Before calling save / load on / from USB stick by key, the USB stick must be connected to the USB port, otherwise the menu items, related to USB stick, are not displayed.

For the user **Professional** the password can be changed.

Change password if necessary

Move cursor to the left

Move cursor to the right

Delete character before cursor position

Insert character before cursor position

Select one character after the other with the keys of the navigation keys.

Confirm

Reject

For the user **Professional**
functions and parameter

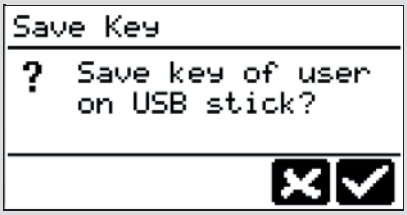
can be activated

and/or

deactivated.

The user can scroll between the functions / parameters by the up/down key of the navigation keys.

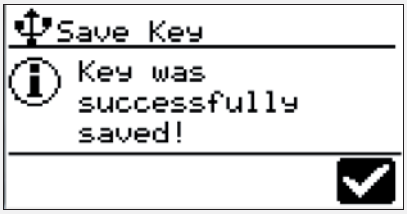
Save key on the USB stick.



Select function.

Confirm

Reject



Storage is done.

Return to previous operator level

Before export it is checked, whether there is already a file with the key (KEY.PT) on the USB stick. The file can be over-written.
Only one service file is permissible per USB stick.

12.15.3User Admin

Confirm

Return to previous operator level

Before calling save / load on / from USB stick by key, the USB stick must be connected to the USB port, otherwise the menu items, related to USB stick, are not displayed.

For the user **Admin** the password can be changed.

Change password if necessary

Move cursor to the left

Move cursor to the right

Delete character before cursor position

Insert character before cursor position

Select one character after the other with the keys of the navigation keys.

Confirm

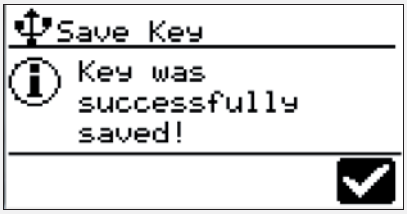
Reject

Save key to the USB stick.

Select function.

Confirm

Reject



Storage is done.

Return to previous operator level

Before export it is checked, whether there is already a file with the key (KEY.PT) on the USB stick. The file can be over-written.

Only one service file is permissible per USB stick.

13 Functions

In this chapter all functions and corresponding parameters of hot runner controllers are described.

13.1 Heating current measuring - and - monitoring

Description 	The objective of heating current measuring and monitoring is: ■ to determine heating currents by measuring ■ to compare measured values with setpoint values and tolerance ■ to execute a plausibility check The heating current measuring is implemented in a fixed time raster.
How it works	Beside the display of the active heating currents, the heating current measuring provides information on the heater's condition (total fail, partial fail if heaters in parallel) and monitors current data considering a tolerance band. It monitors power controller condition and reports an alarm for continuously running heating output (e.g. permanently short-circuit SSR's), which can cause damage from overheating. It supports a number of controller functions. For example, bad adjustments of control parameters can be avoided because the automatic parameter identification (auto tuning) is only started if a corresponding heating current is recognized in the control zone, i.e. when it is certain that the zone is ready for heating. Else, the starting of the identification function is delayed until a heating current is recognized.
What good is it	Hence, a wrongful adaptation is prevented without user input or additional software.

Description 	Heating current measuring is standard in each hot runner controller. The heating current measuring is done by so called current transformers. The hot runner controller hotcontrol cDT can display residual current. This indicates important information on the status of the heater in the hot runner and gives early enough notice of a damage.
What good is it	One can react immediately and longer downtimes due to unnecessary tool removal and repair are omitted.

Setting by parameter
↗Automatic ramp
[P005] Current Tolerance

Function preset for user			
✓	Standard	✓	Professional
✗	Standard	✓	Professional

13.2 Automatic ramp

Description 	The different dimensions of zones in the hot runner cause different heating-up times and different temperature levels. That means, that the nozzles have already reached the setpoint value and the manifold zones are still far from. Herefrom result temperature dependent expansions of steel, which cause unwanted mechanical tensions.
How it works	The automatic ramp function was developed to eliminate the causes of mechanical tensions. All zones are uniformly heated up. All zones orientate themselves automatically on the slowest zone. Its actual value is a reference for the setpoint value for the other zones.
What good is it	With this measure all zones remains at heating-up automatically on the same temperature level. The hot runner is disburdened and protected. Hereby damage is reduced and service intervals are extended. Maintenance costs are reduced.

Setting by parameter

	Function preset for user			
[SP02] Automatic ramp tolerance band (a)	✗	Standard	✓	Professional
[SP03] Automatic ramp setpoint (value) change (b)	✗	Standard	✓	Professional
[P022] Automatic ramp	✓	Standard	✓	Professional

The maximal temperature difference of each zone based on the reference zone during heating-up is configurable (parameter (a)). In the event a zone exceeds this limit the output value will be corrected.

A zone is taken off the link of the automatic ramp, if

- a sensor error (e.g. FAL) occurs in the zone
- the zone is in manual mode
- the manual temperature ramp is active
- the zone is passive

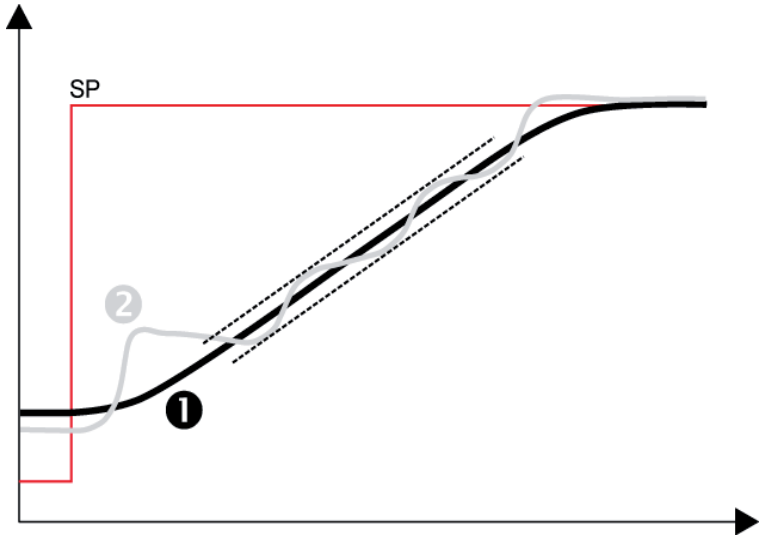
The automatic ramp function is triggered 5 K before reaching the setpoint values; the zones heat up to the final setpoint value without any output value intervention.

Specifies the minimum setpoint value increase to start the automatic ramp function.	Parameter (b)
Specifies the maximum difference between the actual values and reference zone.	Parameter (a)

Example

Temperature trend of two zones with different rate of rise with activated automatic ramp.

After Heating identification of zone 2, both zones are heated-up together to the final setpoint value.



13.3 Heat'n'Dry

Description 	With Heat'n'Dry hotcontrol cDT hot runner controllers offer a function for low-stress heating-up of heaters.
How it works	During the heating-up process the hot runner is heated up with step-by-step heating capacity. During heating-up the residual current is checked. Exceeds the residual current the limit value set, the heating is done with reduced heating capacity, as long as the residual current is under the limit value again. Heat‘n‘Dry has higher priority than function start-up operation.
What good is it	Heat'n'Dry guarantees a longer lifetime of heating elements. It is ensured, that a heating-up to the set setpoint value is only done, when it is 100% guaranteed that there is no moisture in the isolation material of the heating elements. By this, damage can be prevented resulting of short-circuits in the heater.

Setting by parameter

[SP05] Max. residual current (a)
[P027] Heat‘n‘Dry (b)

Function preset for user

✗	Standard	✓	Professional
✗	Standard	✓	Professional

When molds are stored for a longer time, the insulating material for the electrical heating elements can draw moisture.This moisture can at rapid heating (without Heat'n'Dry) lead to vapor pressure inside the heater and cause damage. Furthermore this moisture leads to leakage currents on connected protective conductors, that disconnects fault-current circuit breakers and prevents the heating-up.

Heat ’n’ Dry executes a gentle heating-up with stepwise increasing of the power supply. The leakage current is permanently checked. The moisture is completely dried by a setpoint value of 110°C.
The heating-up on the final setpoint value starts first, when it is assured, that

- the error current lies below a adjustable limit value
- in the heating elements is no longer moisture.

The function Heat’n’Dry is started, when the start conditions

- Actual value < 90°C (194 °F)
- Setpoint value > 110°C (230 °F)
- Heat’n’Dry is enabled by parameter

are met.

During heating-up of the zones with active Heat’n’Dry function, also the inactive zones for Heat’n’Dry are adjusted to 110°C. After the zones with active Heat’n’Dry are adjusted to 110°C, all zones are adjusted to their preset setpoint values.

While the Heat’n’Dry function is running, no current measuring is executed.

By the parameter (a) the maximum admissible value for the leakage current is set.

The function can be activated/deactivated by the parameter (b).

The function Heat'n'Dry has priority to function see function ↗Start-up Mode.

13.4 Auto Tuning (Identification)

Description 	hotcontrol cDT offers a procedure, that is named identification.
How it works	The heating control parameters are automatically calculated after a setpoint value jump of 40 K
What good is it	adapts itself to the factors of the connected control system.

Setting by parameter

[P030] Identification (a)
[P031] Loop control (b)
[P032] Cutback (c)

Function preset for user

✗	Standard	✓	Professional
✗	Standard	✓	Professional
✗	Standard	✓	Professional

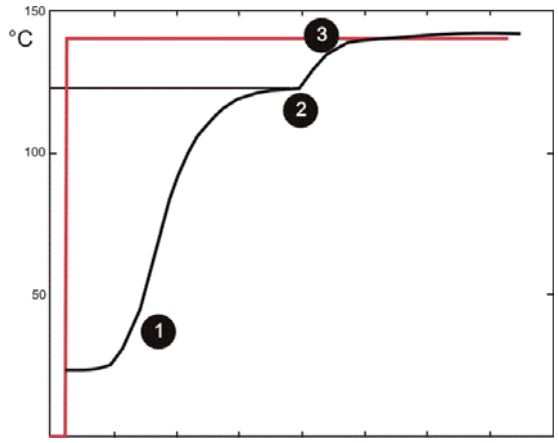
By loop control is specified whether the calculated heating control parameters during identification are directly checked with the setpoint value and whether they are to be corrected.

By cutback is specified, whether this identification is made directly for the setpoint value or below the setpoint value.

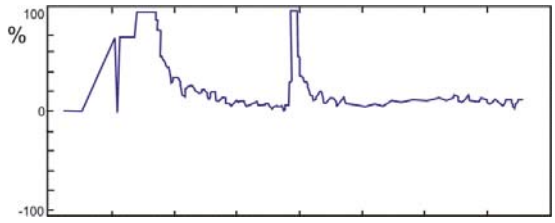
1 After a setpoint value jump from 0°C to 140°C the Heating control parameters are recalculated during heating-up.
Identification (a)... = On
Loop control (b)... = On

2 20°C (setpoint value cutback) before reaching the setpoint value of 140°C the calculation of the heating control parameters is finished.
...Cutback (c) = 20

3 Control is executed on the specified setpoint value.



Setpoint value / actual value



Output value

13.5 Start-up Mode

Description 	The start-up operation is one of the eldest functions in the hot runner controllers. The main reason for the function is the hygroscopic characteristic of the isolation material Magnesium oxide used in the heaters. That means, that this material binds moisture and influences therefore the electric isolation negative. Voltage application may result in damage of the heater.
How it works	That should be avoided by start-up operation. At start-up, the zones are not directly heated up to setpoint value with full heating power, but for a defined start-up time to a setpoint value of 100°C. During this time the moisture is completely dried in the heating element, so that after elapsed start-up time, heating up to the end setpoint value is safe.
What good is it	The start-up operation implies high operating reliability and extension of lifetime of the heating elements, what is reflected in low operating and maintenance costs.

Setting by parameter

[P015] Start-up mode
[P016] Start-up time

Function preset for user

✓	Standard	✓	Professional
✓	Standard	✓	Professional

13.6 Auto Standby

Description 	The hot runner controller offers an Auto Standby function. Herewith the hot runner controller monitors a cyclically recurring signal from the injection molding machine and sets the controller, when the signal fails to appear within an adjustable time, into standby mode. The setpoints are lowered depending on the configuration of the standby function to a standby setpoint or by a standby temperature value. Prerequisite for this function is a digital signal from the injection molding machine, as well as the adaptation of certain configuration parameters in hot runner controller.
How it works	A digital signal (24VDC) of the injection molding machine must be fed to one of the four available digital inputs. In the injection molding machine, the events must be determined which lead to a change in signal level of the digital output. The hot runner controller evaluates the signal edges. In injection molding machines are usually digital outputs available whose functions are freely configurable. For example, it lends itself to use the cycle start as signal edge for the Auto Standby function and to reset the signal during the injection cycle ("open tool" for example) by another event.
What good is it	To prevent damage to the plastic in the cavities of the hot runner by high temperatures, for example, when production stops, the hot runner controller offers an Auto Standby function.

Setting by parameter

	Function preset for user			
Digital inputs	✗	Standard	✓	Professional
[SP11] Auto Standby Time	✗	Standard	✓	Professional
[P007] Standby setpoint	✓	Standard	✓	Professional
[SP09] Standby	✗	Standard	✓	Professional

The function is configured in hot runner controller.

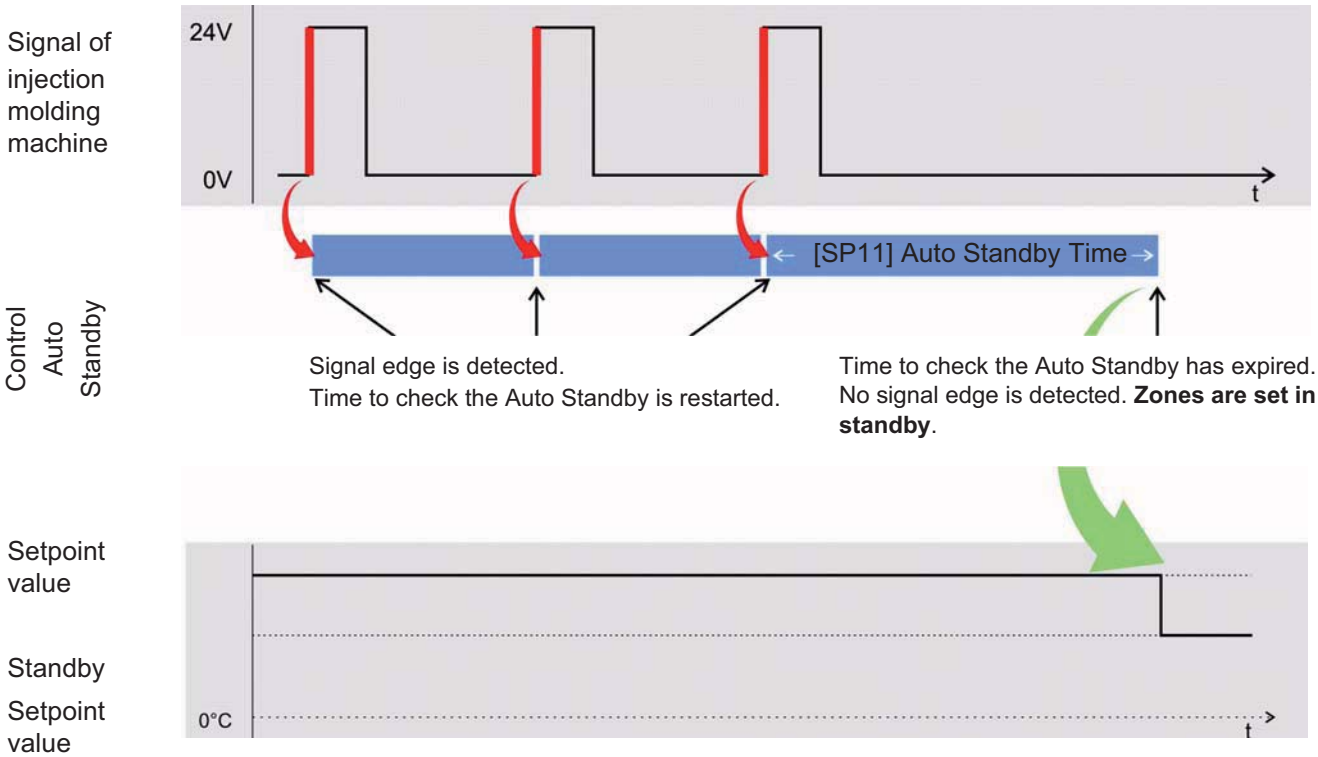
- For a digital input (IP1 ... IP4) is specified whether a positive edge (15-Auto Standby high) or a negative edge (16-Auto Standby low) is used for triggering of the function.
- By the system parameter [SP11] Auto Standby Time is specified, in which time the controller expects a start signal from the injection molding machine.
  Note: This time must be specified in any case longer than the cycle time of the process.
- Control [P007] Standby setpoint.
  Note: Factory setting for lowering of temperature is by this value (= relative). Should be lowered to a fixed value, so this has to be changed under the system parameter [SP09] Standby

With the above settings, all active control zones are heated by turning on the hot runner controller without examination of cycle signal to the set values. After reaching the setpoint values the Auto Standby function is automatically activated.

After this all zones are controlled to the setpoint value set, when the cycle signal of the injection molding machine fails within the adjusted time.

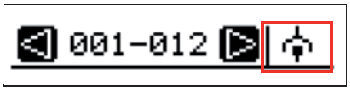
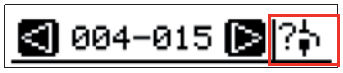
Should the actual setpoint be controlled again, the standby mode must be reset by the operator via the operation and display units. The controller heats the zones without exam of the cycle on the setpoint values and then turns on the Auto Standby function again, when all active zones have reached the setpoint value.

Note: are there zones in the controller used only for temperature monitoring not for temperature control, their setpoint values should preferably be set to 0°C (equivalent to zone passive).



Example for digital input triggered by positive edge

13.7 Hot Runner Controller overall functions

Description 	Hot runner controllers can be linked by CAN bus. The functions leading zone operation, automatic ramp and MoldCheck can be used for all connected hot runner controllers and zones overall.
How it works	The hot runner controllers must be connected by CAN bus (see chapter ↗Interfaces; XS2; CAN2 lead through). Each hot runner controller must have its own unique [CP06] CAN NodeID. The parameter [SP06] Offset zone numbering must be set, that no zone numbers are overlapping for the connected hot runner controllers.
What good is it	Flexible use by combining several devices according to requirements. Hot runner controllers can be combined and be used for tools with a high number of zones. Functional synchronization among each other.
Applications	2 hot runner controllers (6 zones, 12 zones) are connected by CAN bus with each other. Notice interface settings (XS2; CAN2 lead through). Set unique NodeID. Setting: [SP06] = 1 (on 1. hot runner controller) [SP06] = 7 (on 2. hot runner controller) (Zone 1-6 first hot runner controller; Zone 7-18 second hot runner controller)
	In leading zone operation for a defective sensor in zone 2 (on 1. hot runner controller) [P023] = 9 can be set, that means zone 9 (zone 3 on 2. hot runner controller) works as leading zone.
	The function MoldCheck runs after zone selection ALL over all zones connected to the CAN Bus.
	The automatic ramp runs for all zones, that are available on the CAN bus and where the function automatic ramp is activated.
	All other functions for the zones are directly operated by the control panel DU on each hot runner controller.
	 
	At correct connection and correct setting of parameters the symbol (see above) is shown in the header.
	At existing CAN bus connection, but wrong setting of parameters the symbol (see above) is shown in the header.

Setting by parameter	Function preset for user			
[CP06] CAN NodeID	✗	Standard	✓	Professional
[SP06] Offset zone numbering	✗	Standard	✓	Professional

13.8 USB support

Description 	USB flash drives are now common media for data exchange. They are readily available and easily manageable. All hotcontrol cDT are equipped with a USB port. A variety of functions is possible in the areas of data backup, service, update and quality assurance.
How it works	Functions, that save and/or load data on and/or from the USB stick, are enabled for the user, as soon as an USB stick is recognized on the USB port.
What good is it	For queries of the customer, thus can be used more information. This makes the service easier, faster, more professional. With this feedback the customer may be sent back corrected data, which he can then simply write it into his controller.

Where the USB support in hot runner controllers is available, is characterized by the following symbol, see chapter:

↗Save / Load program
↗MoldSnapshot
↗MoldCheck
↗Export service file
↗Login/Logout

USB support from pT-DC2.
File name in 8.3 data format: FMMddhhmm
F: data from function, MM: $month_{hex}$, dd: day, hh: hour, mm: minute

Setting by parameter

<not any>

Function preset for user

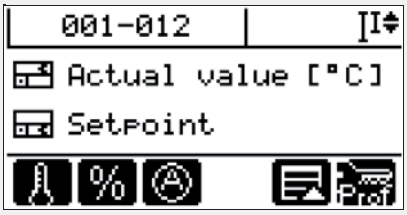
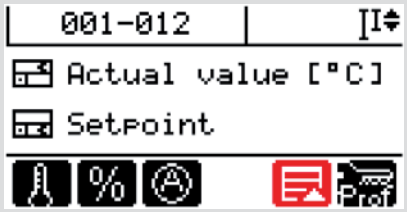
✗	Standard	✓	Professional

13.9 Digital inputs & Digital-/Outputs

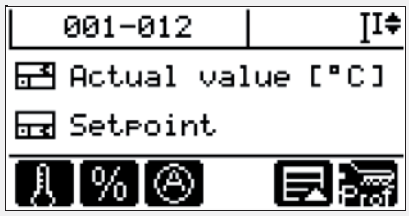
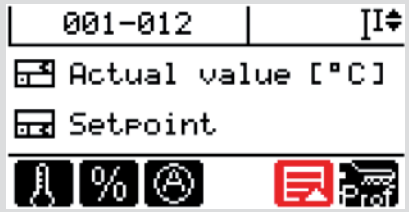
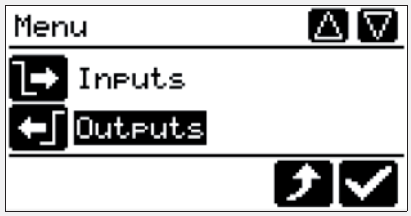
Description 	The simplest method to communicate with the injection molding machine is by the digital inputs and digital -/ outputs of the hot runner controller. Digital inputs are used to enable controller functions by external signal sources (for example, injection molding machine, etc.) ■ Adjustable High / Low active ■ Control via signal level or signal edge Digital outputs are used for ■ Transmission of alarm conditions in the hot runner from the controller to the injection molding machine or to a signal source (lights, horn, etc.) ■ Identification of controller internal fault conditions (for example, "data fault") ■ Identification of functional states, in which the hot runner controller is ■ Multiple states/functions may be issued by or-function. ■ Adjustable High / Low active
How it works	The hot runner controller issues the signal for enabling of the machine by this. Hereby the proper status of the hot runner is signalized to the injection molding machine. The hot runner controller receives for example signals for Boost and Standby mode from the injection molding machine. The function of the digital inputs and the digital -/ outputs can easily be customized.
What good is it	The enabling of the machine guarantees reliability of the production process, because the enabling is only given to the machine, when the conditions are proper in the hot runner. Also all other alarm status may be linked with the machine to react on critical alarm status immediately.

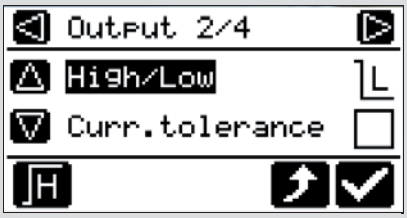
Setting by parameter	**Function preset for user**			
Digital inputs	✗	Standard	✓	Professional
Digital - / Outputs	✗	Standard	✓	Professional

13.9.1 Specify digital inputs

		Login as user Professional (see chapter ↗Login/Logout).
		Select function
	 	By the up/down key of the navigation keys the list functions / menu can be scrolled for **Inputs**. Call menu
	   	The user can scroll between the settings for the digital inputs by the up/down key of the navigation keys. The selected setting (color coded) can be ticked and the digital input is assigned. The setting of a tick, removes it on the other place, i.e. only one tick can be set. Return to previous operator level Return to previous operator level
		Possible settings, see chapter digital inputs.
		The user can scroll between the 4 digital inputs by the left/ right key of the navigation keys.

13.9.2 Specify digital - / outputs

		Login as user Professional (see chapter ↗Login/Logout).
		Select function
		By the up/down key of the navigation keys the list functions / menu can be scrolled for **Outputs**. Call menu
		Specification whether the output is High or Low active. Key to set output High active. Key to set output Low active.
		The user can scroll between the settings for the output by the up/down key of the navigation keys. The selected setting (color coded) can be ticked and the output is assigned. The selected setting (color coded) can be deactivated and the output is not assigned.
		Return to previous operator level Return to previous operator level
		Possible settings, see chapter digital - / outputs.



The user can scroll between the 4 outputs by the left/right key of the navigation keys.

14 Appendix

14.1 Version History

Version	Date	Changes
1.01.01	3/31/2016	In detail, the following amendments/corrections were made: ■ MoldCheck display 888->SSC ■ Function Auto Standby added ■ Digital in- / - outputs specified
1.01.00	1/31/2014	In detail, the following amendments/corrections were made: ■ Text for process monitoring, Heat'n'Dry, external reference junction specified ■ Document parts Parameter&Code numbers separate document
1.00.11	2/22/2013	In detail, the following amendments/corrections were made: ■ [SP17] added ■ [P028] Default value 2.0 -> 0.3 ■ [SP05] per card HCC ■ [P019] specified
1.00.10	11/30/2012	In detail, the following amendments/corrections were made: ■ Chapter fan test amended ■ Chapter type plate amended ■ [P024] Factor 0.1 ■ Terminal marking pT-ADP-COM revised, XM3, XS1
1.00.09	03/26/2012	In detail, the following amendments/corrections were made: ■ Chapter Error Messages - Trouble Shooting;Security References revised ■ Digital inputs 7, 8, 19, 20; P025 specified ■ Hot Runner Controller overall functions in separate chapter
1.00.08	11/30/2011	In detail, the following amendments/corrections were made: ■ Reference junction/Setup for Admin ■ CAN interface CAN1/CAN2 ■ XM1, XM3 specified ■ Automatic ramp leading zone -> reference zone
1.00.07	10/26/2011	In detail, the following amendments/corrections were made: ■ Function automatic ramp specified
1.00.06	2011-09-19	In detail, the following amendments/corrections were made: ■ Digital inputs 21-24 new (from pt-DC xxx3611z) ■ [SP16] added ■ Specification of Process Monitoring, MoldCheck ■ First switch-on ■ Copy of key from USB
...	...	...
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