EWIKON

pro **CONTROL** *BASIC*

Hot runner controllers

Operating manual

Content

1 Introduction

1.1 Symbols used

	Caution/Warning	Information on possible damage to property or personal injury
	Information	Important information

1.2 Notations

Menu structures between words are indicated by the **>** symbol and depicted in the same way on the device.

Interaction with the operator is denoted by the finger symbol. 

2 Safety instructions

	Please read this document completely and carefully before commissioning or operating the device.

2.1 Intended use

The hot runner controller is used to control the temperature of heating circuits and is designed for use under precisely defined conditions, such as supply voltage and temperature. The operator must therefore ensure that the controller is only used under operating conditions that comply with the technical data. The manufacturer is not liable for damage resulting from non-compliance with the intended use.

The hot runner controller is not suitable for use beyond the limits defined in the technical data and during its design. In addition, the use of spare parts from third parties and the implementation of non-described maintenance activities constitute failure to comply with the intended use.

Alterations, conversions and other modifications are made exclusively at the operator's own risk and could pose safety hazards. The manufacturer and distributor of this device cannot be held liable for direct and indirect damage resulting from improper handling or treatment.

2.2 Information for operators and users

The controllers are operated on the low-voltage network. The relevant safety regulations must be observed when connecting up the controller and performing maintenance on it. In addition, the local and general safety regulations must be observed for its installation and operation. The operator is responsible for compliance with these regulations. The operator must additionally make this documentation available to the user and provide instruction in the correct operation of the device. The user must be familiar with this documentation. In order to ensure reliable and safe operation, the individual user is required to observe the information and warnings.

The controllers may only be brought into operation by authorized specialist personnel. Under the terms of these operating instructions, specialist personnel are persons who can recognise and assess the dangers associated with the work entrusted to them on the basis of their specialist training, their experience and their knowledge of standards.

The device is checked carefully prior to delivery and has passed the tests specified in the test plan for its production, in conformity with the manufacturer's valid quality guidelines. To prevent any damage to the controller, it must be transported and stored in the correct manner. Further safety-related notices are marked in the individual sections of this documentation.

3 Structure and functionality

3.1 General information

The pro CONTROL BASIC hot runner controllers are especially suited to the temperature control of hot runner molds on injection molding machines. In use, the controllers are connected directly to the mold via cables.

During operation, the hot runner controllers deliver electric current to the heating units for an injection mold. The so-called heating current leads to an adjustable temperature increase in the heating units and hence in the mold. Continuous temperature monitoring takes place in parallel via connected thermocouples. In the event of deviations between the actual temperature recorded and the temperature set on the hot runner controller, the heating current is automatically adjusted until the two temperatures are identical.

The controllers are available in different variants. These differ solely in terms of the number of control circuits that are possible – which are also referred to as heating zones. Depending on the variant, hot runner controllers are available with 2 or 6 heating zones.

3.2 Structure

Housing front: The pro CONTROL BASIC hot runner controller is operated from the housing front with 12 keys. Furthermore, the front contains all visualization elements. The setpoint and actual values of the individual zones are displayed via 7-segment displays. If required, the display can be switched over to heating current and output rate. In addition, status LEDs provide information about operating modes and messages of the individual zones. The controller status is visualized in color via a fault message display visible from afar. In control mode this display lights up green. In case of a warning or alarm, the display changes to yellow or red (traffic light status). This allows a quick assessment of the controller status even from a distance. A detailed description of the display and operating functions can be found in chapters 4.2 and 5.

Back of housing: All connections for the hot runner controllers and the 3-pin main switch for switching on and off are located on the back of the housing. In addition to the connecting cable, which is used for connection to the supply voltage, the controllers offer a further connection for a potential-free alarm contact and a 24V digital input for external control of the set-back operation. The connection to the hot-runner mold is established via plug-in systems.

3.2.1 pro CONTROL BASIC 2 und 6 Zonen

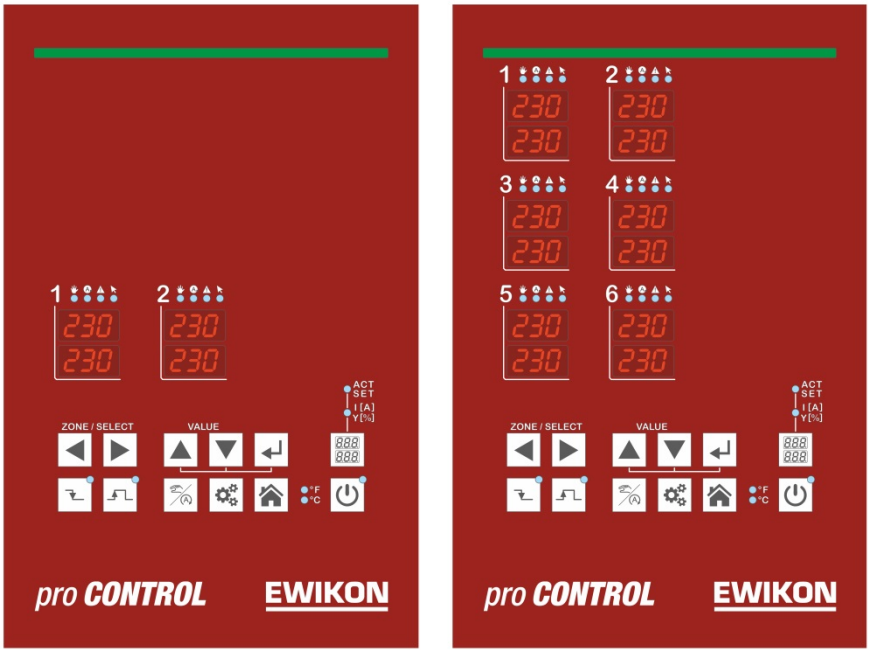


Figure 1 - pro CONTROL BASIC front panel

3.2.2 Operating front

The convenient operation of the pro CONTROL BASIC hot runner controller is carried out on the front panel (Figure 1 - pro CONTROL BASIC front panel) via 12 keys. The front also contains all visualization elements. The setpoints and actual values of the individual zones are displayed via 7-segment displays. If required, the display can be switched over to heating current and degree of operation.

3.2.3 LED-strip

The status of the controller is displayed in color via a strip of LEDs visible from afar. This enables a quick assessment of the current controller or tool status.

3.2.4 Power card

Inside the housing there are power cards which control connected heaters and record measured temperatures of the thermocouples. Each zone is switched individually via relays on the power cards, so that individual zones can be switched off separately and a seamless production process is always guaranteed.

3.2.5 Fuses

The controllers have three different types of fuses inside the housing. Each zone has two fuses on the power card. One fuse is used to protect the load output (fuse in the fuse holder below the heat sink). The second fuse, on the other hand, is required for use in delta networks. In addition, another control fuse is located in a terminal on the bottom of the housing.

3.2.6 Notification contact / Digital input

The pro CONTROL BASIC hot runner controllers have a potential-free message contact and a digital control input, which are brought out via a 7-pin plug on the rear of the unit. A contact diagram of the built-in plug is given in chapter 11.2.

The control input is PLC-compatible, i.e. it operates over a voltage range of 13…30 VDC with a typical current consumption of approx. 8.5 mA. The controller can be switched to standby mode via the input. The controller remains in this mode as long as the signal is present. De-activation via the standby button on the device is not possible.

The potential-free notification contact is used to transmit the controller status to an injection molding machine. When warnings or alarms occur, the contact opens. Accordingly, the contact is normally closed (NC) and opens as soon as an alarm or warning is present. Chapter 6 provides an overview of the behavior when messages occur.

3.2.7 Identification on the controller

The type label is mounted on the side of the controller housing. It contains the type designation with the number of zones, the electrical connection data and the manufacturer's data.

Typ / Type		**pro CONTROL BASIC 6**	
S/N	**20091**	**Prod. KW / CW**	**03 / 2020**
Code		**E7H1-AKB4-C1Z6-87A**	
Versorgung / Supply		● Y 230/400 VAC 50/60 Hz	
		○ Δ 230 VAC 50/60 Hz	
Belastung / Load		3x 16 A	
Schutzart / IP Class		IP20	
Temp. Fühler / Sensor		Fe-CuNi Type J	
EWIKON Heißkanalsysteme GmbH		**Made in Germany** CE	
Meldebuchse / Message Socket			
Pin 1+3	Relay	Sammelmeldung / collective message	
Pin 2+6		Steuereingang / Digital input	

Figure 2 – Type label

3.2.8 Wiring of the plug systems

The plugs for connecting the temperature sensors and heating elements to a hot runner are available on the rear of the controller. The customer-specific wiring plan for the plug systems is located on the side of the controller housing (see Figure 6 for an example).

	X1			
	Load		Sensor	
Zone	**230 V**	**~**	**+**	**-**
1	1	6	5	10
2	3	8	4	9

Table 1 – 2-zone plug

	X1		X2	
	Load		Sensor	
Zone	**230 V**	**~**	**+**	**-**
1	1	9	1	9
2	2	10	2	10
3	3	11	3	11
4	4	12	4	12
5	5	13	5	13
6	6	14	6	14

Table 2 – 6-zone plug

4 Commissioning

4.1 Electrical connection

	Important! Before the device is connected to the supply voltage, a check must first be performed to ensure that the mains electricity conditions comply with the specifications on the type plate.
	The electrical connections must be performed by a qualified electrician. Commissioning and operation while the controller is running are only to be carried out by authorised qualified personnel!
	Switching off all the outputs or individual zones will not protect any of the outputs against hazardous voltages. Before working on the connected heating elements, the associated connections must be unplugged, or the entire device disconnected from the mains power. Before the device is opened, it must be disconnected from the mains power!

4.1.1 Mains power supply

Before connecting the device to the supply voltage, a check must be conducted to ensure that the mains electricity system is correct. The hot runner controllers are prepared by default for operation in a star network (3x400VAC + N + PE) but can also be operated in a triangular network (3x230VAC + PE). For operation in a triangular network without a neutral conductor, it is essential to follow the local regulations for the installation of electrical systems. The terminals in the controller must be bridged accordingly for use in a star or triangular network. Annex 11.1 contains a clear terminal connection diagram.

4.1.2 Mains connection

To ensure correct operation, the hot-runner controller is connected to the low-voltage mains by using the connecting cable connected to the unit.

4.1.3 Connection of the mould

To connect the individual control zones to the corresponding injection mold, use must be made of appropriate leads for the sensor and heating unit connection.

	Please note: It must always be ensured that the internal wiring, the wiring of the cable set and the wiring in the mold are suitably coordinated with each other.
	Important! To exclude any effects of potential shifts, the injection molds that are connected up must be properly earthed in all cases.

4.2 Operating and display elements

The operation as well as all display elements of the hot runner controllers is carried out via the soft keys on the front of the housing. The following illustration shows the front view of a 6-zone controller, from which all operating and display elements are shown.

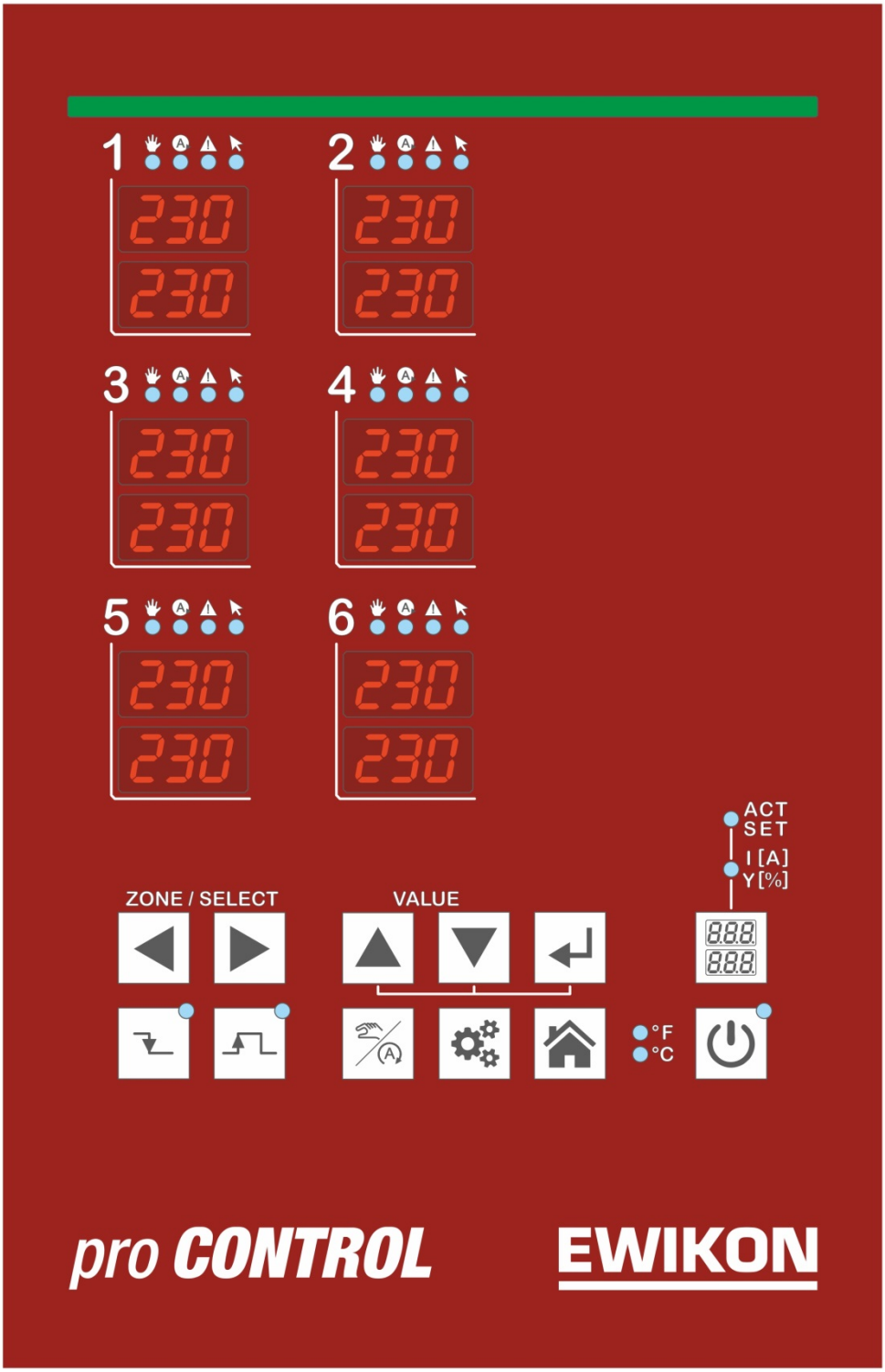


Figure 3 – Operating and display elements

4.2.1 Display elements

4.2.1.1 Status display

The status of the controller is indicated by a LED strip in the front. In control mode, this indicator lights up green. In case of a warning or alarm, the display changes to yellow or red (traffic light status).

	Green signals all is well. The controller operates in normal mode.
	Yellow indicates warning messages that indicate a deviation from the normal state.
	Red indicates alarms. Depending on the fault, outputs of corresponding zones are also deactivated.

4.2.1.2 Zone display

Each heating zone has two 7-segment displays and four LEDs for status indication. The 7-segment displays show either the setpoint and actual value or the heating current and degree of operation. In addition, the four LEDs can also be used to display the states shown below.

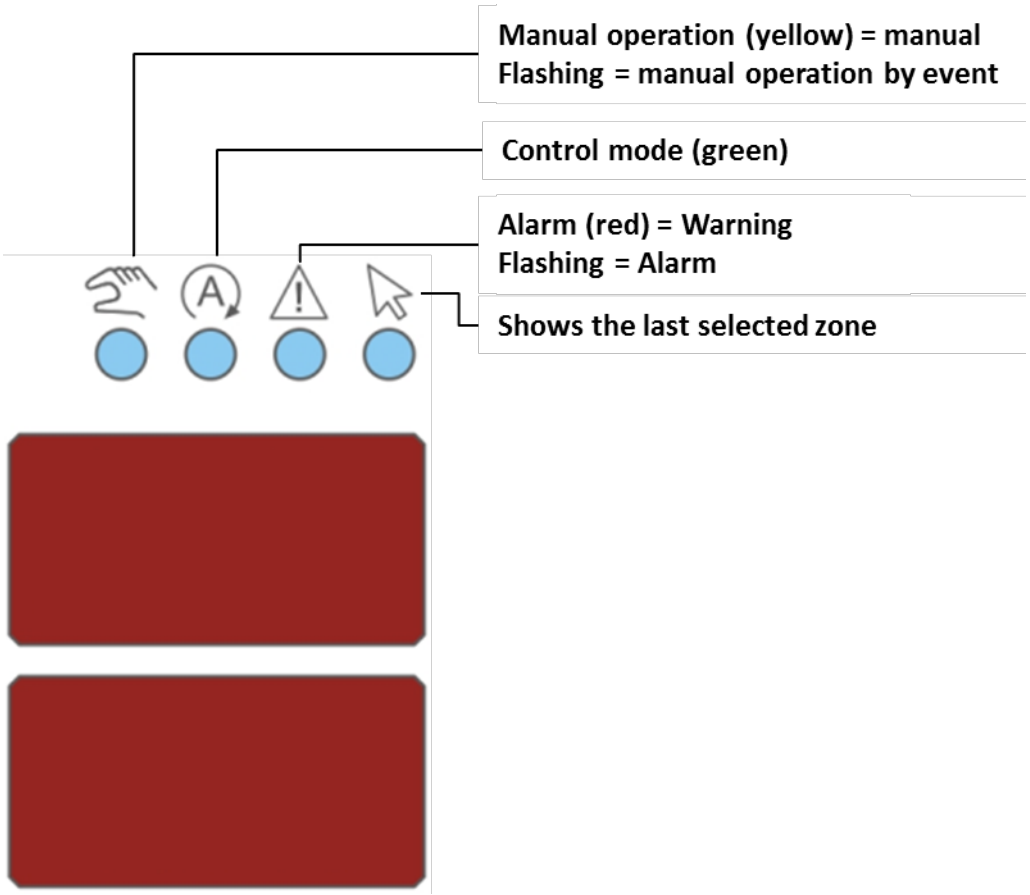


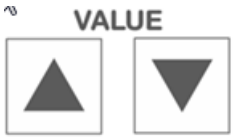
Figure 4 – Zone display

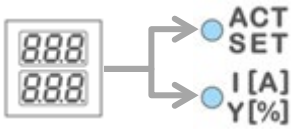
4.2.2 Operating elements

4.2.2.1 Main switch

The main switch is located on the back of the housing. The switch must be operated to switch the controller on and off.

4.2.2.2 Soft keys

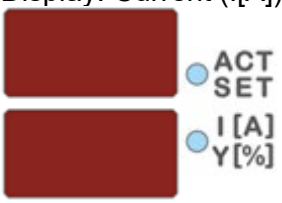
Operating element	Description
	Selection of zones Each time the arrow keys are pressed, the display jumps one zone further.
	Change in value
	Confirm button / Acknowledge error
	Boost
	Standby
	Change operating mode
	Parameterization / System information
	Basic view: Display of all zones / Reject input



Shift key for the zone display

Display: Actual value (ACT) and setpoint (SET)

Display: Current (I[A]) and output level (Y[%])



Activating / deactivating the controller outputs

Temperature unit of the display

5 Operation

5.1 Zone selection

5.1.1 Selecting a zone

Step	Operation	Description
1.		Each time the arrow keys are pressed, the display jumps one zone further. All other zones that are not selected are hidden.

5.1.2 Selecting multiple zones

Step	Operation	Description
1.		Select zone
2.		Press confirmation key
	... repeat 1. and 2.	To select any zones

5.1.3 Selecting several consecutive zones

Step	Operation	Description
1.		Selection of the 1st zone to be selected
2.		Keep confirmation key pressed
3.		With each keystroke a zone is added to the selection
4.		Release the confirmation key

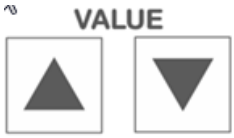
5.1.4 Selection of all zones

Step	Operation	Description
1.		The basic rule is: In the basic view, all zones can be operated and are virtually already selected for a value change. "The Zones that you see can also be operated."

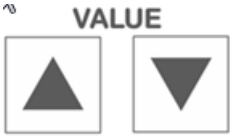
5.2 Operating mode

Step	Operation	Description
1.		Select the zone(s) as described in 5.1
2.		Selection of the operating mode The display switches between Manual mode Hnd Control mode on Zone off oFF Note: The display flashes and must be confirmed within 5 seconds.
3.		Confirm the entry The display stops flashing
4.		Press the Home button to return to the overall display of all zones.

5.3 Setpoints

Step	Operation	Description
1.		Select the zone(s) as described in 5.1
2.		Use the buttons to set the setpoint to the desired value. The display flashes, indicating that the value has not yet been accepted.
3.		Confirm the entry The display stops flashing
4.		Press the Home button to return to the overall display of all zones.

5.4 Output rate

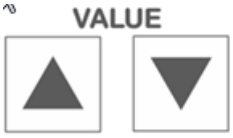
Step	Operation	Description
1.		Select the zone(s) as described in 5.1
2.		Selection of the operating mode. Operate until manual mode Hnd is displayed.
3.		Confirm selection
4.		Switching the zone display to Current (I) and output rate (Y)
5.		Use the buttons to set the output level to the desired value. The display flashes, indicating that the value has not yet been accepted.
6.		Confirm the entry. The display stops flashing.
7.		Press the Home button to return to the overall display of all zones.

5.5 Controller outputs

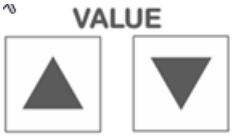
Step	Operation	Description
1.		Activating / deactivating the controller outputs either switches on all heating zones in control mode and manual operation or switches off all zones.

5.6 Parameter

5.6.1 Zone parameter

Step	Operation	Description
1.		Select the zone(s) as described in 5.1
2.		Press key to change to the parameterization level
3.		Select parameter. Each time the arrow keys are pressed, the parameter is incremented or decremented. 
4.		Use the buttons to set the value of the selected parameter to the desired value. Note! Password entry required before parameterization (default "22"). Set the current password with the keys and confirm. The parameter can then be changed The display flashes. This means that the value has not yet been accepted.
5.		Confirm the entry. The display stops flashing.
6.		Press the Home button to return to the overall display of all zones.

5.6.2 System parameter

Step	Operation	Description
1.	 … 2s	Press and hold for 2s. The display changes to the system parameter level. This level contains system information that cannot be changed:  System Information However system parameters and system functions can be changed. The representation is made as SYS PAr or SYS Fun:  System Parameter  System Function
2.		Select system parameters.
3.		Set the value of the selected parameter to the desired value using the arrow keys. Note! Password entry required before parameterization (default "22"). To do this, set the current password with the keys and confirm. The parameter can then be changed The display flashes, indicating that the value has not yet been accepted. Example: System parameter HH with value 500 
4.		Confirm the entry. The display stops flashing.
5.		Press the Home button to return to the overall display of all zones.

5.7 Boost

Step	Operation	Description
1.		Select the zone(s) as described in 5.1
2.		Pressing the Boost button increases the setpoint value for the selected zones by the value stored in the zone parameters. The duration of the boost process is stored in parameters. If necessary, the standby mode is ended by the boost. The setpoint display SET flashes alternating with the display „bSt“.

5.8 Standby

Step	Operation	Description
1.		Pressing the standby button lowers the setpoint to the value stored in zone parameters. Confirming again deactivates the standby mode. The standby mode terminates the boosting if necessary. The standby mode can also be activated via the digital 24V control input. The setpoint display SET flashes alternating with the display „Stb“.

6 Warning and error messages

The pro CONTROL BASIC controllers provide information about the current status via status and 7-segment display. Warnings and alarms are shown as abbreviations in the 7-segment display. In addition, the LED band indicates the controller status in green, yellow and red. In the standard state, the LED band lights up green. An existing warning is displayed in yellow. Warning messages alert the plant operator to possible problems. However, production operation is continued. A suddenly occurring alarm is displayed in red. If it occurs, the plant operator must intervene. For critical alarms, an error acknowledgement or a device restart may be necessary. The following subchapters contain a detailed list of all warnings and alarms.

6.1 Warnings

Warnings are shown in yellow by the status display (LED stripe).

7 segm. display	• Description / Causes	Notification contact
dH	**Positive temperature deviation** • The actual value of the sensor is above the tolerance band set as zone parameter P03.	Warning is displayed
	- Tolerance band (zone parameter P03) too small, if oscillation occurs due to the process.	
dL	**Negative temperature deviation** • The actual value of the sensor is below the tolerance band set as zone parameter P03.	Warning is displayed
	- Controller is in the heat-up phase - Tolerance band (zone parameter P03) too small - Heat output may not be sufficient - Heating could be defective - Sensor not in contact with this zone	
-E-	**Broken sensor** • No connection to the sensor.	Warning is not displayed
	- No sensor connected - Sensor cables / connecting cable defective - Sensor plug connections defective **Zone operates with the average output level in manual mode**	

6.2 Alarms

Alarms are shown in red by the status display (LED stripe).

7 segm. display	• Description / Causes	Notification contact
HH	**Shut-off temperature** • The actual value of the sensor is above the maximum permissible temperature (system parameter HH). • All outputs are switched off. The controller can only be restarted by restarting or acknowledging the error by ↵. The actual value must also be below the parameter HH.	Alarm is displayed
	- Setpoint too close to HH value - Triac malfunction. This results in current flowing and heating without output level	
Hi	**Over temperature** • The measured actual value of the sensor is greater than the limit value set under Zone parameter P02 (Hi-Alarm). • The corresponding zone is switched off until the actual value falls below the value of the parameter P02 again.	Alarm is displayed
	- Alarm limit (zone parameter P02) is too close to the setpoint - Triac malfunction. This results in current flowing and heating without output level	
Lo	**Under temperature** • The actual value of the sensor is below the limit value set under zone parameter P01 (Lo alarm).	Alarm is displayed
	- Alarm limit (zone parameter P01) is too close to the setpoint - Heat output may not be sufficient - Heating could be defective - Sensor not in contact with this zone - Sensor polarity reversal - Controller is heating up	

7 segm. display	• Description / Causes	Notification contact
-E-	**Broken sensor** • No connection to the sensor, in addition the average output level could not yet be recorded.	Alarm is displayed
	- No sensor connected - Sensor cables / connecting cable defective - Sensor plug connections defective	
Pol	**Sensor polarity** • The polarity of the sensor is reversed • Due to incorrect polarity, negative temperature values can be measured by the controller. Therefore the corresponding zone is switched off at -15°C and can only be switched on again after the polarity has been changed.	Alarm is displayed
	- Sensor wrong polarity. This causes the measured temperature to show falling values during heating.	
IFu	**Fuse** • Zone is not supplied with power	Alarm is displayed
	- Fuse defective	
Itr	**Triac** • Without control of the outputs a current flows	Alarm is displayed
	- Triac defective, switches through permanently Note: The relevant zone is switched off and the alarm output opens. After exchanging the triac, the controller can be operated again.	
Pot	**Sensor voltage** • The voltage potential on the sensor cable is impermissibly high	Alarm is displayed
	- Wiring error - Cable or plug defective - Cable pinching	

7 segm. display	• Description / Causes	Notification contact
noI	**No current flow** • When controlling the outputs with an output level > 0% no current flows - Cable or plug defective - Heating defective - Triac defective, does not switch through - No heating connected	Alarm is displayed
rEL	**Relay** • Internal hardware error - Output relay of the zone defective • Message must be acknowledged - Defect of the device hardware	Alarm is displayed
dI	**Current deviation** • The rated current set in zone parameter P14 deviates from the current monitoring tolerance set in zone parameter P15. - Heating defective or partially failed - Correct rated current set under zone parameter P14? - Tolerance band (zone parameter P15) too small	Alarm is displayed
IHI	**Load short circuit** • An impermissibly high current flows through a short circuit in the heating circuit • Message must be acknowledged - Wiring error - Cable or plug defective - Line pinch	Alarm is displayed
CAn	**CAN-Bus fault** • Communication error of the internal power card - Identical address assigned twice - Cable not connected correctly - Missing final resistance of the last participant	Alarm is displayed

7 Functions and parameterization

7.1 Basic settings

(see chapter 5.6.2 System parameter)

7.1.1 Access authorizations

Description

System parameter Cod: Password

The control unit is protected against unauthorized settings by a password = identification code Cod. The password can be individualized after it has been entered.

The release is done with code "22"

System parameter IdL: User level

The IdL parameter determines the degree of locking, with which the device is locked against inputs.

0= No interlock

1= Only setpoints and operating modes free

2= All parameters locked

IdL is always only accessible via the code

System parameter Pin: Pin Code

If the password Cod has been changed and is subsequently unknown, the password can be reset via the parameter Pin. A master password must be generated by the manufacturer via the pin shown.

Parameter

System parameter		Settings
Cod	ID Code	0…999, Default value = 22
IdL	ID Level	0…2, Default value =1
Pin	ID Pin Code	(read only, value cannot be changed)

7.1.2 Fahrenheit display

Description	This parameter indicates the temperature unit in which the controller is displayed and operated. During operation, the setting can also be read off via LED indicators on the display. • 0: °C • 1: °F

Parameter	**System parameter**	Settings
	FAH Fahrenheit-display	0 / 1, Default value = 0 → °C

7.1.3 Thermocouple type

Description	The tCt parameter specifies the type of thermocouples used for the entire controller.

Parameter	**System parameter**	Settings
	tCt Thermocouple type	0: Fe/CuNi Typ J 1: Ni/CrNi Typ K with temperature range max. 800°C Default value = 0

7.2 Control behaviour

7.2.1 Control parameters P I D

Description	The automatic determination of the control parameters P I D is called classification. It is performed automatically after the controller outputs are switched on and overwrites all previous settings of the control parameters. **PID-Parameter** When classifying the zones, the controller sends a defined heating impulse to each zone in order to automatically determine the heating behaviour of e.g. the nozzle or manifold. The controller determines the suitable control parameters for P, I and D and stores them in the parameters P04, P05 and P06. The process can be recognized by the flashing green LED band and can take up to 60s for large, sluggish objects. The determined classification can be viewed for each zone under Parameter d2. **Activate and deactivate classification** To obtain special settings of the P, I and D parameters in any case, the classification per zone can be switched off with the parameter P07 = "0".

Parameter	**Zone parameters**		**Settings**
	P04	P-Band	0…100%
	P05	Tn Reset time	0…999s
	P06	Tv Derivative time	0…999s
	P07	Activate classification	OFF = 0 ON = 1 Default value = 1
	d2	Classification of the zone	Read only

7.2.2 Output level

Description	The parameter specifies the output level for manual operation. If the controller is already in manual mode, the setting of P13 can also be made as described in section 5.4.

Parameter	**Zone parameters**		**Settings**
	P13	Output level	0…100% Default value: 0%

7.2.3 Maximal output level

Description	This parameter limits the maximum output power of the heaters via the output level.

Parameter	**Zone parameter**		**Settings**
	P12	Maximal output level	0…100% Default value: 100%

7.3 Heating

7.3.1 Softstart (Gentle heating)

Description	All zones are gently heated separately to 100°C, independent of a higher setpoint temperature. Up to a temperature of 50°C, each zone is heated with a maximum degree of operation of 50%. From 50 - 100°C the degree of operation is determined according to the existing temperature, i.e. from 60°C with a degree of operation of 60% etc. After reaching 100°C, the soft start is completed and the zone can heat at full power. Softstart is already set at the factory.	
Parameter	**Zone parameter**	**Settings**
	P08 Softstart	0: Without Softstart 1: With Softstart Default value: 1

7.3.2 Compound heating

Description	**Joint heating with respect to the slowest zone** This is to prevent the complete mold, manifold and nozzles from heating up with thermal imbalances. All zones are heated in such a way that they may only have a certain temperature difference to each other (system parameter Ct) The slowest zone (whose number can be read off as information in the system parameter SC) works with maximum output. The other zones are limited in the degree of operation in such a way that they may only advance by the set temperature difference. The parameter P09 defines the assignment of a zone to the "compound.	
Parameter	**Zone parameter**	**Settings**
	P09 Compound heating	0: Zone without compound 1: Zone with compound
	System parameter	**Settings**
	Ct Max temperature difference of the compound	Adjustable from 1° … 100° Default value: 10°
	SC Slowest channel	Read only
Example	Zones 1 to 4 should be heated together. The temperature difference during the heating process should not exceed 20° C. Zones 5 and 6 should not be part of the heating compound. The settings: Zone 1 to zone 4: Parameter P09 = 1 Zone 5 and Zone 6: Parameter P09 = 0 System parameter Ct = 20	

7.4 Hot runner monitoring

7.4.1 Temperature monitoring

Description

Monitoring of the zones for under- or overtemperature

Limit value for undertemperature: Lo alarm
If the process value is below this value, an alarm is given. The LED band lights up red and the alarm contact is switched.

Limit value for overtemperature: Hi alarm:
If the process value is above this value, the zone is switched off until the process value falls below the Hi-alarm again. The LED band lights up red and the alarm output is switched.

Negative temperature deviation: dL tolerance band
In case of a dL alarm, the process value deviates too much from the set-point and is below the specified tolerance band. The LED band lights up yellow and the alarm output is switched. The zone is NOT switched off. The size of the tolerance band is set in parameter P03.

Positive temperature deviation: dH- tolerance band
In case of a dH alarm, the actual value deviates too much from the set-point and is above the specified tolerance band. The LED band lights up yellow and the alarm output is switched. The zone is NOT switched off. The size of the tolerance band is set in parameter P03.

Shut-off temperature: HH-Alarm
The HH parameter defines the shut-off temperature of the device. If the -value is exceeded, an alarm is generated and all zones are switched off. The LED band lights up red.

Parameter

Zone parameter		**Settings**
P01	Lo-Alarm	-15…600°C (800°C for NiCrNi as Thermo-couple) Default value: 0°C
P02	Hi-Alarm	1…600°C (800°C for NiCrNi as Thermo-couple) Default value: 400°C
P03	dL / dH Tolerance band	1…600°, Default value: 15°C
System parameter		
HH	HH-Alarm	0…600°C (800°C for NiCrNi as Thermo-couple) Default value: 400°C

Example

The set point is 200°C.

Above and below the setpoint, a limit value should be set at intervals of 15°C.
A warning is to be issued when these limits are exceeded or undercut. The LED band lights up yellow and the alarm output switches.

If the temperature exceeds 250°C an alarm is to be triggered and the zone switched off.
The LED-band lights red and the alarm output switches.

If the temperature falls below 150°C an alarm should also be triggered.
The LED band is red and the alarm output switches.

A value of 400°C should be set as the maximum upper temperature limit for all zones. If this value is exceeded, all zones are switched off.

The following settings must be made:

Parameter

Zone parameter		**Settings**
P01	Lo-Alarm	150°C
P02	Hi-Alarm	250°C
P03	dL / dH Tolerance band	15°C
System parameter		
HH	HH-Alarm	400°C

The following figure illustrates the relationships:

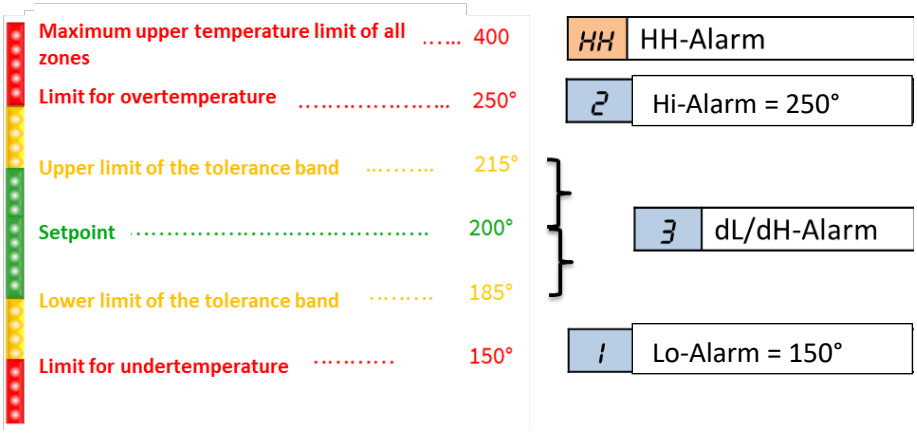


Figure 5 – Temperature monitoring

7.4.2 Average output level

Description	This parameter is calculated during regular control operation. Note! After a set point change, the average output is temporarily deleted and recalculated. The output is also deleted if a zone is put into manual mode.	
Parameter	**Zone parameter**	**Settings**
	01 Average output level	Is determined by the controller
Procedure	Start-up the system. Let it work at the setpoint for about 10 minutes. After that the determined value can be read in the zone parameter 01.	

7.4.3 Broken sensor

Description 01	A sensor break is automatically detected by the controller. In the event of a sensor break, the controller automatically switches over to the average output level. This sets the zone to manual mode and accepts the parameter 01 as the new output level. After the sensor break has been rectified, the zone automatically returns to control operation. The sensor break is shown as an alarm in the display. Note! If no average output was saved before the sensor break occurred, the zone switches off the corresponding output in case of an alarm.
Example 01	Zone 2 has a current setpoint of 110°C. According to parameter 01, the average output of the zone is 35%. In the event of a sudden sensor break, zone 2 would now be put into manual operation and 35% would be specified as the degree of operation.

7.4.4 Heating current monitoring

Description	The current flow to a heater can be continuously controlled by the heating current monitor. **Current: Reference value** To activate the heating current monitoring, the nominal current ("normal" current) of the heating element must be entered in Parameter P14. The current measurement monitors this value with the tolerance according to parameter P15. • 0,0: no heating current monitoring • > 0: this value is monitored **Current: Tolerance** Parameter P15 defines the tolerance for heating current monitoring. The current measurement monitors the value of parameter P14 with this tolerance.	
Parameter	**Zone parameter**	**Settings**
	P14 Current: Reference value	0,0…25,0A, Default value=0,0A
	P15 Current: Tolerance	0,0…16,0A, Default value=0,5A

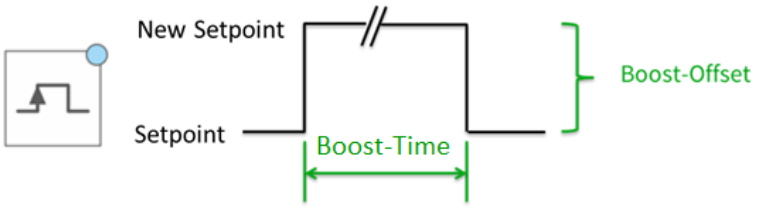
7.4.5 Triac monitoring

Description	Each zone has its own triac monitoring (triac = electronic power switch which directly controls the heating circuits), in order to be able to detect a possible control interruption of a zone, e.g. nozzle heating. A defective triac is detected if a current flows without controlling the outputs. If a current flows, this zone is switched off and an error message Itr is displayed.

7.5 Special functions

7.5.1 BOOST

Description	By executing the boost function, the temperature in selected zones is raised by a fixed value - the boost offset (parameter P10) - for a certain time (parameter P11). The control is carried out via the "Boost button".



Parameter	Zone parameter		Settings
	P10	Boost-Offset	0…50K, Default value=0K
	P11	Boost-Duration	0…900s, Default value=60s

7.5.2 STANDBY

Description	The use of the standby function is recommended in order to protect the tools and the raw material they contain as well as to reduce energy costs during downtimes. The standby temperature can be set according to the materials used. It is controlled via the "Standby button". The standby function always applies to all zones. 

Parameter	Zone parameter	Settings
P16	Standby temperature	0…300°C Default value=20°C

7.5.3 Load detection

Description	With this parameter the load detection of the controller can be deactivated. This allows error-free control of very small nozzles with heating currents < 100 mA. 1 = Deactivate load detection

Parameter	Zone parameter	Settings
P17	Load detection	0, 1 Default value: 0

7.5.4 Default parameter

Description	**System parameter** Std With this parameter a reset of all settings to the factory setting can be initiated. 1 = Load default parameters

Parameter	System parameter	Settings
Std	Default parameter	0, 1 Default value: 0

8 Parameter overview

8.1 Zone parameter

	Zone parameter	Short description	Chapter
P01	Lo-Alarm	Lower temperature limit value / under-temperature	7.4.1
P02	Hi-Alarm	Upper temperature limit value / excess temperature	7.4.1
P03	dL/dH-Tolerance band	Permitted deviation of actual temperature from setpoint	7.4.1
P04	P-Band	Parameter of the PID-Controller	7.2.1
P05	Tn Reset time	Parameter of the PID-Controller	7.2.1
P06	Tv Derivative time	Parameter of the PID-Controller	7.2.1
P07	Classification	Activate / deactivate classification	7.2.1
P08	Softstart	Gentle heating due to limitation of output	7.3.1
P09	Compound heating	Common, slow heating of zones	7.3.2
P10	Boost-Offset	Brief increase of the target temperature	7.5.1
P11	Boost-Duration	Time of temperature rise at BOOST	7.5.1
P12	Maximal output level	Output level limitation to maximum value	7.2.3
P13	Output level	Output presetting in manual operation	7.2.2
P14	Current reference value	Nominal current of the zone to be monitored	7.4.4
P15	Current tolerance	Tolerance of current monitoring	7.4.4
P16	Standby temperature	Lowering the temperature to a new set point	7.5.2
P17	Load detection	Switching off the load detection for error-free control of very small nozzles	7.5.3
r01	Average output level	The average output level (Read Only)	7.4.2
r02	Classification of zone	Found classification (Read Only)	7.2.1

8.2 System parameter

Display		System parameter	Short description	Chapter
SYS InF	SC	Slowest channel	The slowest zone during heating is stored here	7.3.2
SYS PAr	HH	HH-Alarm	Shut-off temperature: Maximum upper temperature limit value for all zones	7.4.1
SYS PAr	Ct	Max temperature difference of the compound	Maximum temperature deviation of the compound heating	7.3.2
SYS PAr	FAH	Fahrenheit display	Presentation of the display	7.1.2
SYS PAr	tEt	Thermocouple type	Type of the connected thermocouples	7.1.3
SYS PAr	IdL	ID Level	User level	7.1.1
SYS PAr	Cod	ID Code	Password	7.1.1
SYS InF	Pin	Pin Code	The displayed value is required if the password has been forgotten. In this case contact the service.	7.1.1
SYS Fun	Std	Default parameter	Reset to factory settings	7.5.4
101 InF	UEr	Software Version	Shows the current software version of the power card	
101 InF	ttr	Temperature heat sink	Shows the current temperature of the heat sink of the power card inside the case	
101 InF	ttc	Temperature Thermo-Terminal	Shows the current temperature of the thermocouple terminal on the power card	
SYS InF	UEr	Software Version	Shows the current software version of the firmware	

9 Technical data

EWIKON Heißkanalsysteme GmbH	pro CONTROL BASIC	
Number of zones	2	6
Housing		
Dimensions W x H x D	175 mm x 270 mm x 390 mm*[1]	
Weight	13kg	
Body material	Galvanized steel	
Protection class	IP 20	
Environmental conditions		
Operating temperature	0...50°C	
Maximum housing surface temperature *[2]	55°C	
Air humidity	0…90% rel. Humidity, no condensation	
Storage temperature	-25 … +75°C	
Operation and display		
Display per zone	2x three-digit 7-segment	
Control panel	12 Soft keys	
Electrical connection		
Connection cable with CEE plug	1 x 16 A	3 x 16 A
Supply voltage	3 x 190 – 400 V AC, N, PE	
Switchable to	3 x 110 – 230 V AC, PE	
Tolerance	+ 5% / -15%	
Main switch	40 A 3-pin	
Mains fuses		
Control voltage electronics	1 x 2,5A mid-term contracts (5 x 20mm)	
Internal heating outputs	Je 16A gRL (6,3 x 32mm)	
Additional fuses (delta) internal	Je 16A träge (6,3 x 32mm)	
Power consumption	max 30 W without load	
Thermocouple inputs		
Thermocouple	Fe-CuNi Typ J - 0…700°C	
convertible to	NiCr-Ni Typ K	
Cold junction compensation	intern	
Measurement accuracy	±0,25 K	
Temperature query	4x128 / second	
Load outputs	Bistable, electrically insulated	
per zone	1x heating, 230VAC switchable	
Shortest controller response	10ms at 50Hz	
Current per zone	max. 16A at 80% Duty cycle	
Beware! Observe the total load capacity of the electrical connecting cable		
Minimum load	100 W	
Control behavior	PI, PD or PID separately adjustable for all zones	
Message contact/ control input		
Notification contact (relay contact) - potential-free		
Maximum voltage	250V AC	
Maximum current	4A at cosφ = 1; 2A at cosφ = 0,5	
Digital input - isol. potential free	13 – 30V DC	

*[1]: Depth gauge without mold connection
*[2]: at an air temperature of 20°C

10 Spare parts + accessories

The following table contains a useful list of spare parts that can be replaced if necessary, taking into account the safety instructions:

General spare parts / General accessories

Description	Item number
Signal cable pro CONTROL BASIC DigiIn/Out, L = 6 m	60070.046
Fuse holder cap pro CONTROL	18401
Fuse pro CONTROL 16 A(gRL) 6.3 x 32 mm	18402
Fuse pro CONTROL 16 A (T) 6.3 x 32 mm	18403
Fuse 2,5 A (MT) 5x20 mm	18243
Power board pro CONTROL 6 zones	60040.500
Housing feet pro CONTROL, pluggable	18404

Spare parts for 694xx

Description	Item number
Power board pro CONTROL BASIC 2 zones 694xx	60040.400
Processor board CONTROL BASIC for 694xx	60040.402

11 Appendix

11.1 Terminal bridges of the star-delta supply

11.1.1 Terminal jumpers in star network (state at delivery!)

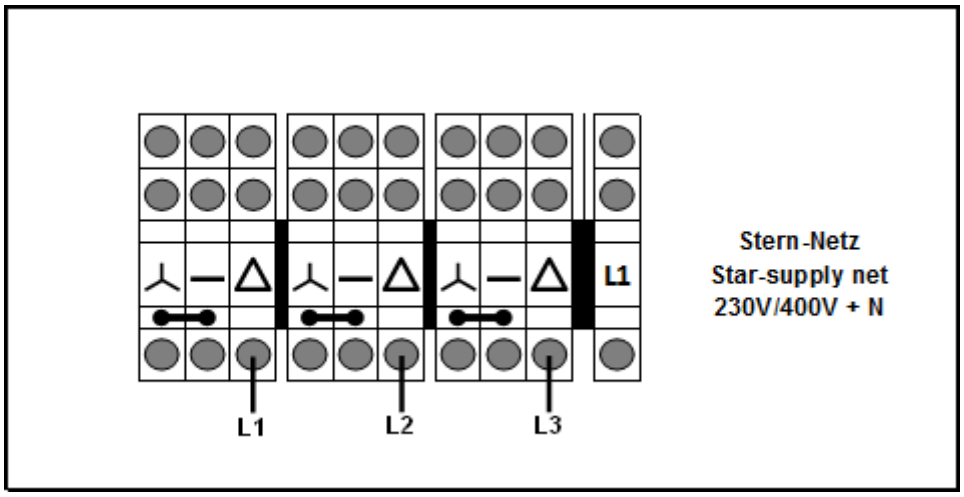


Figure 6 - Star-network

11.1.2 Terminal bridges in delta network

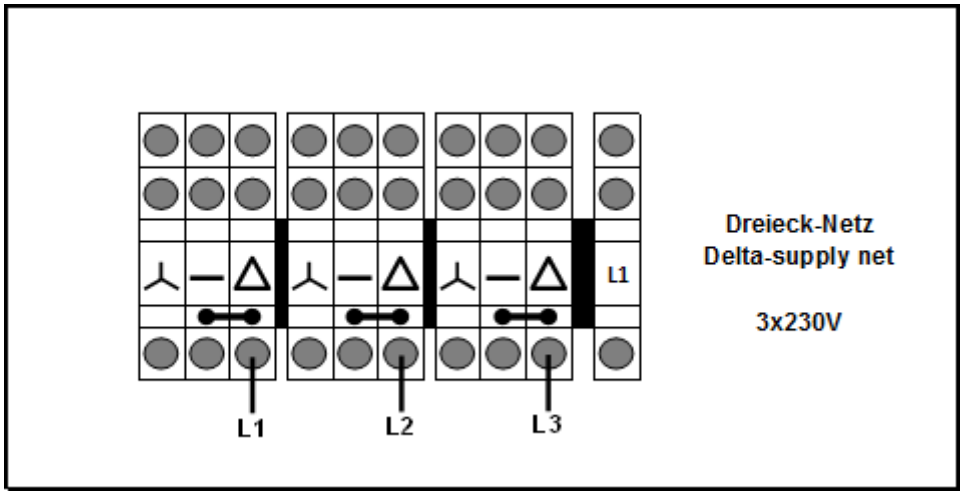


Figure 7 - Delta-network

11.2 Notification contact / Digital input

Contact	Function	
1.+3.	Notification contact	Normally closed
2.	Digital input	0V Standby
6.	Digital input	24V Standby

EC - Declaration of Conformity

EWIKON

We hereby confirm that the products described below conform to the essential protection requirements of the following European Directives

2014/35/EC “Low Voltage Directive”

and

2014/30/EC “EMC Directive”

with respect to their design type. This requires that the products are used for their intended purpose, that the assembly and operating instructions are observed and that genuine connecting cables outside the device are used.

Alterations made to the product will void the declaration of conformity.

Producer:

EWIKON Heißkanalsysteme GmbH
Siegener Straße 35
35066 Frankenberg / Germany
phone: +49 (0) 6451 / 501-0

Product:

pro CONTROL hot runner controllers
for the operation of 230 V hot runner systems

Type:

Controllers for
2 / 6 zones
69400.002 / .006

Controllers for
6 / 12 zones
69510.006 / .012
69511.006 / .012

Controllers for
18 / 24 zones
69520.018 / .024
69521.018 / .024

Controllers for
30 / 36 zones
69530.030 / .036
69531.030 / .036

Controllers for
36 - 120 zones
69550.036 - .120
69551.036 - .120

Applied harmonised standards:

DIN EN 61010-1:2011-07
Safety requirements for electrical equipment for measurement, control and laboratory use

DIN EN 61326-1:2013-07
Electrical equipment for measurement, control and laboratory use - EMC requirements

Frankenberg, 14 November 2019

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