OPERATING INSTRUCTIONS

May 2006
(Subject to technical modifications)

TEMP-STAR

SINGLE

HUMMEL AG
Geschäftsbereich EL
Merklinstraße 34
79183 Waldkirch
Telefon: 07681/4712-0
Fax: 07681/23080
Internet: www.hummel.com

HUMMEL®

Table of Contents

☞ Important operating instruction – do not ignore!

Safety Instructions

- ☞ Please read these operating instructions carefully prior to using the product.
- ☞ The unit may be serviced only by qualified personnel. Be sure to withdraw the mains plug before opening the housing!
- ☞ Never replace any fuses unless the unit has been disconnected from the power supply.
- ☞ Prior to inserting the hot-runner mold cables, be sure to verify that all connectors have been properly connected (see Connections).
- ☞ Check power cable and mold connecting cables for potential defects on a regular basis! Be sure to use a new cable whenever the cable sheath is found to be defective!

Warranty

For all TEMP-STAR controllers, the manufacturer issues a 2-year warranty, with the period of warranty beginning on the day when the product is dispatched to the buyer. This warranty shall not cover any damage that has been caused by improper handling, wrong connection or improper use of the product (see next section). Return shipments must be addressed to **HUMMEL AG**, Geschäftsbereich EL Waldkirch (Germany), using the original packaging.

Intended Use

TEMP-STAR units are industrial temperature controllers for controlling the melting temperature of hot-runner molds. The temperature is measured with thermocouples and then adjusted accordingly.

- ☞ To prevent overheating damage in case of malfunction, an external temperature fuse must be integrated into the heating circuits.
- ☞ The manufacturer will not accepting responsibility for damage caused by improper use of the unit.

General Instructions

A separate "control zone" is required for every load to be connected. A "control zone" consists of a slide-in controller, a temperature sensor input, and a load output including a load circuit fuse.

- ☞ When connecting the hot-runner mold cables, be sure to assign the cables to the correct connectors. In front view, the control zones are to be numbered from left to right, beginning with the bottom row.
- ☞ Unused controller zones must be switched off. Non-used controller slots must always be covered with a blanking plate!

For connecting the load circuits, a heat resistant flexible cable must be used. For the temperature sensors, a special compensating cable is required!

Installation

Place your TEMP-STAR controllers on a stable, flat working surface. The displays should be at eye-level with the user.

Cooling fans prevent overheating of the output stage. Be sure that the air can circulate freely through the appropriate vents provided on the unit’s rear and underside.

Maintenance and Cleaning

We recommend cleaning the ventilation slots on the rear and underside of the unit at regular intervals. If necessary, use compressed air to remove dust or other dirt.

Note that this work may only be carried out by qualified service personnel! The housing and the control panel may be cleaned with a soft cloth soaked with alcohol if necessary. However, do not use acid cleaners or scouring agents! No further servicing or maintenance is required. Should you experience any malfunction, please call your TEMP-STAR Service or contact the manufacturer.

Start-Up

After carefully checking the cables for potential defects, connect the hot-runner mold to the controller. If needed, you can also make a connection to the molding machine using the alarm connector. The controller must be connected to a three-phase power supply source using a CEE connector (see Specifications). Connect the power cable, then switch on the controller with the main switch.

☞ Each controller can be switched on and off separately with the I/O key. Please note that unused control zones must be switched off!

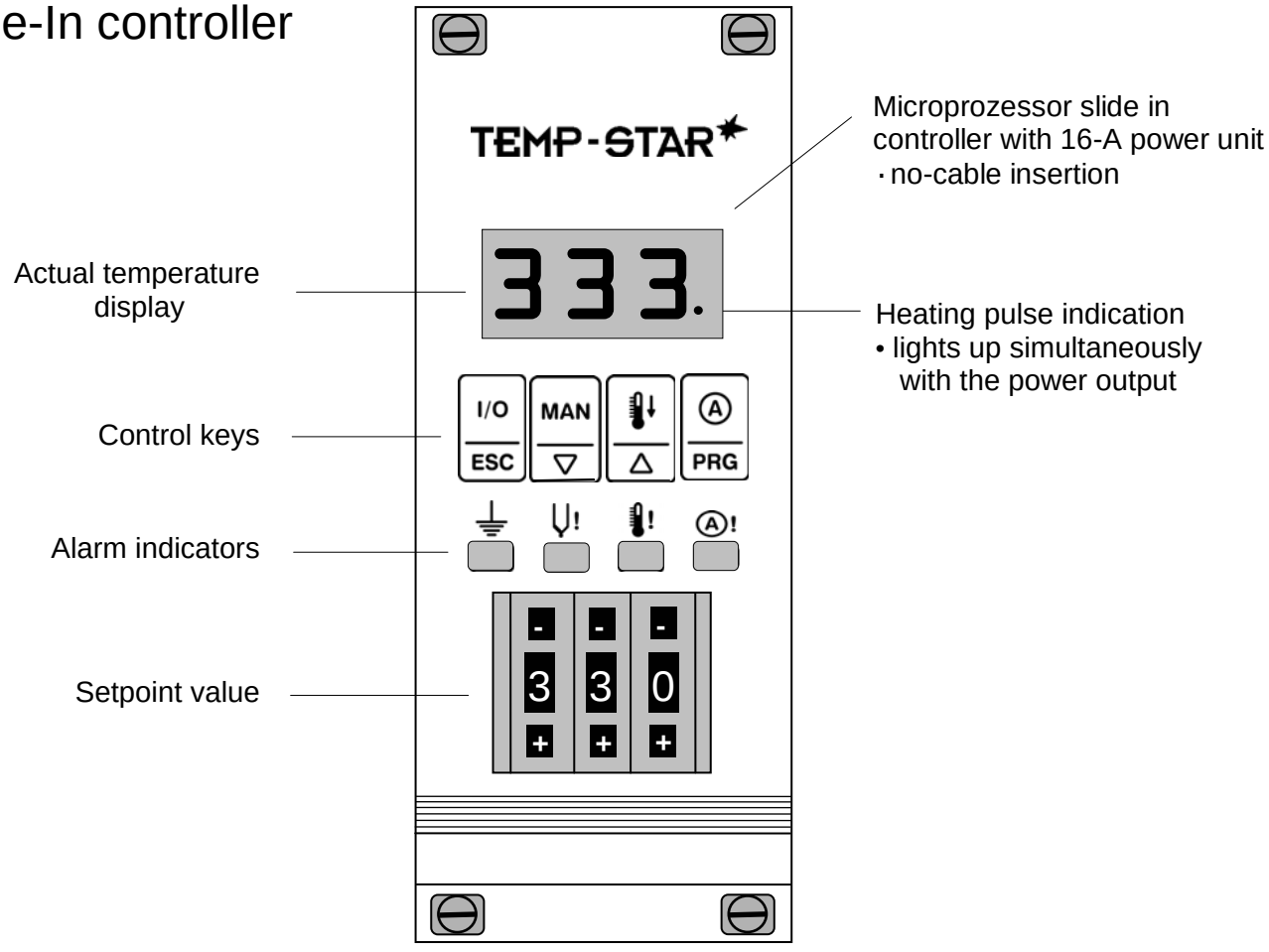
Select the desired setpoint on the controllers (see Displays & Indicators, Operation).

The controllers will now heat up the mold in a uniform manner, thereby drying up any moist heating elements. During this process, the temperature deviation alarm indicator will be flashing (soft-start ramp).

As soon as the setpoint has been reached, the production process can be started on the basis of the factory settings.

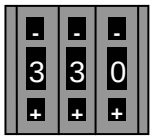
Should malfunction occur during the start-up process, the cause of the trouble will be indicated by the corresponding control panel indicator (see Displays & Indicators, Operation).

Slide-In controller

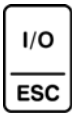


Displays & Indicators, Operation (* Optional functions)

Actual-value display
Indicates the measured temperature (in °C). The dot indicates power output.
* Load-current indication in amperes (see “load current” switch “A”).
* Manual-control mode indication “Hnd” (see “manual-control mode” switch “MAN”).
* Temperature-reduction indication “tdn” (see ”temperature down” switch ↓).
* “not” is displayed in automode (automatic control mode); this mode is triggered in the event of sensor breakage (see “Programming”).
* Menu display (see “Programming”).



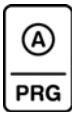
Setpoint display & setting
Indicates the temperature setpoint value (in °C).
The setpoint can be changed by using the UP (“+”) or DOWN (“-“) key above or below the respective digit (maximum value: 600 °C).
* Setting and indication of the regulation ratio in %: for example, “450” means 45% (see “manual-control mode” switch).



On/Off switch
This key is used for switching the respective controller (control zone) on or off. Please note that unused control zones should always be switched off!
* “ESC” key (see “Programming”).

Manual-mode switch
This key is used for activating the manual. Output power now needs to be set manually (in %) via the Setpoint display section (see “Setpoint display & setting”). In this mode, the information indicated in the Actual Value display section constantly alternates between “Hnd” and actual-value indication or – if sensor breakage has occurred – “---“.
* DOWN key (see “Programming”).

Temperature down switch
This key is used for decreasing the setpoint value. The reduced value can be programmed within a range of 10-90% of the setpoint (see “Programming”). In this mode, the information indicated in the Actual Value display section constantly alternates between “tdn” and actual-value indication. This function can also be activated by the injection-moulding machine via the alarm input / connector (see “Connections”).
* UP key (see “Programming”).



Load current switch
When this key is pressed, the average load-current value of the last minute of operation will be displayed in the Actual Value display section. This must be taken into account when adjustments are made in manual-mode!
* Programming key (see „Programming“).

Earth fault alarm indicator
This indicator will light up in the event that the heating-element-to-earth resistance falls below 100 kΩ. In such a case, the power supply will be interrupted.

Thermocouple alarm indicator
Continuously lit in the event of sensor breakage; at the same time, “---“ is shown in the Actual Value display section. In automode, the information displayed will alternate between “---“ and “not”. In the event of polarity reversal, this indicator will start flashing a few minutes after the controller has been switched on, and the Actual Value display will likewise show “---“.

Temperature alarm indicator
This indicator will keep flashing during the heating-up phase of the soft-start ramp. It will be lit continuously if overtemperature or undertemperature occurs (see “Programming”). Moreover, the power supply will be interrupted automatically in the event of overtemperature.

Overcurrent alarm indicator
This indicator will light up when the set maximum current has been exceeded (see “Programming”).

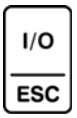
Programming

Starting the programming mode
Pressing the “PRG” key for more than one second activates the programming function. Now the first menu point - “Ot” - is shown in the Actual Value display section. A short touch on the “PRG” key calls up the corresponding setting value. This value can now be changed with the help of the UP/DOWN keys. Upon pressing the “PRG” key once again, the new value is stored in the system’s memory, and the corresponding menu point (“Ot” in our example) is displayed again. To move from menu point to menu point (either backward or forward), the UP/DOWN keys can be used (see “Menu Points”).

☞ After programming any parameters the controller must remain in operation, for at least one minute, to save the new parameters permanently.

UP key
To move through the menu.
To change the setting values.

DOWN key
To move through the menu.
To change the setting values.



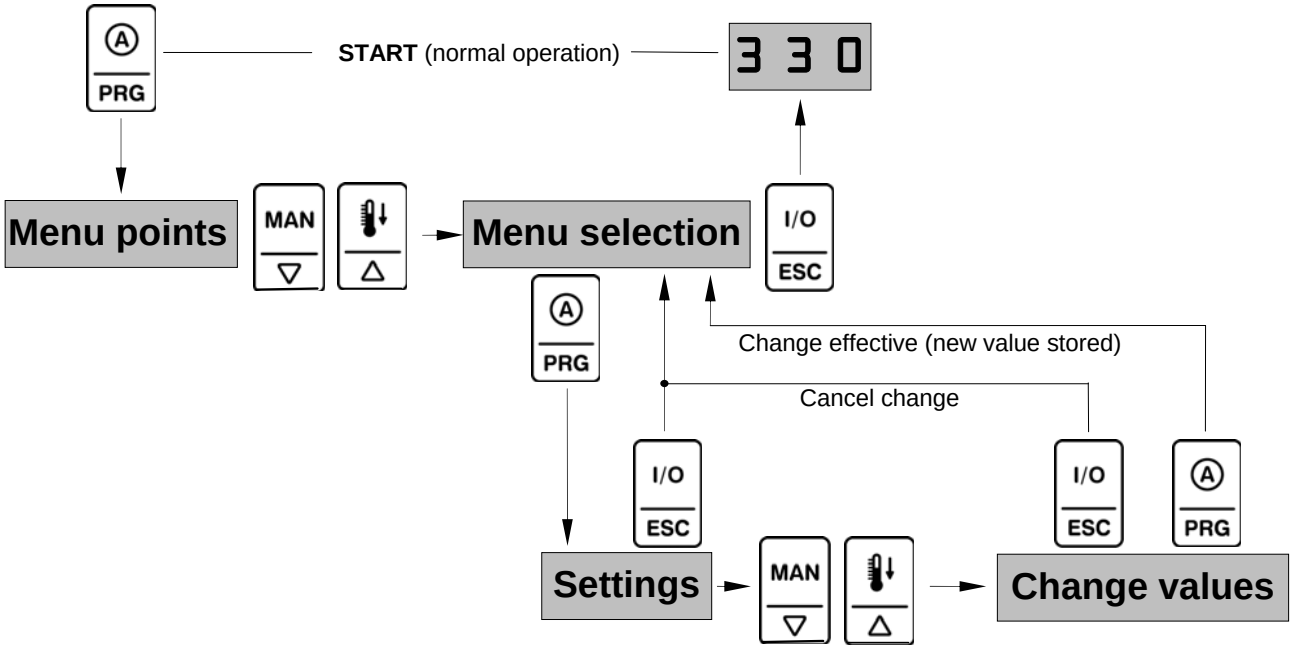
ESC key
To cancel/exit programming; changes ineffective.

Programming Menu

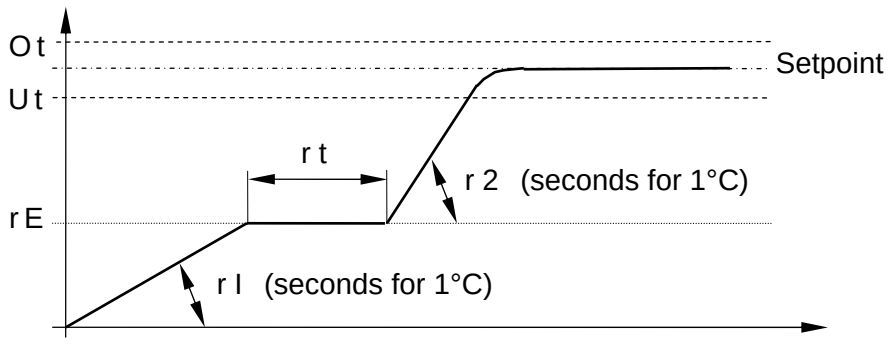
Menu Item	Name	Function	Range	Standard Factory-preset
Cod	Access code	Lock function	0 - 250	0 (inactive)
Ot	Overtemperature	Overtemperature limit value	0 – 50 °C	10 °C
Ut	Undertemperature	Undertemperature limit value	0 – 50 °C	10 °C
Cur	Overcurrent	Load output limit value	1 – 16 A	16 A
Tdn	Standby	Temperature below setpoint	10 – 200 °C	50 °C
rE	Ramp end	Final temperature ramp 1	80 – 120 °C	120 °C
r1	Rise, ramp 1	Heating speed, ramp 1	2-10 s for 1°C	4 s
r2	Rise, ramp 2	Heating speed, ramp 2	2–10 s for 1°C	2 s
Rt	Ramp pause	Pause between ramps 1 + 2	1 – 10 min	1 min
AOt	Overtemperature	Alarm: I = active / 0 = inactive	0 or I	I
AUt	Undertemperature	Alarm: I = active / 0 = inactive	0 or I	I
Not	Automode *	I = active / 0 = inactive	0 or I	0
Adr	Zone address	Slot no. following connection	0 - 99	99
Hnd	Manual mode	I = active / 0 = inactive	0 or I	0
toP	Setpoint limitation	Setting maximum setpoint	50 – 500 °C	450 °C
tUP	Boost function	Temperature above setpoint	5 – 60 °C	20 °C
F C	Temperature unit	°F or °C	°F or °C	°C
J L	Thermocouple	Type of Thermocouple	J / L	J
PrE	Preset	Set to factory preset values	-	-

* Automode function is available only after **failure-free** operation for approx. 15 min!

Programming Diagram



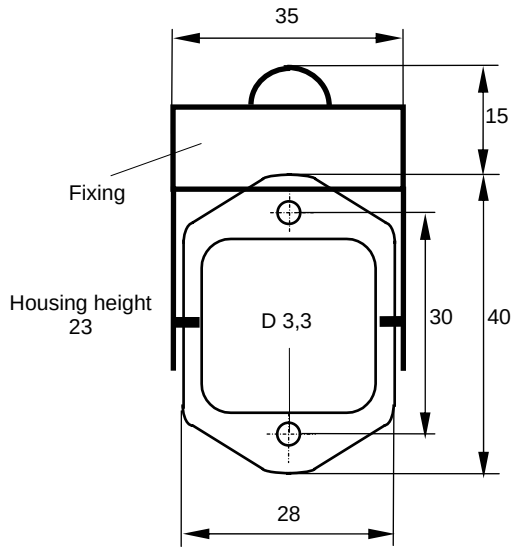
Soft-Start Ramp, Temperature Limit Values



CE

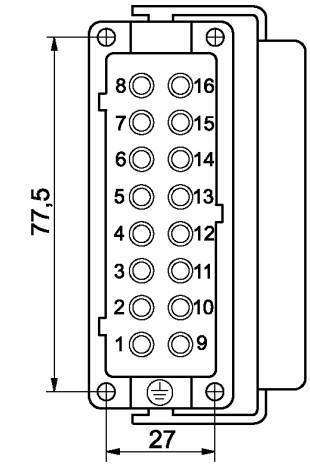
Connections (following DIN 16765-A)

4-Pole



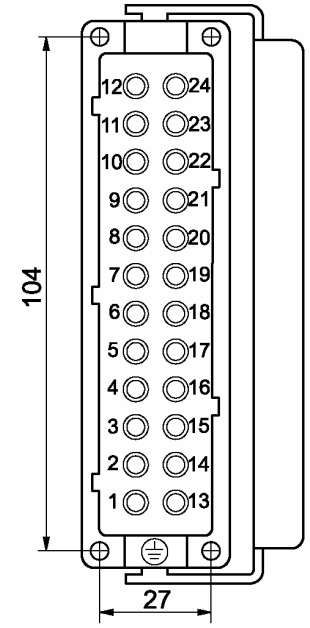
Zone	Load PIN	T / C PIN
1	1 / 4	1(+) / 4(-)
2	2 / 3	2(+) / 3(-)
	Ground connect to housing	

16-Pole Load



Zone	PIN
1	1 / 9
2	2 / 10
3	3 / 11
4	4 / 12
5	5 / 13
6	6 / 14
Ground connect to housing	

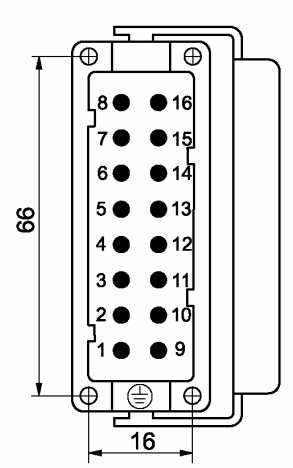
24-Pole Load



Zone	PIN
1, 13, 25	1 / 13
2, 14, 26	2 / 14
3, 15, 27	3 / 15
4, 16, 28	4 / 16
5, 17, 29	5 / 17
6, 18, 30	6 / 18
7, 19, 31	7 / 19
8, 20, 32	8 / 20
9, 21, 33	9 / 21
10, 22, 34	10 / 22
11, 23, 35	11 / 23
12, 24, 36	12 / 24
Ground connect to housing	

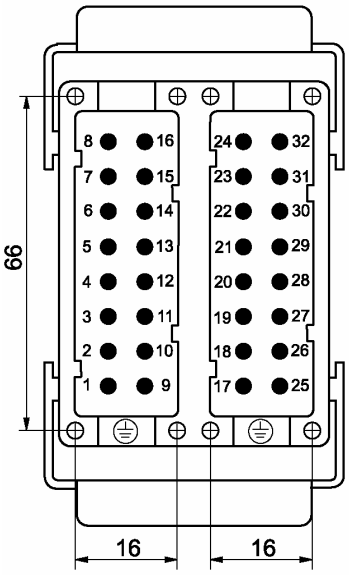
Connections (following DIN 16765-A)

16-Pole Thermocouple



Zone	PIN
1	1 + / 9 -
2	2 + / 10 -
3	3 + / 11 -
4	4 + / 12 -
5	5 + / 13 -
6	6 + / 14 -
Ground connect to housing	

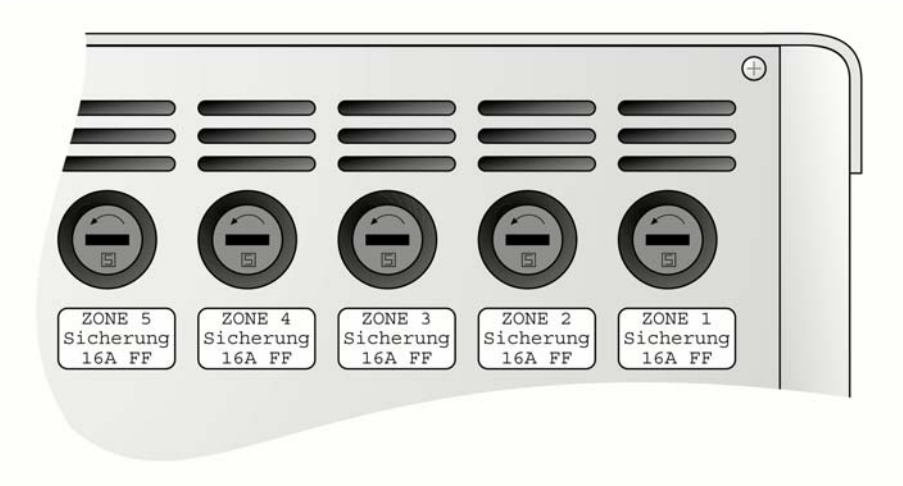
32-Pole Thermocouple



Zone	PIN
1, 13, 25	1 + / 9 -
2, 14, 26	2 + / 10 -
3, 15, 27	3 + / 11 -
4, 16, 28	4 + / 12 -
5, 17, 29	5 + / 13 -
6, 18, 30	6 + / 14 -
7, 19, 31	7 + / 15 -
8, 20, 32	8 + / 16 -
9, 21, 33	17 + / 25 -
10, 22, 34	18 + / 26 -
11, 23, 35	19 + / 27 -
12, 24, 36	20 + / 28 -
Ground connect to housing	

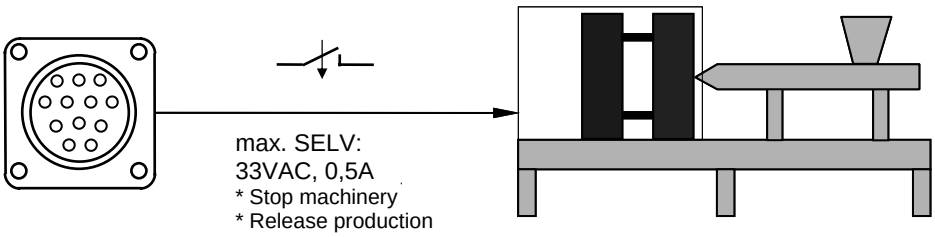
Load Fuses

The load fuses are located at the rear of the housing. Before changing withdraw the mains plug. Please replace only with similar fuses!



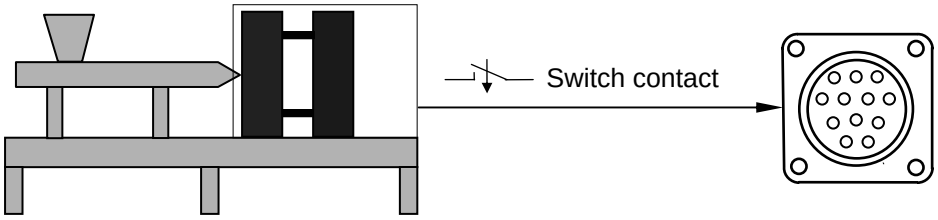
Alarm connector 12-pole

Output



PIN	Colour	Function
2	pink	Closed in case
3	grey	of alarm

Input (external standby)



PIN	Colour	Function
4	white	Standby active
5	brown	when closed

Specifications

Working conditions: To be operated only in closed rooms. Altitude max. 2000m. Relative humidity up to 80% at 30°C (86°F). Avoid moisture condensation! Pollution severity level 2.

Temperature range: Operation: 10...40°C (50…104°F) storage: 0…50°C (32…122°F)

Housing: Half-shell metal housing; protection IP20, class of protection I

2-slot:	approx. 180 x 200 x 390 mm	(WxHxD)	Weight	approx. 8 kg
6-slot:	approx. 350 x 200 x 390 mm	(WxHxD)	Weight	approx. 14 kg
10-slot:	approx. 550 x 200 x 390 mm	(WxHxD)	Weight	approx. 20 kg
16-slot:	approx. 460 x 330 x 390 mm	(WxHxD)	Weight	approx. 32 kg
24-slot:	approx. 460 x 460 x 390 mm	(WxHxD)	Weight	approx. 40 kg
32-slot:	approx. 570 x 730 x 450 mm	(WxHxD)	Weight	approx. 48 kg

Connection: Load and Thermocouple separate,
4-, 16-, 24-, 32-pole (depending on number of control zones; pinning see “Connections“)

Power supply: 4-conductor three-phase system 230 / 400VAC +/- 10%, 50 / 60 Hz, Overvoltage class II, CEE connector (other Supplies on request)

Connected load: 2-slot: max. 16 A per phase
6-slots or more: max. 32 A per phase

Slide-in controller: European standard size p.c.b. 160x100 mm, with 16 A power output

Thermocouple: Fe-CuNi, type J or L (DIN 43714)

Power output: Contactless semiconductor output stage, max. 16 A, zero switching

Control range: 50 ... 500°C (122…932°F)

Control accuracy: Better 1°C (if hotrunner permits)