



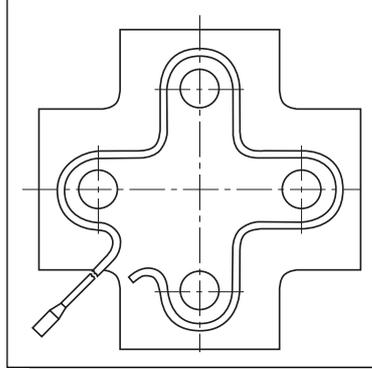
# Heating Elements for the Plastic Processing Industry



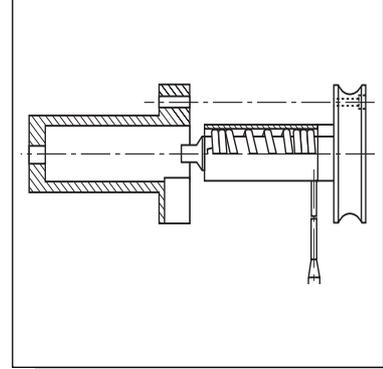
# Heating Elements for the Plastic Processing Industry



**WRP — Coil Heaters**  
(see page 8)



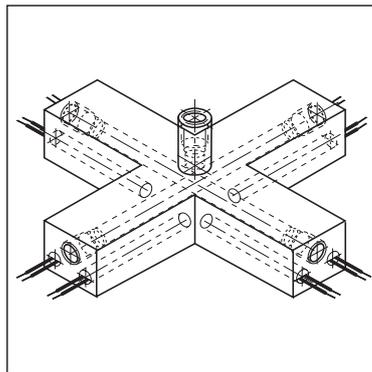
**Hot runner systems**  
WRP — Heating of manifolds



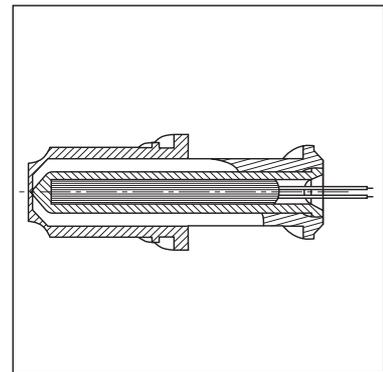
**Hot runner systems**  
WRP — Heating of hot runner nozzles



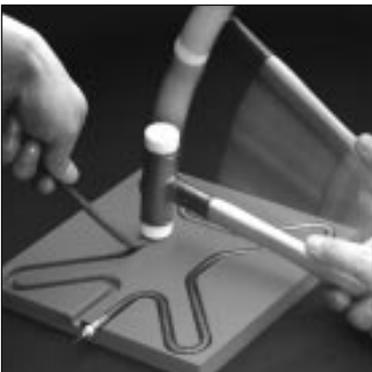
**HHP — High Watt Density Cartridge Heaters**  
(see page 9)



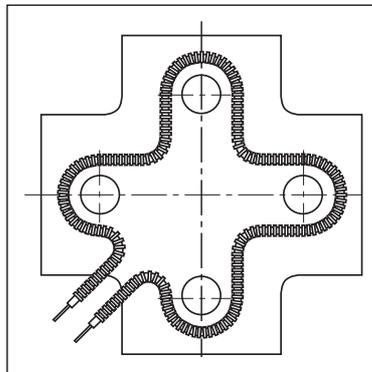
**Hot runner systems**  
HHP — Heating of manifolds



**Injection moulding**  
HHP — Inside heating of nozzles



**hotflex® — Flexible tubular heater**  
(see page 10)



**Hot runner systems**  
hotflex® — Heating of manifolds

# Heating Elements for the Plastic Processing Industry

hotset-heating elements have been used successfully for many years for solving industrial heating problems in the plastic processing industry.

For example the heating of hot runner nozzles with Coil Heaters (type WRP) or High Watt Density Cartridge Heaters (type HHP) or the heating of manifolds with the flexible tubular heater "hotflex®".

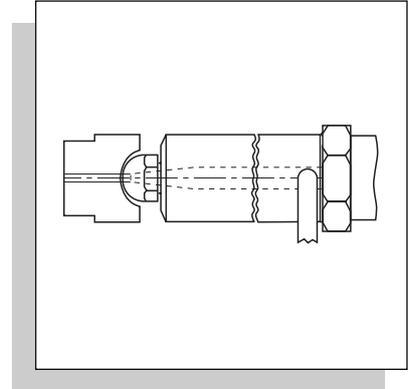
For the heating of injection moulding nozzles, hotset offers some more heating variants: on the one hand the Nozzle Heater Maxi (type DBM) and on the other hand the Heated Machine Nozzle (type BMD), which both offer increased customer advantages. The BMD is a completely sealed system, which offers the best possible protection for the actual heating element, the thermocouple and the connections against damages coming from the ingress of material. This leads to a high production security which - combined with a uniform temperature level along the total length of the flow channel and a decisive shortening of the sprue bar - enables the user to get a technically and economical optimal production at a high quality level.

Thus, the wide range of the hotset-heating elements offers application-oriented solutions for nearly all heating variants in the plastic processing industry. Technology which you can rely on in everyday use.

hotset — a good feeling!



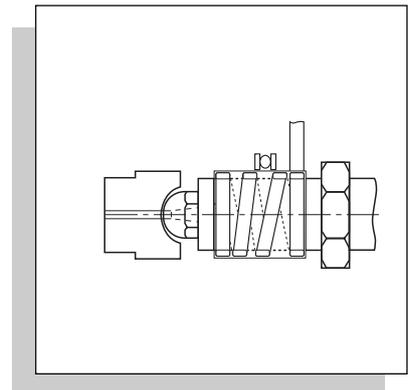
**BMD — Heated Machine Nozzle**  
(see page 4 ff.)



**Injection moulding**  
BMD — Heated Machine Nozzle



**DBM — Nozzle Heater Maxi**  
(see page 7)



**Injection moulding**  
DBM — Heating of machine nozzles

## BMD — Heated Machine Nozzle

### **BMD — A completely sealed system with high production security:**

A hermetically welded tube protects the actual heating element against damages which may occur through ingress of material or when cleaning the nozzle. Thus, this completely sealed system reduces down times and guarantees a long-lasting production security.

### **BMD — A machine nozzle with uniform temperature level:**

Due to the application-oriented wattage distribution of the integral heating element, the BMD obtains a uniform temperature level along the total length of the flow channel. The used plastic material is gently treated, the injection moulding parts attain a higher quality level.

### **BMD — Material savings due to short sprue bar:**

A deep immersion of the nozzle into the mould cavity is possible due to the small shank diameter of the BMD of only 48 mm (standard). Thus, the BMD can substitute a part of the sprue bar. Less material usage as well as a reduction of the cycle times are the result.



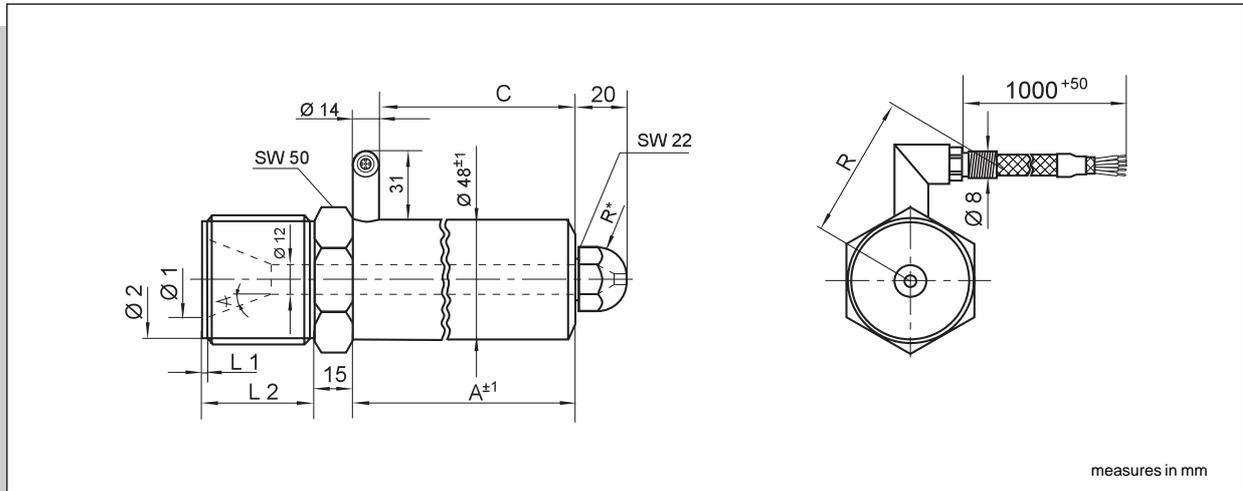
### **Standard**

- Heated Machine Nozzle with integral Coil Heater type WRP / Maxi / 4.6 x 8.6 as a completely sealed system
- with wattage distribution
- with integral thermocouple Fe-CuNi
- shank-Ø 48 mm for deep immersion into the mould cavity
- surface of the flow channel treated with nitrate for long durability
- three standard nozzle tips alternatively available (see page 6)
- connection voltage 230 V
- connection 1,000 mm teflon insulated leads with earth and braided metal sleeving
- see page 5 for measurements and technical data

### **Options**

- connection thread can be chosen (Ø max. 55 mm, length max. 45 mm)
- with insulation tube (see page 6)

## BMD — Technical Construction



### Standard measurements

- A shank length  
(see table below)
- C immersion length  
(see table below)

### Variable measurements

- L1 length of the sealed plane
- L2 thread length and dimension  
(max. 45 mm)
- $\varnothing 1$  cone diameter
- $\varnothing 2$  thread diameter  
(max. 55 mm)
- $\nabla$  flow-in angle of the flow
- $R^*$  radius of the nozzle tip  
(see page 6)
- R space for connection  
(min. 65 mm resp.  $\varnothing$  130 mm)

### Technical data

- max. temperature in the channel  
470 °C
- high voltage stability (cold)  
1250 V-AC
- insulation resistance (cold)  
 $\geq 5$  MOhm at 500 V-DC
- leakage current (cold)  
 $\leq 0.5$  mA at 253 V-AC
- wattage tolerance (cold)  
 $\pm 10\%$
- max. connection voltage  
440 V

### Stock measurements BMD:

art.-no.	type BMD	wattage (W)	A (mm)	C (mm)	+ tip (mm)	variable measurements*					thread
						L1	L2	$\varnothing 1$	$\varnothing 2$	$\nabla$	
5830137	90	250	30	~ 16	+ 20						
5830143	140	550	80	~ 66	+ 20						
5830151	190	1000	130	~ 116	+ 20						
5830253	240	1150	180	~ 166	+ 20						

other measurements on request

\* on customers' request, please state measures

## BMD — Nozzle Tips

### Only one nozzle for different materials:

Due to interchangeable nozzle tips, the BMD can be adjusted to different materials. On the one hand the nozzle tips differ from their individual form of the flow channel, on the other hand the nozzle tips are available with different contour of the flow channel.

#### type 1

- convex, with continuous conical bore
- increase of the flow speed by a slow tapering of the channel

#### type 2

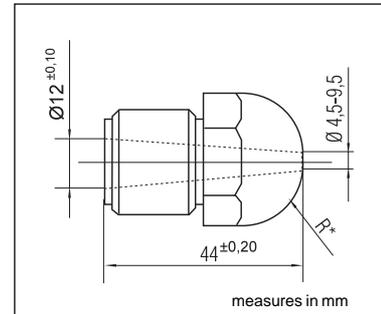
- for easy flowing materials or plastics which create filaments respectively have a defined interruption point (ABS, PA, PET, etc.)

#### type 3

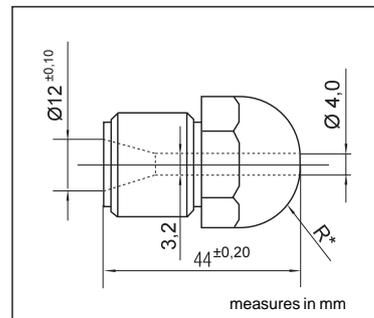
- nozzle tip for processing thermally-sensitive respectively hard flowing plastics (POM, PVC-hard, PPO, PPS, etc.)

### General information about the nozzle tips:

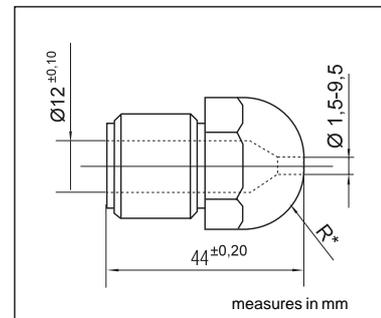
- radius  $R^*$  on customers' request
- the diameter of the flow channel in the crossing area of the BMD to the nozzle tip has to be identical



type 1



type 2



type 3

## BMD — Insulation Tubes

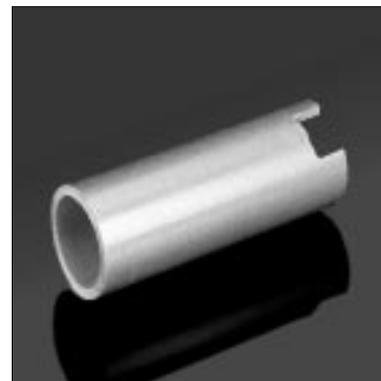
### Remarkable energy savings with insulation tube:

In the past, a high heat radiation to the outside had to be accepted when heating injection moulding tools.

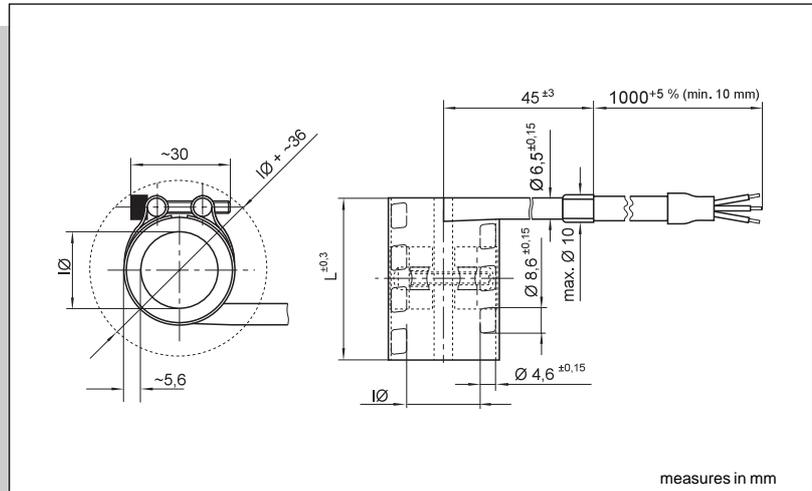
With an insulation tube which can be applied on the BMD, it is possible to reduce this heat radiation by nearly 60%. This saves energy and protects tools and machine parts from high temperatures.

The insulation tube enlarges the outside diameter of the machine nozzle by approximately 11 mm.

- insulation tube, art.-no. 36220  
outside- $\varnothing$  59 mm



## DBM — Nozzle Heater Maxi



### DBM — Economy for medium demands:

The DBM - the previous type of the BMD - offers a favourable price-performance ratio in those scopes, in which besides quality the economical aspects play an important part above all.

At comparatively high wattages, the DBM with integral thermocouple offers a uniform temperature distribution with good durability against mechanical damages.

### Standard

- Coil Heater type WRP / Maxi / 4.6 x 8.6 with clamping band
- high wattage within small dimensions
- surface load up to 10 W/cm<sup>2</sup>
- connection voltage 230 V
- connections 1,000 mm teflon insulated leads with earth and glass silk protective sleeving

### Options

- integral thermocouple (not grounded) Fe-CuNi / NiCr-Ni (type DBM / T)
- measuring point can be chosen
- connection length can be chosen (standard: 1,000 mm)
- connection option can be chosen

### Measurements

- L total length
- IØ inside diameter
- tolerances:
  - up to IØ 30 mm -0.10 / -0.30;
  - up to IØ 50 mm -0.20 / -0.40

### Stock measurements:

art.-no.	IØ (mm)	L (mm)	wattage (Watt)	exit	thermo-couple
7703021	30,0	30,0	300	rad. 45°	—
7703026	30,0	38,0	400	rad. 45°	—
7803223	32,0	30,0	350	tang.	Fe-CuNi
7803830	38,0	32,0	500	tang.	Fe-CuNi
7704027	40,0	30,0	450	rad. 45°	—
7704223	42,0	22,0	350	tang.	—
7704427	44,4	34,9	450	tang.	—
7705030	50,0	34,0	500	rad. 45°	—
7705023	50,8	25,4	350	tang.	—

### Technical data

- max. temperature at heater sheath 750 °C
- high voltage stability (cold) 1250 V-AC
- insulation resistance (cold) ≥ 5 MOhm at 500 V-DC
- leakage current (cold) ≤ 0.5 mA at 253 V-AC
- wattage tolerance (cold) ± 10%
- max. connection voltage 440 V
- max. surface load 10 W/cm<sup>2</sup>

# WRP — Coil Heaters

(For detailed information please see **hotset**-brochure "Coil Heaters")



Especially for the plastic processing industry, **hotset** offers a wide range of Coil Heaters with different wattage data and measurements. Differentiated wattage distributions, integral thermocouples, several connection options and numerous clamping mechanisms have made the **hotset**-Coil Heaters to a steady size when solving industrial heating tasks.

**hotset**-Coil Heaters are available from stock in many saleable measurements and wattage data. Furthermore, **hotset** develops exactly that adjusted Coil Heater which you require for your individual application.

## Coil Heaters

- with flat cross sections for high efficiency due to flat surface:  
WRP / Micro / F / 1.0 x 1.6 mm;  
WRP / Mini / F / 1.3 x 2.3 mm;  
WRP / F / 2.2 x 4.2 mm;  
WRP / Maxi / 4.6 x 8.6 mm
- with square cross-section:  
WRP / Q / 3.0 x 3.0 mm
- with round cross-sections:  
WRP / Micro Ø 1.3 mm;  
WRP / Mini Ø 1.8 mm;  
WRP Ø 3.3 mm;  
WRP Ø 3.8 mm
- delivered straight and bendable or coiled according to specifications
- with user-specific wattage distribution
- with integral thermocouple
- with clamping band, screwing or other fixing possibilities
- casted in brass



**hotset**-Coil Heaters with numerous fixing possibilities



The smallest Coil Heater from **hotset**:  
WRP / Micro Ø 1.3 mm



The largest Coil Heater from **hotset**:  
WRP / Maxi / 4.6 x 8.6 mm

# HHP — High Watt Density Cartridge Heaters

(For detailed information please see **hotset**-brochure "Cartridge Heaters")

**hotset**-High Watt Density Cartridge Heaters are offered from stock in ten different diameters (mm / inch), in a variety of lengths and wattages. There are three different variants of standard connection options to choose from. User-specific wattage distribution, integral thermocouples, numerous connection options and an extensive accessory range make it possible to adjust **hotset**-High Watt Density Cartridge Heaters individually to almost any application — up to a completely new development together with the customer.

## High Watt Density Cartridge Heaters

- in many different standard measurements from Ø 3.1 mm (1/8") up to Ø 25.4 mm (1"), numerous of them directly available from stock
- length up to 3,000 mm, depending on diameter and type
- diverse connection options
- with integral thermocouple
- numerous options proved to VDE 0700, part 1 available
- with heat conductive copper bottom or with copper tip
- with application-oriented wattage distribution
- with several heat zones which can be controlled separately
- with external cooling



High Watt Density Cartridge Heaters: with integral wattage distribution adjusted to individual specifications

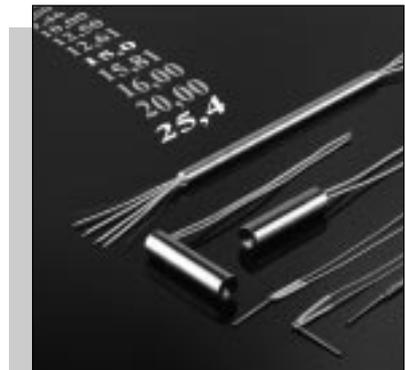
## High Watt Density Cartridge Heaters: diameters available

metric Ø (\*= stock heaters)

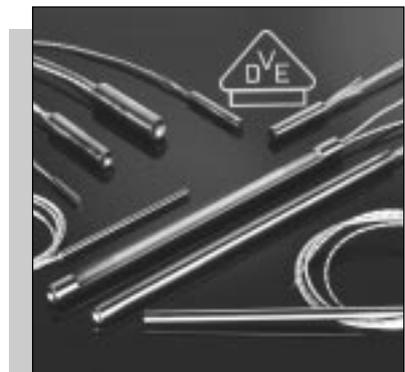
4.0	6.0	*6.5	*8.0	*10.0	11.0	12.0	*12.5	12.7	15.0	*16.0	19.0	*20.0
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inch-Ø (\*= stock heaters)

1/8"	*1/4"	*3/8"	*1/2"	*5/8"	3/4"	1"
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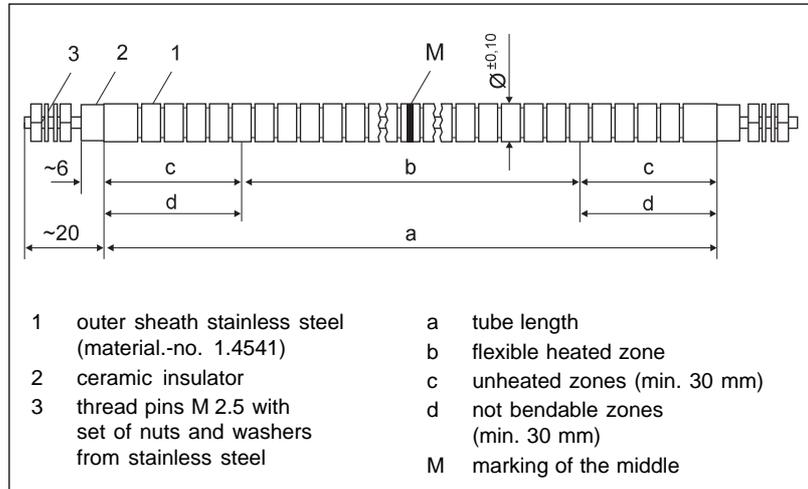
High Watt Density Cartridge Heaters: 20 different diameters available, 10 from them directly from stock



High Watt Density Cartridge Heaters: numerous options proved to VDE 0700, part 1

# hotflex® — Flexible Tubular Heater

(For detailed information please see hotset-brochure "hotflex®")



The hotflex® from hotset was especially designed for heating of manifolds in hot runner systems. Delivered straight, this flexible tubular heater can be bent manual with a plastic hammer to nearly each form into an existing slot. For a good fit a cover plate (preferable a heat insulation plate) is necessary.

This easy handling means a high flexibility in purchasing, stock-keeping and installation for the user:

- easy installation, high fit, short preparation times
- time saving due to easy purchasing and short delivery times (delivery of more than 20 types direct from stock)
- reduction of the costs due to low stock-keeping at high security in operation
- long-lasting application possibilities also at tool modifications or production changes
- wide range of applications due to sensible wattage data, high durability, excellent resistance also in alkaline media

The hotflex® was patented as a new development from the DBPA.

## Standard

- Ø 8.5 mm (± 0.10 mm)
- length and wattage acc. to right table
- voltage: 230 V
- connection option (3) thread pins M 2.5 with set of nuts and washers from stainless steel
- unheated zones (c) min. 30/30 mm
- not bendable zones (d) min. 30/30 mm

## Options

- Ø 8.0 or 8.2 mm
- other length and wattage
- narrow down of the wattage tolerance possible
- other connection voltage
- other connection option
- lengthening of unheated zones

## Stock measurements hotflex® Ø 8.5 mm\*

length* (a)	wattage* (alternatively)	
300 mm	650 W	---
350 mm	750 W	---
400 mm	900 W	---
450 mm	1.050 W	---
500 mm	1.150 W	700 W
550 mm	1.300 W	780 W
600 mm	1.450 W	860 W
650 mm	1.600 W	950 W
700 mm	1.750 W	1.000 W
750 mm	1.900 W	1.100 W
800 mm	2.050 W	1.190 W
850 mm	2.200 W	1.250 W
900 mm	2.350 W	1.350 W
950 mm	2.500 W	1.430 W
1.000 mm	2.650 W	1.500 W
1.050 mm	2.800 W	1.590 W
1.100 mm	2.930 W	1.650 W
1.150 mm	3.060 W	1.750 W
1.200 mm	3.190 W	1.830 W
1.250 mm	3.320 W	1.900 W
1.300 mm	3.450 W	1.990 W
1.350 mm	3.580 W	2.070 W
1.400 mm	3.710 W	2.150 W
1.450 mm	3.840 W	2.230 W
1.500 mm	3.970 W	2.300 W

\*) diameter 8.5 mm (± 0.10 mm);  
 length in mm (± 1.5%);  
 wattage in watt (± 10%) at 230 V.

## TEF / PWF — Thermocouples and Resistance Sensors

(For detailed information please see hotset-brochure "Service and Accessory")

### Thermocouples and resistance sensors

- thermocouples Fe-CuNi or NiCr-Ni to DIN 43710 or IEC 584, resistance sensors to DIN IEC 751 (PT 100, 2 x PT 100 or 2 x PT 50)
- as a sheath thermocouple, point or surface sensor
- in standardized designs or to customers' request according to drawing or sample
- very accurate measurement at high mechanical durability



## RR — Temperature Controllers

(For detailed information please see hotset-brochures "Temperature Controllers")

The user-specific temperature control of industrial heating tasks requires temperature controllers, which are adjusted to the individual application considering technical and economical perspectives. Therefore hotset offers different types of micro-processor controllers, which differ from their characteristics:

### Series RR 211 / 221 / 231

### Series RR 212 / 222 / 232

- built-in devices for standard control tasks with the sensor types Fe-CuNi, NiCr-Ni or PT 100 or for complex control tasks with nearly all common sensor types

### Series RR 411 / 412

- table devices based on the controllers type RR 211 and RR 212

### Multiple Controller

- with 3 or 6 control circles based on the controller type RR 221 und RR 222

### Multiple Zones Controller Series RR 500

- uniform, user-friendly handling of 8 up to 32 control zones (with PC-control up to 256 control zones at a high function range)
- adaptive self-optimizing control action



hotset-Temperature controllers: built-in devices series RR 211 ff.



hotset-Temperature controllers: table devices series RR 411 ff.



hotset-Temperature controllers: Multiple Controller



hotset-Temperature controllers: Multiple Zones Controller series RR 500 ff.

hotset — in Germany and 30 other countries all over the world:



- |                  |               |                |
|------------------|---------------|----------------|
| ● Argentina      | ● India       | ● Singapore    |
| ● Australia      | ● Israel      | ● South Africa |
| ● Austria        | ● Italy       | ● Spain        |
| ● Belgium        | ● Japan       | ● Sweden       |
| ● Brazil         | ● Korea       | ● Switzerland  |
| ● Czech Republic | ● Netherlands | ● Taiwan       |
| ● Denmark        | ● New Zealand | ● Turkey       |
| ● Finland        | ● Poland      | ● USA          |
| ● France         | ● Philippines |                |
| ● Great Britain  | ● Portugal    |                |
| ● Greece         |               |                |
| ● Hongkong       |               |                |