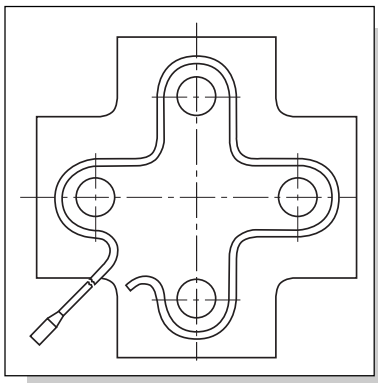
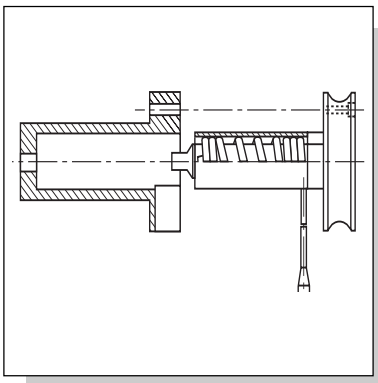
Coil Heaters
type WRP

Content

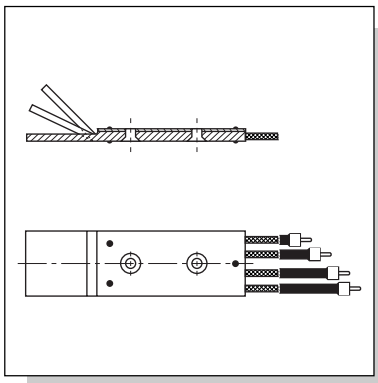
Application Examples



Hot runner systems
WRP — Heating of manifolds



Hot runner systems
WRP — Heating of hot runner nozzles



Packaging industry
WRP — Heating of heat sockets

General Information

Whether for the plastic processing or the packaging industry, for mechanical engineering, the chemical industry or in medical devices — Coil Heaters are nearly irreplaceable for these and many other applications. Everywhere, where a precisely controlled and exactly managed heating wattage is needed, the Coil Heater (type WRP) offers a mature solution with far reaching possibilities to suit individual requirements.

hotset can look back on years of experience in the development and manufacturing of powerful Coil Heaters. Capability as a basis for innovative products, which stand out due to their high manufacturing quality, an over average durability, extremely high loading capacity and a great flexibility.

hotset-Coil Heaters can be delivered from stock in many different measurements and wattage data to cover most applications. All heaters are earthed as standard. The length of the leads as well as their protection (e.g. braided metal) against mechanical damages are added according to customers' requirements.

hotset-Coil Heaters without reflection tube are manufactured with a minus tolerance of the inside diameter as a matter of fact.

With individual customer requirements very much in mind, the **hotset**-Coil Heaters stand out due to the wide range of further options:

- voltage and wattage according to application
- choice of lengths of the heated resp. unheated zones at a maximum total length of 3000 mm
- delivery straight and bendable or coiled to specifications (considering the possible bending radius)
- additional covering with clamping band or reflection tube
- casted in brass, also with additionally integral cooling**
- delivery with integral thermocouple (except WRP / Mini)*

* At Coil Heaters with integral thermocouple, the unheated zone of approx. 12 mm at the bottom is used for placing the thermocouple (standard). At low operation temperatures this type of temperature measuring has been proved as the most reliable. At a higher operation temperature the last winding with the integral thermocouple will be lifted up due to the heat expansion and the thermocouple will then indicate only the temperature of the heater. Therefore it is recommended to use a separated sensor e.g. the sheath surface thermocouple MT 1,5.

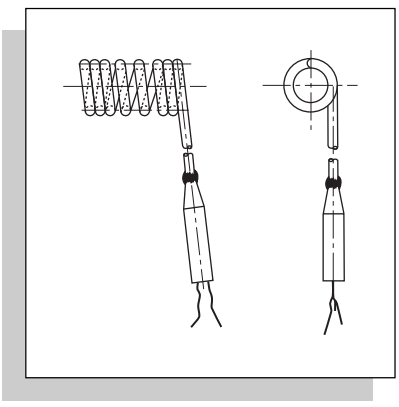
Optionally the **hotset**-Coil Heaters (except WRP / Mini) offer the possibility to place the measuring point of the thermocouple insulated from the sheath in any area of the heated zone.

** When manufacturing the Coil Heaters casted in brass, there is the optional possibility of an integral cooling to achieve temperature tolerances under 5 °C at the medium which is to be heated. The present applications are the processing of duroplastics and the control of expansion bolts. The integral cooling tube is manufactured from stainless steel, it is placed beneath the heating element.

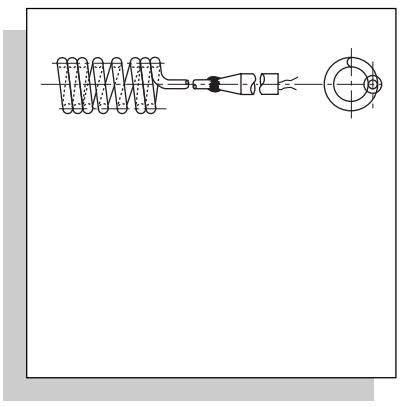
Safety instructions:

- Heating elements with a not grounded thermocouple (insulated from heater sheath) have to be earthed at the input side of the temperature controller by the customer himself.
- The length of the connection head add. 5 mm of the unheated zone is not bendable.
- The minimum bending radius has to be considered.
- Heaters which have been formed once must not be formed again.
- The head of the heater must not be touched.
- Temperature on tool must be below the corrosion temperature with heaters that are manufactured with current return via heater sheath, this ensures a smooth current transfer. The corresponding connection (welded, soldered) must be provided if this is not possible.

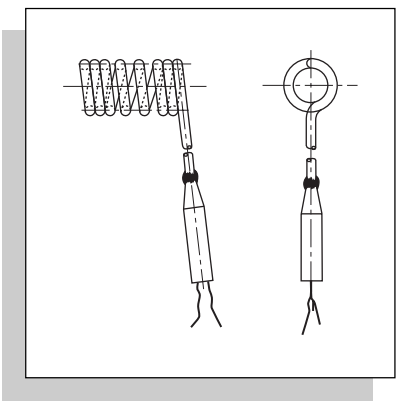
Exits



Tangential exit

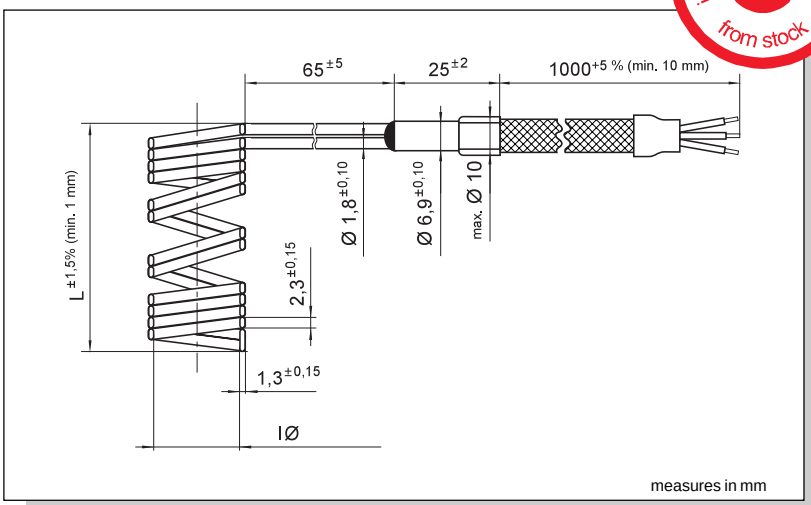


Axial exit



Radial exit

WRP / Mini / F / 1.3 x 2.3



Standard details for stock heaters

- Coil Heater with flat cross-section 1.3 x 2.3 mm
- for inside diameter, coiled length and wattage see table
- voltage: 230 V
- exit axial, radial or tangential (see page 3)
- unheated zone: 65 mm
- common connection head: 25 mm
- connection option: 1000 mm teflon insulated leads, earth and glass silk protective sleeving

Options

- with or without thermocouple (e.g. wrapped up) available
- with or without reflection tube available
- other types on request considering the technical data (see page 14ff.)

Order details

WRP / Mini / F / 1.3 x 2.3

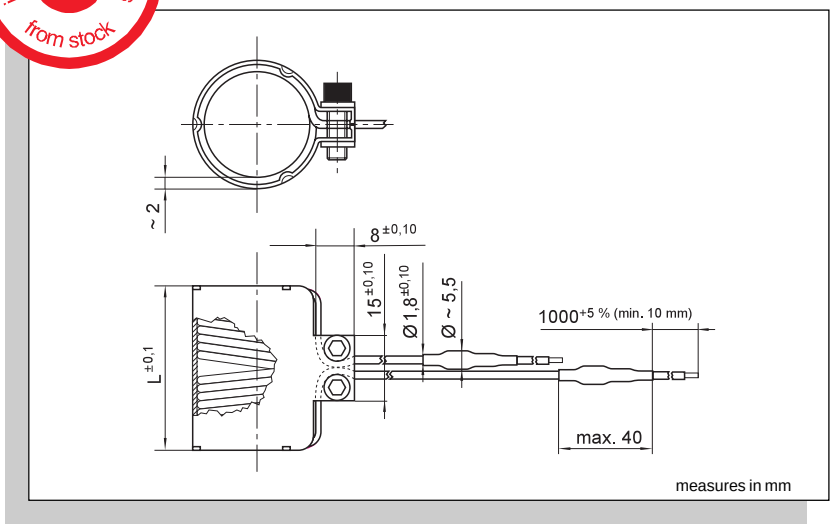
+ inside-Ø: .....
+ coiled length: .....
+ wattage: .....
+ voltage: .....
+ exit: .....
+ connection length: .....
+ thermocouple: .....
+ reflection tube: .....
+ number of pieces: .....

Stock heaters

inside-Ø in mm	inside-Ø in inch	coiled length L in mm					
		30-40	30-50	40-60	40-70	60-80	
8,0		120		160		250	
10,0		140		200		300	
12,0		160		230		350	
16,0			210		300		
19,0	3/4"		250		450		
		wattage in watt at 230 V					

WRP / Mini / F / 1.3 x 2.3

with clamping band with tangential screwing



Stock heaters

for nozzle-Ø in mm	for nozzle-Ø in inch	length of clamping band L in mm					
		25.4	30.5				
19,05	3/4"	*125	125				
19,05	3/4"	250	250				
22,20	7/8"		125				
22,20	7/8"		250				
		wattage in watt at 230 V					

Standard details for stock heaters

- Coil Heater with flat cross-section 1.3 x 2.3 mm with clamping band with tangential screwing
- for corresponding nozzle diameter, length of clamping band and wattage see table
- voltage: 230 V
- unheated zones: ca. 130/180 mm (* ca. 25/75 mm, see table)
- separated connection heads
- connection option: 1000 mm teflon insulated leads
- code data imprinted

Options

- other types on request considering the technical data (see page 14ff.)

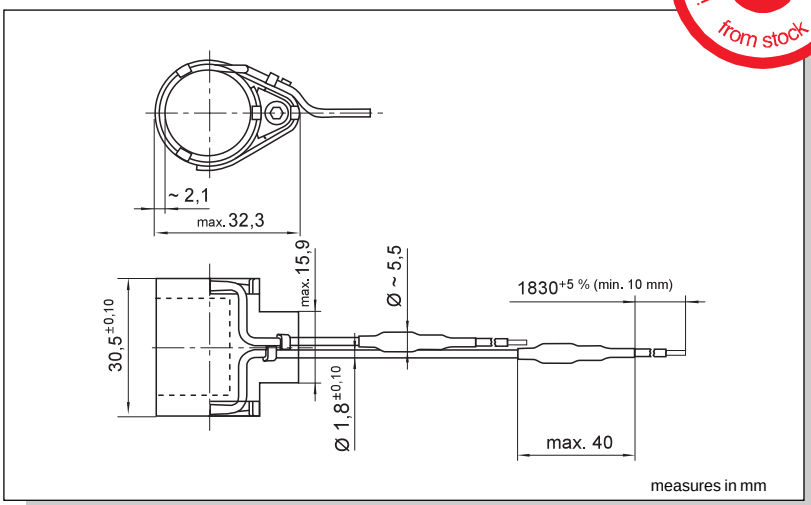
Order details

WRP / Mini / F / 1.3 x 2.3
with tangential screwing

+ for nozzle-Ø: .....
+ length of clamping band: .....
+ wattage: .....
+ voltage: .....
+ unheated zones: .....
+ number of pieces: .....

WRP / Mini / F / 1.3 x 2.3

with clamping band with axial screwing



Standard details for stock heaters

- Coil Heater with flat cross-section 1.3 x 2.3 mm with clamping band with axial screwing
- for corresponding nozzle diameter, length of clamping band, wattage and voltage see table
- voltage: 230 V / 240 V (see tables)
- unheated zones: ca. 130/180 mm
- separated connection heads
- connection option: 1830 mm teflon insulated leads

Options

- other types on request considering the technical data (see page 14ff.)

Order details

WRP / Mini / F / 1.3 x 2.3
with axial screwing

+ for nozzle-Ø: .....
+ length of clamping band: .....
+ wattage: .....
+ voltage: .....
+ unheated zones: .....
+ number of pieces: .....

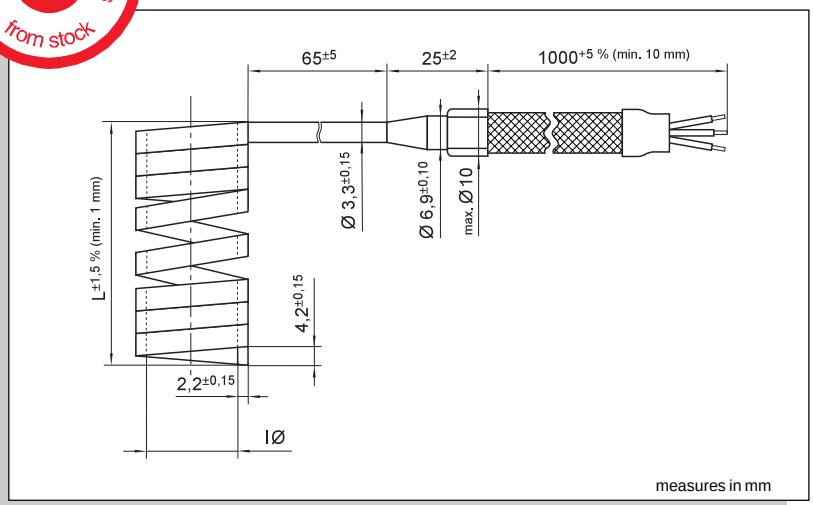
Stock heaters

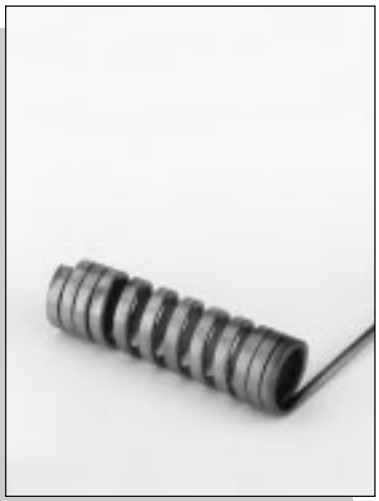
for nozzle-Ø in mm	for nozzle-Ø in inch	length of clamping band in mm					
		30.5					
19,05	3/4"	149					
19,05	3/4"	268					
		wattage in watt at 240 V					

Standard heaters

for nozzle-Ø in mm	for nozzle-Ø in inch	length of clamping band in mm					
		30.5					
22,20	7/8"	125					
22,20	7/8"	250					
		wattage in watt at 230 V					

WRP / F / 2.2 x 4.2





Stock heaters (straight) with and without thermocouple (Fe-CuNi)

total length (mm)	340	370	425	475	550	610	690	850	990
heated length (mm)	250	280	335	385	460	520	600	760	900
wattage (watt)	195	215	240	295	350	400	460	610	690

Measurements which can be produced from stock heaters

inside-Ø		coiled length L in mm									
mm	inch	20	40	60	80	100	120	140	160	180	200
10,0			195	240	350	350	350	400	460	460	610
12,0			215	295	400	400	400	460	610	610	610
12,5	1/2"		215	295	400	400	400	460	610	610	690
14,0			240	350	400	400	460	610	610	690	690
15,0			240	400	460	460	610	610	610	690	
16,0	5/8"		240	400	460	460	610	610	690	690	
18,0			295	400	610	610	610	690	690		
19,0	3/4"		295	400	610	610	610	690			
20,0			295	460	610	610	690	690			
22,0	7/8"	195	350	610	690	690	690				
24,0		195	400	610	690	690					
25,0	1"	215	400	610	690	690					
28,0		215	460	690							
30,0		240	460	690							
32,0	1 1/4"	240	460	690							
35,0		295	610								
38,0	1 1/2"	295	610								
40,0		295	610								
42,0		350	610								
45,0		350	690								
48,0		400	690								
50,0	2"	400	690								
		wattage in watt at 230 V									

Standard details for stock heaters

- Coil Heater with flat cross-section 2.2 x 4.2 mm
- for total length, heated length, inside diameter, coiled length and wattage see tables
- voltage: 230 V
- exit axial, radial or tangential (see page 3)
- unheated zone: 65 mm
- connection head: 25 mm
- connection option: 1000 mm teflon insulated leads, earth and glass silk protective sleeving

Options

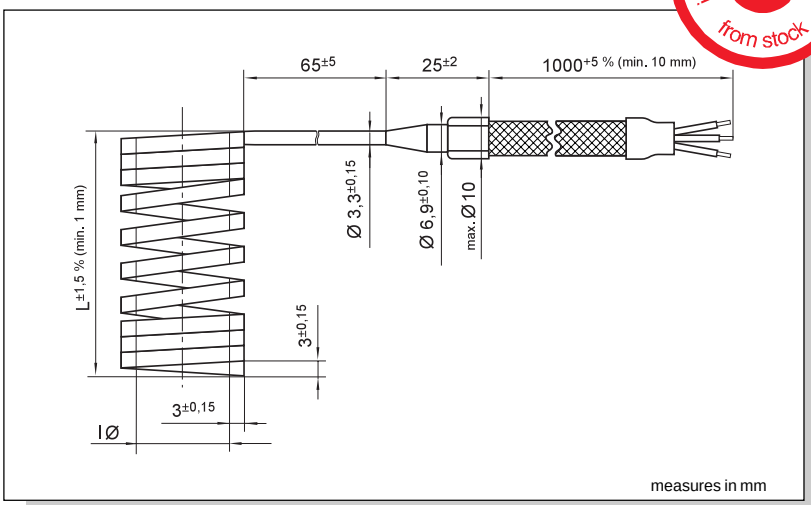
- with or without thermocouple (grounded or not grounded) Fe-CuNi or NiCr-Ni available
- with or without reflection tube available
- other connection options (see page 13)
- other types on request considering the technical data (see page 14ff.)

Order details

WRP / F / 2.2 x 4.2

+ inside-Ø: .....
+ coiled length: .....
+ wattage: .....
+ voltage: .....
+ exit: .....
+ connection length: .....
+ thermocouple: .....
+ number of pieces: .....

WRP / Q / 3.0 x 3.0



Standard details for stock heaters

- Coil Heater with square cross-section 3.0 x 3.0 mm
- for total length, heated length, inside diameter, coiled length and wattage see tables
- voltage: 230 V
- exit axial, radial or tangential (see page 3)
- unheated zone: 65 mm
- connection head: 25 mm
- connection option: 1000 mm teflon insulated leads, earth and glass silk protective sleeving

Options

- with or without thermocouple (grounded or not grounded) Fe-CuNi or NiCr-Ni available
- with or without reflection tube available
- other connection options (see page 13)
- other types on request considering the technical data (see page 14ff.)

Order details

WRP / Q / 3.0 x 3.0

+ inside-Ø: .....
+ coiled length: .....
+ wattage: .....
+ voltage: .....
+ exit: .....
+ connection length: .....
+ thermocouple: .....
+ number of pieces: .....

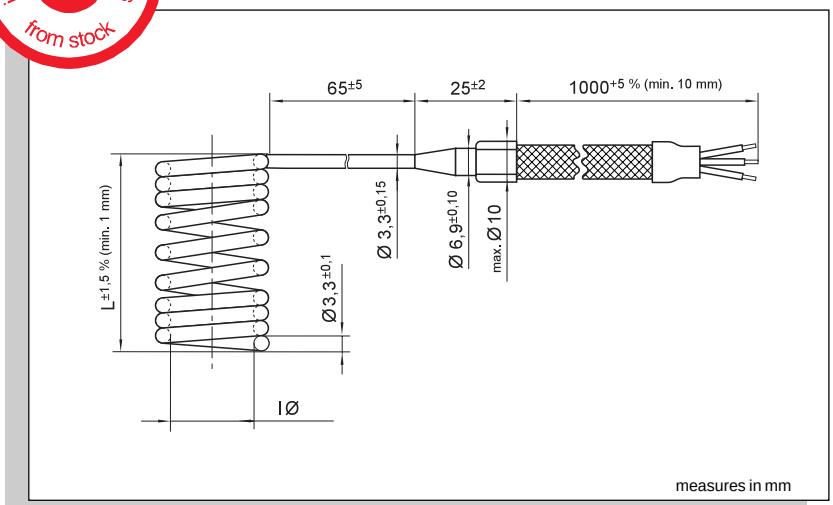
Stock heaters (straight) with and without thermocouple (Fe-CuNi)

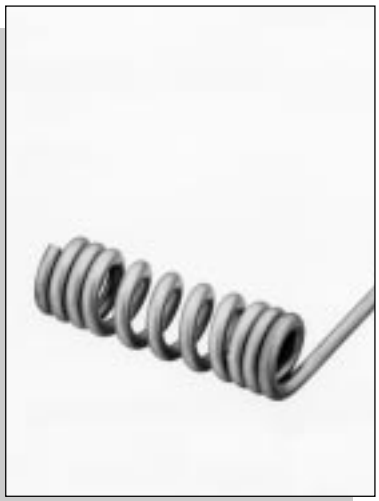
total length (mm)	390	540	740	940	1140				
heated length (mm)	300	450	650	850	1050				
wattage (watt)	215	325	470	610	630				

Measurements which can be produced from stock heaters

inside-Ø		coiled length L in mm									
mm	inch	20	40	60	80	100	120	140	160	180	200
10,0			215	325	325	325	470	470	610	610	630
12,0			215	325	470	470	470	610	610	630	630
12,5	1/2"		215	325	470	470	470	610	610	630	
14,0			215	470	470	470	610	610	630		
15,0			325	470	610	610	610	630	630		
16,0	5/8"		325	470	610	610	610	630	630		
18,0		215	325	610	610	610	630				
19,0	3/4"	215	325	610	630	630	630				
20,0		215	325	610	630	630	630				
22,0	7/8"	215	325	610	630	630					
24,0		215	470	630							
25,0	1"	215	470	630							
28,0		325	470	630							
30,0		325	470								
32,0	1 1/4"	325	470								
35,0		325	610								
38,0	1 1/2"	325	610								
40,0		325	630								
42,0		470	630								
45,0		470	630								
48,0		470									
50,0	2"	470									
		wattage in watt at 230 V									

WRP Ø 3.3





Stock heaters (straight) with and without thermocouple (Fe-CuNi)

total length (mm)	390	540	740	940	1140				
heated length (mm)	300	450	650	850	1050				
wattage (watt)	180	270	390	500	630				

Measurements which can be produced from stock heaters

inside-Ø		coiled length L in mm									
mm	inch	20	40	60	80	100	120	140	160	180	200
10,0			180	270	390	390	500	500	500	630	630
12,0			180	270	390	390	500	500	630		630
12,5	1/2"		180	270	390	500	500	500	630		630
14,0			270	390	390	500	500	630			630
15,0			270	390	500	500	630				630
16,0	5/8"		270	390	500	500	630				630
18,0			270	390	500	630					
19,0	3/4"		270	390	500	630					
20,0			270	390	500	630					
22,0	7/8"	180	390	500	630						
24,0		185	390	500	630						
25,0	1"	185	390	630	630						
28,0		185	390	630							
30,0		185	500	630							
32,0	1 1/4"	185	500	630							
35,0		185	500								
38,0	1 1/2"	270	500								
40,0		270	630								
42,0		270	630								
45,0		270	630								
48,0		390									
50,0	2"	390									
		wattage in watt at 230 V									

Standard details for stock heaters

- Coil Heater with round cross-section Ø 3.3 mm
- for total length, heated length, inside diameter, coiled length and wattage see tables
- voltage: 230 V
- exit axial, radial or tangential (see page 3)
- unheated zone: 65 mm
- connection head: 25 mm
- connection option: 1000 mm teflon insulated leads, earth and glass silk protective sleeving

Options

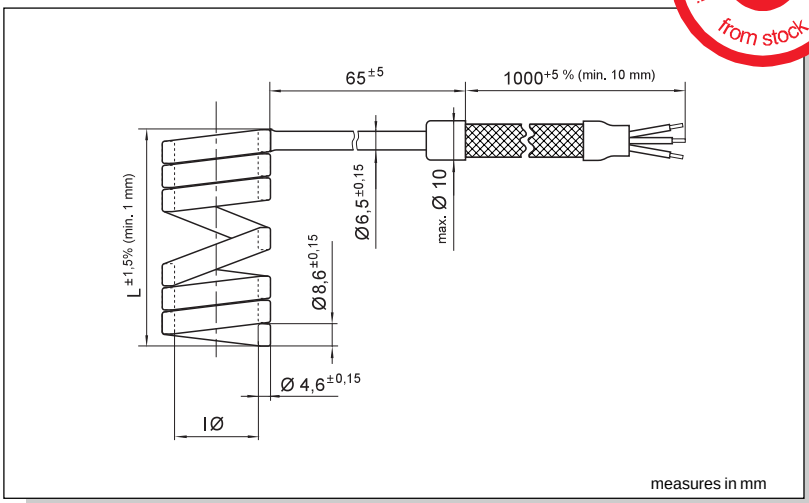
- with or without thermocouple (grounded or not grounded) Fe-CuNi or NiCr-Ni available
- with or without reflection tube available
- other connection options (see page 13)
- other types on request considering the technical data (see page 14ff.)

Order details

WRP Ø 3.3

+ inside-Ø: .....
+ coiled length: .....
+ wattage: .....
+ voltage: .....
+ exit: .....
+ connection length: .....
+ thermocouple: .....
+ number of pieces: .....

WRP / Maxi / 4.6 x 8.6



Standard details for stock heaters

- Coil Heater with flat cross-section 4.6 x 8.6 mm
- for total length, heated length, inside diameter, coiled length and wattage see tables
- voltage: 230 V
- exit axial, radial or tangential (see page 3)
- unheated zone: 65 mm
- connection option: 1000 mm teflon insulated leads, earth and glass silk protective sleeving

Options

- with or without thermocouple (Fe-CuNi or NiCr-Ni) available
- with or without reflection tube available
- other types on request considering the technical data (see page 14ff.)

Order details

WRP / Maxi / 4.6 x 8.6

+ inside-Ø: .....
+ coiled length: .....
+ wattage: .....
+ voltage: .....
+ exit: .....
+ connection length: .....
+ thermocouple: .....
+ number of pieces: .....

Stock heaters (straight) with and without thermocouple (Fe-CuNi)

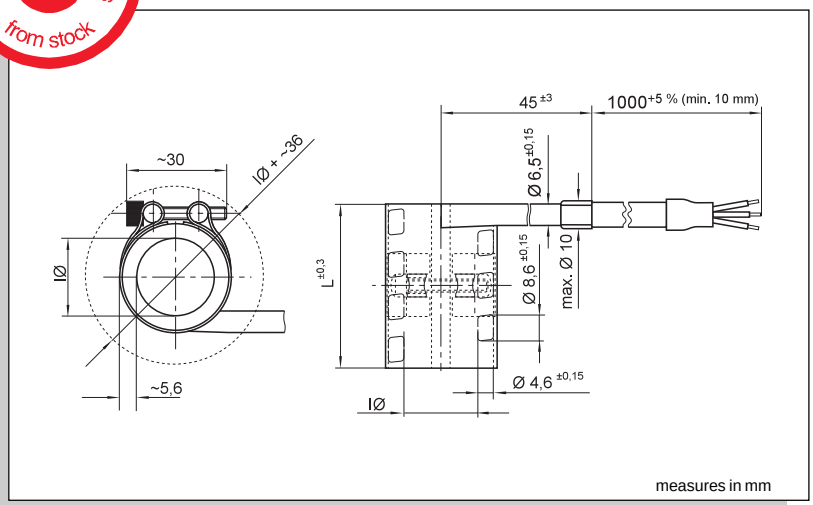
total length (mm)	315	415	515	715	915				
heated length (mm)	250	350	450	650	850				
wattage (watt)	300	450	550	800	1000				

Measurements which can be produced from stock heaters

inside-Ø in mm	coiled length L in mm								
	20	40	60	80	100	120	140	160	
20	300	450	550	550	800	800	800		
22	300	450	550	800	800	800	800		
24	300	550	550	800	800	800	1000		
26	300	550	550	800	1000	1000	1000		
28 / 30	450	550	550	800	1000	1000	1000		
32	450	550	800	1000	1000	1000			
34	450	800	800	1000	1000				
36	450	800	800	1000					
38 / 40	550	800	800	1000					
42 / 44 / 46	550	1000	1000						
48 / 50 / 52	550	1000	1000						
54	550								
56 / 58 / 60	800								
62 / 64	300	800	1000						
66 / 68 / 70	300	800							
72 / 74	300	800							
76 / 78 / 80	300	1000							
82 / 84 / 86	300	1000							
88 / 90 / 92	450	1000							
94 / 96 / 98	450	1000							
100	450	1000							
	wattage in watt at 230 V								

WRP / Maxi / 4.6 x 8.6

with clamping band



Stock heaters (* with thermocouple Fe-CuNi)

inside-Ø mm	inside-Ø inch	length of clamping band L in mm 22.0	25.4	30.0	32.0	34.0	34.9	38.0	exit
30,0				300				400	rad. 45°
32,0				*350					tang.
38,0					*500				tang.
40,0				450					rad. 45°
42,0		350							tang.
44,4	1 3/4"						450		tang.
50,0						500			rad. 45°
50,8	2"		350						tang.
		wattage in watt at 230 V							

Standard details for stock heaters

- Coil Heater with flat cross-section 4.6 x 8.6 mm with clamping band
- for inside diameter, length of clamping band and wattage see table
- voltage: 230 V
- for exit radial or tangential (see page 3) see table
- unheated zone (a): 45 mm
- connection option: 1000 mm teflon insulated leads, earth and glass silk protective sleeving

Options

- with or without thermocouple (Fe-CuNi) available
- other types on request considering the technical data (see page 14ff.)

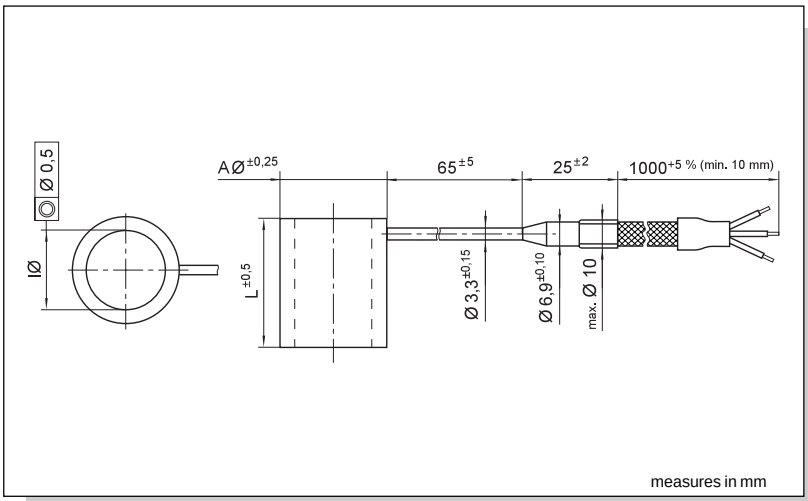
Order details

WRP / Maxi / 4.6 x 8.6
with clamping band

+ inside-Ø: .....
+ length of clamping band: .....
+ wattage: .....
+ voltage: .....
+ exit: .....
+ connection length: .....
+ thermocouple: .....
+ number of pieces: .....

WRP / M

casted in brass



WRP / M

inside-Ø in mm	max. length L in mm
10 - 11	60
12 - 15	120
16 - 18	200
19 - 21	120
22 - 26	100
27 - 36	100
37 - 41	90
43	70
46	70
53	60
58	50
59	50

Standard details WRP / M

- Coil Heater casted in brass with outer sheath of stainless steel
- for inside diameter and max. length see table left
- voltage: 230 V
- unheated zone: 65+25 mm
- connection option: 1000 mm PTFE-insulated leads, earth and glass silk protective sleeving
- wall thickness 4.5 up to 5.5 mm

Standard details WRP / Mini / M

- for corresponding nozzle diameter, length and wattage see table below
- voltage: 230 V
- unheated zones: ca. 130/180 mm (* ca. 25/75 mm, see table)
- connection option: 1000 mm PTFE-insulated leads, earth and glass silk protective sleeving
- wall thickness: 2.5 mm

Options

- WRP / M: with or without thermo-couple (grounded or not grounded) Fe-CuNi or NiCr-Ni available; WRP / Mini / M: with separate sheath surface thermocouple available
- other unheated zones (min. 25+25 mm)
- reinforcement tube covering the unheated zone as protection against bending or breaking damages

WRP / Mini / M

for nozzle-Ø in mm	for nozzle-Ø in inch	length L in mm					
		25.4	30.5				
19,05	3/4"	*125	125				
19,05	3/4"	250	250				
22,20	7/8"		125				
22,20	7/8"		250				
		wattage in watt at 230 V					

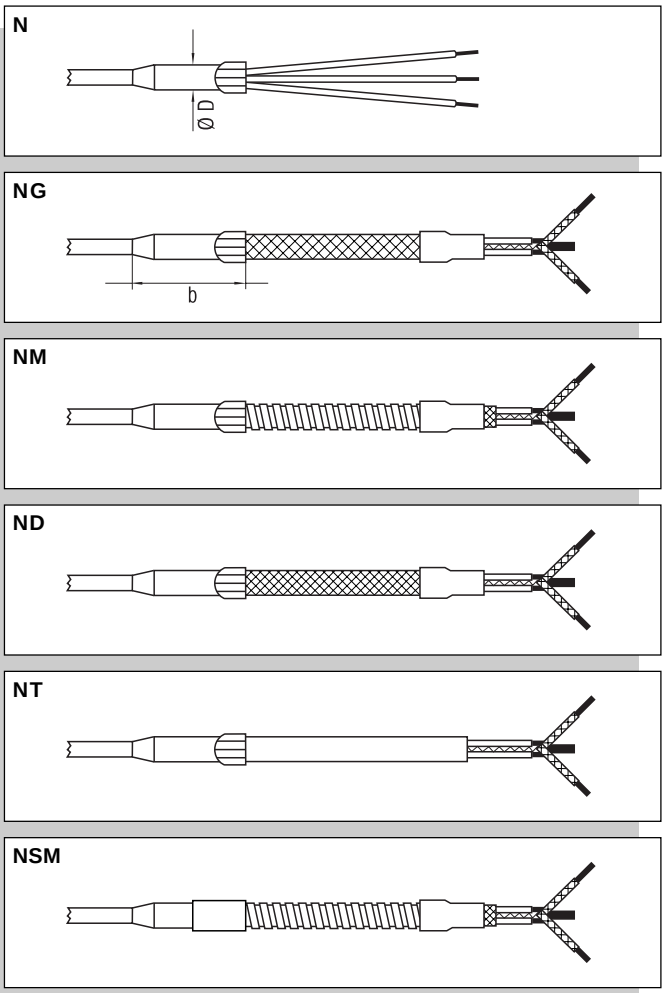
Order details

WRP / M

+ for nozzle-Ø: ..... resp. inside-Ø: .....
+ tolerance of inside-Ø: .....
+ length: .....
+ wattage: .....
+ voltage: .....
+ unheated zones: .....
+ number of pieces: .....

Connection Options

head length (b) 25 mm (standard), 20 mm or 35 mm (option); Ø (D) ~ 7 mm; maximal current at 20 °C ~ 29.7 A, at 250 °C ~ 5.6 A



AS-type N
- teflon insulated leads (standard)
- Ø fastening ring max. 10 mm
- glass silk insulated leads (option)

AS-type NG
- teflon insulated leads (standard) with glass silk insulated protective sleeving
- Ø fastening ring max. 10 mm

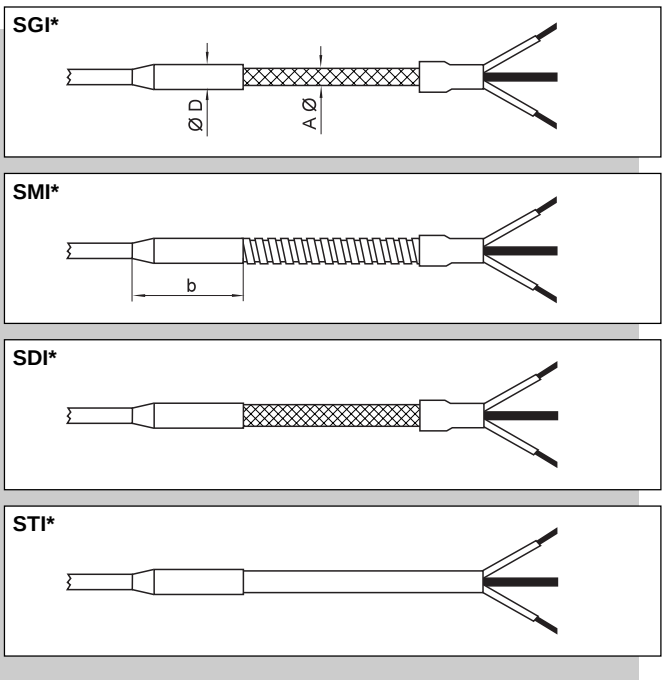
AS-type NM
- teflon insulated leads (standard) with flexible metal sleeving
- Ø fastening ring max. 10 mm

AS-type ND
- teflon insulated leads (standard) with braided metal sleeving
- Ø fastening ring max. 10 mm

AS-type NT
- teflon insulated leads (standard) with PTFE-sleeving
- Ø fastening ring max. 10 mm

AS-type NSM
- teflon insulated leads (standard) with flexible metal sleeving
- Ø fastening ring max. 8 mm

*head length (b) 35 mm; Ø (D) ~ 6,5 mm; maximal current at 20 °C ~ 4.2 A, at 250 °C ~ 0.8 A; maximal voltage 230 V; unheated zone min. 50 mm (2.2 x 4.2; 3.0 x 3.0) resp. min. 20 mm (3.3); not to be used for options with thermocouple, WRP / Mini and WRP / M



AS-type SGI*
- teflon insulated leads (standard) with glass silk insulated protective sleeving from inside
- A Ø ~ 5.5 mm

AS-type SMI*
- teflon insulated leads (standard) with flexible metal sleeving from inside
- A Ø ~ 7 mm

AS-type SDI*
- teflon insulated leads (standard) with braided metal sleeving from inside
- A Ø ~ 6 mm

AS-type STI*
- teflon insulated leads (standard) with PTFE-sleeving from inside
- A Ø ~ 5.5 mm

Technical Data

WRP / Mini: WRP / Mini / F / 1.3 x 2.3 WRP / Mini Ø 1.8 (also possible with current return via the heater sheath for low safety voltages up to 24 V) [1] only valid for options with voltage > 24 V	heater sheath	CrNi-steel or nickel
	insulation material	highly compressed MgO
	heat conductor material	NiCr 8020
	sheath temperature	max. 750 °C
	high voltage stability (cold)	800 V-AC
	insulation resistance (cold)	≥ 5 MOhm at 500 V-DC [1]
	leakage current (cold)	≤ 0.5 mA at 253 V-AC [1]
	max. total length straight	3000 mm
	min. length of the unheated zone	25 mm (shorter on request)
	length tolerance straight	± 5%
	inside diameter tolerances	without reflection tube: up to IØ 12 mm -0.05/-0.20 up to IØ 30 mm -0.10/-0.30 with reflection tube: +0.05/+0.15
	wattage tolerance (cold)	± 10% (± 2% on request)
	connection voltage	max. 250 V
	sheath surface load depending on operation temperature and heat decrease	max. 15 W/cm² at the heated heater sheath
	minimum bending radius	3 mm
	connections (standard)	see WRP (except AS-Types S..*)

WRP / Mini / F / 1.3 x 2.3 with clamping band same as WRP / Mini, but	inside diameter tolerance	to clamp to stated nozzle diameter
	sheath surface load depending on operation temperature and heat decrease	max. 10 W/cm² at the heated heater sheath

WRP / Mini / M **WRP / M** same as WRP / Mini, but	temperature at inner brass sheath	max. 650 °C
	wattage tolerance (cold)	± 10% (± 5% on request)
	wattage	max. 15 W/cm² on the surface of the inner WRP
	inside diameter tolerance	on application conditions
	outside diameter tolerance	± 0.25 mm
	coaxiality from inside-Ø to outside-Ø	◎ | Ø 0,5

WRP: WRP / F / 2.2 x 4.2 WRP / Q / 3.0 x 3.0 WRP Ø 3.3	heater sheath	CrNi-steel or nickel
	insulation material	highly compressed MgO
	heat conductor material	NiCr 8020
	sheath temperature	max. 750 °C
	high voltage stability (cold)	800 V-AC
	insulation resistance (cold)	≥ 5 MOhm at 500 V-DC
	leakage current (cold)	≤ 0.5 mA at 253 V-AC
	max. total length straight	3000 mm
	min. length of the unheated zone	2.2 x 4.2: 25 mm (with head length 25 mm) 3.0 x 3.0: 25 mm (with head length 25 mm) Ø 3.3: 10 mm

continuation next page >>

Technical Data

<< continuation of previous page **WRP:** WRP / F / 2.2 x 4.2 WRP / Q / 3.0 x 3.0 WRP Ø 3.3	length tolerance straight	2.2 x 4.2: heated zone ± 1% unheated zone ± 2.5% 3.0 x 3.0: heated zone ± 1% unheated zone ± 2.5% Ø 3.3: heated zone ± 2.5% unheated zone ± 2.5%
	inside diameter tolerances	without reflection tube: up to IØ 12 mm -0.05/-0.20 up to IØ 30 mm -0.10/-0.30 up to IØ 50 mm -0.20/-0.40 > IØ 50 mm on request with reflection tube: +0.05/+0.15
	wattage tolerance (cold)	± 10% (± 5% on request)
	connection voltage	max. 250 V
	sheath surface load depending on operation temperature and heat decrease	max. 15 W/cm²
	minimum bending radius	2.2 x 4.2: heated zone 4 mm unheated zone 3 mm 3.0 x 3.0: heated zone 3 mm unheated zone 3 mm Ø 3.3: heated zone 3 mm unheated zone 3 mm
	connections (standard)	PTFE-insulated flexible leads, continuous heat resistant up to 260 °C max. current at 20 °C = 27.9 A; at 250 °C = 5.6 A
	thermocouple	Fe-CuNi or NiCr-Ni (grounded or not grounded)

WRP / Maxi / 4.6 x 8.6	heater sheath	CrNi-steel (standard 1.4541, on request 1.4876)
	insulation material	highly compressed MgO
	heat conductor material	NiCr 8020
	sheath temperature	max. 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
	max. total length straight	3000 mm
	min. length of the unheated zone	45 mm
	length tolerance straight	flat part ± 1% round part ± 5%
	inside diameter tolerances	without reflection tube: up to IØ 30 mm -0.10/-0.30 up to IØ 50 mm -0.20/-0.40 > IØ 50 mm on request with reflection tube: +0.05/+0.15
	wattage tolerance (cold)	± 10% (± 5% on request)
	connection voltage	max. 440 V
	sheath surface load depending on operation temperature and heat decrease	max. 10 W/cm²
	minimum bending radius	10 mm (15 mm when bending on end)
	connections (standard)	see WRP
	thermocouple	Fe-CuNi or NiCr-Ni

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