

SPECIFICATIONS · OPTIONS · INSTALLATION

MI COIL & CABLE HEATERS

Technical Information & Specifications

Custom mineral insulated coil and cable heaters for industrial process heating — technical data, configurations, stock programs, terminations and installation in one place.



ABOUT NEXTHERMAL

ENGINEERED WITH PASSION. DELIVERED WITH DECADES OF EXPERIENCE.

Nexthermal Corporation is a Battle Creek, Michigan-based manufacturer of custom electric heating solutions, with roots dating back to 1986.

The company was originally established as Hotset Corporation, a separate U.S. entity and strategic partner of Germany-based Hotset. Today, Nexthermal brings the depth of its custom-engineered process heating capabilities to OEM design engineers, with technical data, design guides, and expanded product information to help select and specify the right thermal solution for each application.

Alongside our U.S. headquarters and manufacturing in Battle Creek, Nexthermal also has a sales team and manufacturing plant in India.

We thrive on challenging applications and custom designs — and you don't need enormous production volumes to work with us.

OUR CAPABILITIES

- Cartridge heaters
- Mineral-insulated cable and coil heaters
- Silicone rubber and polyimide flexible heaters
- Tubular and ceramic infrared heaters
- Temperature sensors

1986

Roots date back to 1986, originally as Hotset Corporation

U.S. & India

Sales and manufacturing in Battle Creek, MI and Bengaluru, India

Any volume

No enormous production runs required to work with us

Delivering trusted smart heat management® solutions for the world's toughest industrial thermal challenges.

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MI COIL & CABLE HEATERS

Nexthermal designs and manufactures custom MI coil heaters and mineral insulated (MI) cable heaters for demanding industrial process heating applications.

Our coil heaters and MI cable heaters are engineered for applications requiring precise temperature control, high watt density, and reliable performance in extreme environments — across plastics processing, packaging, semiconductor equipment, life sciences, and energy systems.

In addition to fully custom designs, Nexthermal offers a broad range of straight MI cable heaters that can be formed into coils, serpentines, or complex geometries — either by our team or directly by OEM designers.



1 day	±2%	480 V	Type J & K
Wind-from-stock ship time	Wattage tolerance (HotLock™ & Axial)	Maximum voltage (Maxi coil)	Integrated thermocouples

WHAT WE MANUFACTURE

CUSTOM COIL HEATERS
For hot runner systems and dies.

MI CABLE HEATERS
For forming, wrapping, and embedding.

STRAIGHT MI CABLE HEATERS
For OEM forming and integration.

THE NEXTHERMAL DIFFERENCE
Smart Heat Management® starts with understanding the application

Variations in temperature requirements, watt density, voltage, mechanical fit, and operating environment all impact heater performance and service life. Nexthermal engineers design each MI cable heater based on:

01 Thermal load & heat-up requirements

02 Application geometry & space constraints

03 Temperature uniformity & control requirements

04 Environmental exposure (moisture, chemicals, vibration)

05 Heat transfer conditions & mounting method

ENGINEERED FOR DURABILITY & PRECISION

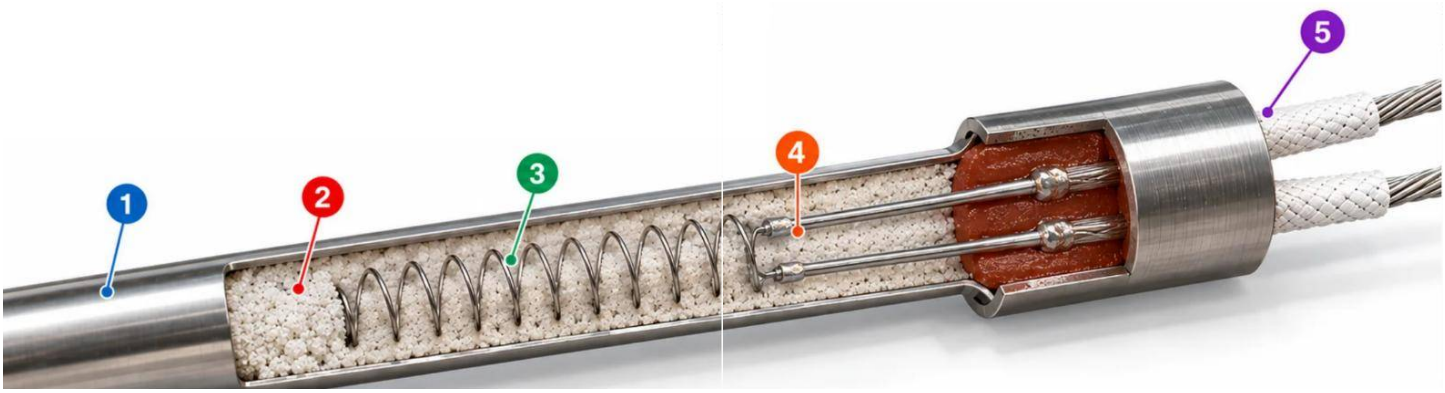
- **High watt density coil heaters** for fast heat-up
- **High-temperature alloy sheaths** for harsh environments
- **Fully annealed construction** for precise forming into complex geometries
- **Integrated thermocouples** (Type J & Type K) for precise control
- **Custom-formed MI cable heaters** for complex geometries
- **High-purity magnesium oxide insulation** for superior heat transfer and dielectric strength
- **Moisture-resistant sealed terminations** for long life

SCAN FOR PRODUCT DETAILS
Coil heater product page
nexthermal.com/coil-heaters

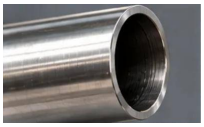
MI CABLE HEATER CONSTRUCTION

WHAT IS A MINERAL INSULATED (MI) CABLE HEATER?

A mineral insulated cable heater consists of a resistance heating element surrounded by high-purity magnesium oxide (MgO) insulation and encased in a high-temperature metal sheath.



INSIDE AN MI CABLE HEATER



1 SHEATH

Corrosion- and high-temperature-resistant sheath in Incoloy 800, stainless steel, or other alloys.



2 MGO REFRACTORY MATERIAL

Highly compacted magnesium oxide (MgO) provides excellent dielectric strength, thermal conductivity, and mechanical support for the resistance coil.



3 HELIX RESISTANCE COIL

Nickel-chromium resistance wire (e.g., NiCr 80/20) wound in a spaced helix configuration, typically 38–40 AWG.



4 COIL TO COLD PIN TRANSITION

Each end of the coil is welded or brazed to a small-diameter nickel cold pin (typically ~0.080") for a robust, low-resistance transition.



5 COLD PIN TO LEAD WIRE

The nickel cold pin is welded to a stranded nickel or copper lead wire and sealed in high-temperature epoxy potting inside a cylindrical potting adaptor.

WHAT THIS CONSTRUCTION PROVIDES

EXCELLENT heat transfer efficiency

HIGH dielectric strength

SUPERIOR temperature capability

RESISTANCE TO oxidation and corrosion

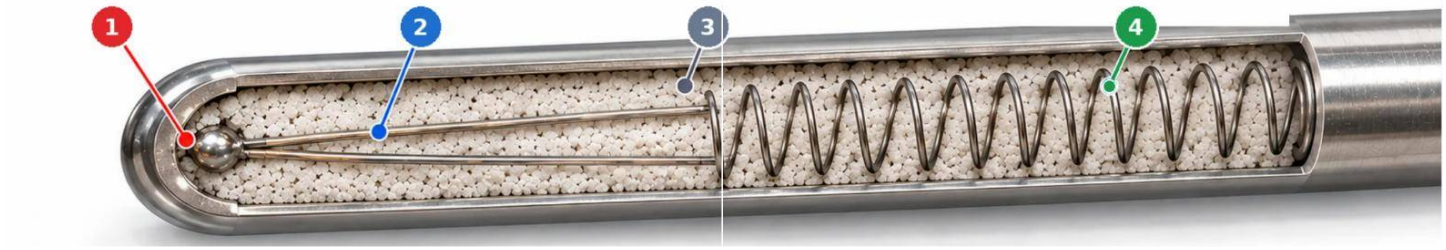
MI cable heaters can be formed into coil heaters, serpentine heaters, and complex geometries, making them ideal for tight spaces and demanding applications. They are available as factory-formed coil heaters or field-formable MI cable heaters, giving OEM engineers maximum flexibility.

INTERNAL THERMOCOUPLE OPTION

THE SENSOR BELONGS INSIDE THE HEATER

For accurate temperature control, the sensor belongs inside the heater. A Type K or Type J thermocouple can be built directly into an MI coil heater, with the measurement junction at the extreme end of the heater, opposite the lead end.

Your controller reads the heater's actual operating temperature, not the surrounding air or a nearby surface, giving a fast and accurate signal to control against. Available in grounded or ungrounded configurations.



1 MEASUREMENT JUNCTION

Located at the tip of the heater, where it senses the internal heater temperature directly.

2 THERMOCOUPLE WIRE

Type K or Type J bare conductors run back to the lead end alongside the heating element.

3 MGO REFRACTORY INSULATION

Compacted magnesium oxide insulates and supports the thermocouple wires and the resistance coil.

4 RESISTANCE COIL (HELIX)

The heating element shares the same sheath, so the thermocouple tracks the heater as it runs.

WHY SPECIFY AN INTERNAL THERMOCOUPLE

- Accurate temperature control from a sensor that reads the heater itself
- Over-temperature protection that helps extend heater life and reduce downtime
- No separate sensor to mount, keeping the installation compact in tight spaces
- Standard Type K or Type J output compatible with common temperature controllers

GROUNDED OR UNGROUNDED JUNCTION



GROUNDED THERMOCOUPLE

The junction is welded to the heater sheath for fast response and good thermal contact.

Choose when: response speed is the priority.



UNGROUNDED THERMOCOUPLE

The junction is electrically isolated from the sheath by MgO insulation.

Choose when: your instrumentation requires isolation from the heater sheath.

COIL TECHNICAL DATA

TOLERANCE & PERFORMANCE RATINGS BY COIL PROFILE

Tolerance and performance ratings by coil profile. A dot marks the grade offered as standard for that profile.

COIL PROFILE	INTERNAL TC	SHAPE	LENGTH TOLERANCE		WATTAGE TOLERANCE			INSULATION RESISTANCE		LEAKAGE CURRENT	STD. LEAD LENGTH (MM)
			HEATED	UNHEATED	±10%	PREMIUM ±5%	±2%	≥5 MΩ @ 500 V DC	SPECIAL REQUEST	<0.5 mA @ 253 V AC	
Mini Flat 1.0 mm x 1.7 mm & 1.3 mm x 2.3 mm Only possible as wound or pressed in	No	Flat	±2.5%	+5 mm / −10 mm	●	●	●	●	●	●	1,830
Mini Round Ø 1.4 mm and Ø 1.8 mm	No	Round	±2.5%	+5 mm / −10 mm	●	●	–	●	●	●	1,000
Mini Axial / Standard Clamp 19.05 mm & 22.22 mm ID	No	Flat	Clamp +0.5 mm	Customer specific	●	●	●	●	●	●	1,830
Rectangle Coil 1.8 mm x 3.2 mm	No	Rectangle	±1%	+5 mm / −10 mm	●	●	–	●	●	●	1,219
Rectangle Coil 2.2 mm x 4.2 mm	Yes	Rectangle	±1%	+5 mm / −10 mm	●	●	–	●	●	●	1,245
Round Coil Ø 3.0, Ø 3.18, Ø 3.2 & Ø 4.0 mm	Yes	Round	±2.5%	+5 mm / −10 mm	●	●	–	●	●	●	1,245
Square Coil 3 mm x 3 mm, 3.25 mm x 3.25 mm	Yes	Square	±1%	+5 mm / −10 mm	●	●	–	●	●	●	1,245
Maxi Coil Heater 4.6 mm x 8.6 mm	Yes	Rectangle	±1%	+5 mm / −10 mm	●	●	–	●	●	●	1,245

Offered as standard · — Not offered for this profile

WATTAGE TOLERANCE & TEST VALUES

Standard wattage tolerance is ±10%; premium wattage tolerance is ±5%. Standardized heaters may be designed to tighter than published wattage tolerances — consult engineering. HotLock™ and Axial Clamp heaters are available with ±2% wattage tolerance.

HIGH-POT TESTING

MINI
800 VAC @ 100 mA

COIL
800 VAC @ 100 mA

MAXI
1,250 VAC @ 100 mA

CONFIGURATION CHART & ID TOLERANCES

CONFIGURATION CHART

Profile, minimum inside diameter, minimum bending diameter and standard straight heated length by heater type, with available inbuilt thermocouple junctions and sheath material.

COIL HEATER TYPE	PROFILE		MIN. INSIDE DIAMETER		VOLTAGE	MIN. BENDING DIAMETER		STRAIGHT HEATED LENGTH		INBUILT TC[1]		SHEATH MATERIAL	
	IN	MM	IN	MM		IN	MM	IN	MM	J	K	SS321	NICKEL
Micro Mini	0.039″ x 0.067″	1.0 x 1.7	0.236″	6.00	240 V	0.118″	3.0	112.2″	2,850	–	–	●	●
Mini Flat	0.051″ x 0.090″	1.3 x 2.3	0.236″	6.00	240 V	0.118″	3.0	112.2″	2,850	–	–	●	●
Mini Round	Ø 0.055″	Ø 1.4	0.236″	6.00	240 V	0.118″	3.0	112.2″	2,850	–	–	●	●
Mini Round	Ø 0.070″	Ø 1.8	0.236″	6.00	240 V	0.118″	3.0	112.2″	2,850	–	–	●	●
Square	0.118″ x 0.118″	3.0 x 3.0	0.472″	12.00	240 V	0.236″	6.0	86.6″	2,200	●	●	●	–
Square	0.128″ x 0.128″	3.25 x 3.25	0.472″	12.00	240 V	0.236″	6.0	86.6″	2,500	●	●	●	–
Flat	0.071″ x 0.126″	1.8 x 3.2	0.472″	12.00	240 V	0.236″	6.0	86.6″	2,500	–	–	●	–
Flat	0.089″ x 0.165″	2.2 x 4.2	0.472″	12.00	240 V	0.236″	6.0	86.6″	2,500	●	●	●	–
Round	Ø 0.118″	Ø 3.0	0.472″	12.00	240 V	0.236″	6.0	86.6″	2,500	●	●	●	–
Round	Ø 0.125″	Ø 3.18	0.472″	12.00	240 V	0.236″	6.0	86.6″	2,500	●	●	●	–
Round	Ø 0.157″	Ø 4.0	0.472″	12.00	240 V	0.236″	6.0	86.6″	2,500	●	●	●	–
Maxi	0.181″ x 0.338″	4.6 x 8.6	0.80″	20.0	480 V	0.393″	10.0	86.6″	2,500	●	●	●	–

Available · – Not available. [1] Externally wound thermocouples are available for all coil heaters.

ID TOLERANCES

Fit tolerance for the pressed-on sheath ID by coil class, and ID tolerance by heated length once the coil is formed.

ID WITH PRESSED-ON SHEATH

COIL CLASS (PRESSED-ON SHEATH)	FIT TOLERANCE
Mini	+0.05 mm to +0.10 mm
Standard	+0.05 mm to +0.10 mm
Maxi	+0.05 mm to +0.15 mm

Clamping strap recommended above 2″ ID.

MINI, STANDARD & MAXI ID TOLERANCES

COIL ID	HEATED LENGTH < 30 MM	HEATED LENGTH ≥ 30 MM
6.54 – 12 mm	–0.05 to –0.2 mm	–0.1 to –0.3 mm
13 – 30 mm	–0.1 to –0.3 mm	–0.2 to –0.4 mm
31 – 50 mm	–0.2 to –0.4 mm	–0.3 to –0.6 mm

Coil IDs over 50 mm are specified on your drawing.

WIND FROM STOCK

IN STOCK. READY TO SHIP.

1 business day
SHIP TIME
Wound, stretched and exited to your specification, then shipped.

215 – 1,300 W
WATTAGE RANGE
Covers the range of nozzle sizes carried in stock.

1.2" wide
STANDARD CONSTRICTOR
Recommended on open coil heaters for the best thermal profile.

If you need a coil heater immediately, consider using a stock heater from Nexthermal. We carry a variety of sizes to accommodate different nozzle dimensions, and we can form them to your exact diameter and width.

HOW A STOCK HEATER IS BUILT

01
STRAIGHT HEATER
Every stock heater starts out as a straight heater held in inventory.

02
WOUND TO DIAMETER
It is wound to your specified diameter and size.

03
STRETCHED TO LENGTH
The coil is then stretched to your specified length.

04
ANGLED EXIT FORMED
The final step creates the angled exit your application requires.

SELECTION RECOMMENDATIONS

- For open coil heaters, we recommend our standard 1.2" wide constrictor for the best thermal profile. This also gives much more accurate readings from the built-in thermocouple located near the tip of the nozzle.
- If you require an outside diameter larger than 2", a pressed-on sheath or constrictor is highly recommended.

STOCK COIL HEATERS

2.2 MM X 4.2 MM (0.089" X 0.165") FLAT COIL HEATER · 240 V

Standard 1,000 mm (39.4") Teflon and PTFE leads, available with ungrounded thermocouple.

HEATED LENGTH (IN)	TOTAL LENGTH (IN)	WATTS
10.5	14.5	215
12.5	16.5	250
16	20	325
19	23	390
22	26	470
26	30	520
30	34	610
36	40	630
38	42	700
42	46	800
45	49	850
75.28	78.84	1,050
79	82.56	1,150
86.6	90.16	1,300

SIZE IT YOURSELF

WIND FROM STOCK SELECTOR

Enter your tool's inside diameter, the length of the section to be heated and the pitch you want once the coil is expanded. The Wind From Stock Selector returns the closest stocked 2.2 mm x 4.2 mm flat coil heater, its Nexthermal part number, and a dimensioned sketch of the wind.

01 **Inside diameter**
The bore the coil must fit around.

02 **Heated length**
The axial length the coil needs to cover.

03 **Expanded pitch**
Center-to-center turn spacing once stretched.

04 **Tight end zones**
Touching turns at each end, or zero for a uniform pitch.

OPEN THE SELECTOR

Scan to get a stocked part number and a dimensioned sketch of the wind.

TERMINATIONS & EXIT ORIENTATIONS

TERMINATION OPTIONS

Maximum lead wire temperature shown



TEFLON (PTFE)

500 °F / 260 °C

Teflon is the go-to for cleanliness and chemical resistance.



FIBERGLASS

482 °F / 250 °C

The "workhorse" of the industry. The leads are integrated directly into the heater core, providing a robust connection.



HIGH TEMPERATURE FIBERGLASS

932 °F / 500 °C

Used when the lead exit point is extremely close to the heat source.

LEAD PROTECTION



ARMOR CABLE

The highest level of mechanical protection against abrasion, sharp edges, and physical impact. Ideal where leads are exposed to constant movement or potential crushing.



GAS-PROOF ARMOR CABLE

Heavy-duty mechanical shielding with a sealed, liquid-tight barrier. Prevents gases, oils, or moisture from wicking into the heater — essential for high-contamination environments.



BRAIDED METAL SLEEVE (BMS)

A flexible, lightweight shield against moderate abrasion. The stainless steel braid protects leads from fraying while allowing a tighter bend radius than rigid armor.



SILICONE IMPREGNATED FIBERGLASS

More durability and moisture protection than standard fiberglass, without adding the weight or rigidity of metal armor.



NEMA RATED SLEEVE

Typically requested when an OEM needs compliance with specific enclosure ratings, such as NEMA 4/4X for washdown or outdoor environments.

EXIT ORIENTATION OPTIONS



















HIGH CAVITATION HOT RUNNER MOLDING

MINI COIL HEATERS FOR HIGH CAVITATION HOT RUNNER TOOLS

High cavitation injection molding hot runner systems use special coil heaters featuring:

- Extremely low profile to fit into tight cavity pockets in the tool
- Specialized clamps to ensure proper heat transfer and ease of installation
- Very tight resistance tolerance of ±2% from nominal resistance
- 1 mm OD independent MI thermocouples for temperature sensing

Nexthermal is the leading manufacturer of Mini Coil heaters for high cavitation hot runner tools. We manufacture two models specifically designed to optimize life and temperature profile in this critical plastics molding application.



HOTLOCK™ MINI COIL HEATER

Nexthermal's fully integrated coil heater solution for multi-cavity hot runner systems. HotLock™ features:

- Mini Coil heater encased between an inner and outer sleeve to ensure coil position and maximize heat transfer efficiency
- Replaceable 1 mm OD thermocouple
- Unique locking cap to precisely locate the assembly in the cavity pocket on the hot runner nozzle

AVAILABLE FROM STOCK – HOTLOCK™ SERIES

LENGTH (MM)	WATTS	OEM PART #	NEXTHERMAL PN	AVAILABILITY
30	220	534975	HL30220	In Stock
30	268	–	HL30268	In Stock
30	350	1501609	HL30350	In Stock
40	220	534976	HL40220	In Stock
40	350	1502992	HL40350	In Stock
50	220	534977	HL50220	In Stock
50	350	1045865	HL50350	In Stock
60	220	534978	HL60220	In Stock
60	400	1501594	HL60400	In Stock
70	220	534979	HL70220	In Stock
70	400	1502994	HL70400	In Stock
80	220	534980	HL80220	In Stock
80	250	–	HL80250	3-Day
80	400	1501595	HL80400	In Stock
90	220	534981	HL90220	In Stock
90	400	1502995	HL90400	In Stock

LENGTH (MM)	WATTS	OEM PART #	NEXTHERMAL PN	AVAILABILITY
100	220	534982	HL100220	3-Day
100	400	1501596	HL100400	3-Day
110	220	534983	HL110220	3-Day
110	400	1502996	HL110400	In Stock
130	220	535470	HL130220	3-Day
130	320	–	HL130320	3-Day
130	400	1502997	HL130400	3-Day
150	220	535471	HL150220	3-Day
150	400	1502998	HL150400	3-Day
150	450	–	HL150450	3-Day
170	220	535472	HL170220	3-Day
170	450	1502999	HL170450	3-Day
190	220	535473	HL190220	3-Day
190	450	1503000	HL190450	3-Day
210	450	–	HL210450	3-Day

AXIAL CLAMP & CONSTRICTOR

AXIAL CLAMP MINI COIL HEATER

Axial Clamp Mini Coil heaters are a legacy version used on thousands of high cavitation hot runner system molds. The design is very simple and easy to install in very small pitch-center hot runner tools.

- Easy-to-access hex screws to tighten the clamp and assure positive contact and exceptional heat transfer to the hot runner nozzle
- Easy to install and remove for quick maintenance

AVAILABLE FROM STOCK — AXIAL SERIES

COIL ID	LENGTH	WATTS	OEM PART #	NEXTHERMAL P/N
0.75" (19.1 mm)	1.2" (30 mm)	149	534233	WM1900003085014940-U
0.75" (19.1 mm)	1.57" (40 mm)	268	521334	WM1900003085026840-U
0.875" (22.2 mm)	1.97" (50 mm)	268	—	WM2222030850026840-U

BUILDING A HIGH CAVITATION HOT RUNNER TOOL?

Send us the nozzle pitch, cavity pocket dimensions and wattage per zone, and a Sales Engineer will specify HotLock™ or Axial Clamp for the tool.

CONSTRICTOR RETAINING SYSTEM FOR OPEN COIL HEATERS

An open coil heater expands as it heats and loosens its grip on the tool. The Constrictor is an optional retaining accessory that slides over the coil after installation and keeps it under continuous tension, so contact with the tool stays consistent through the heat cycle.

- Faster tool recovery from improved heat transfer into the tool
- Better thermocouple feedback when an internal thermocouple is used
- Reduced heat loss, as the alloy reflects heat back toward the tool
- Stocked in a wide range of standard diameters, 30 mm standard length





On tools longer than 60 mm, apply the Constrictor at the end zones only and leave the center as open coil to avoid heat buildup in the middle of the tool.

INSTALLATION & OPERATION GUIDELINES

Follow these guidelines to install, connect and operate MI coil heaters for long-lasting, reliable performance.

INSTALLATION

- Installation should only be performed by people trained in electrical hookup.
- Keep in mind the minimum bending radius. Once the part is bent, do not attempt to bend it again.
- Do not bend the adapter head or the first 5 mm (0.197") from the head.
- Do not hold the connection head with a clamping method.
- Only use non-electrically-conductive sprays and pastes for installation.
- Install heaters with a holding device. Higher operating temperatures may cause the heater to lift off the tool, causing premature failure and false thermocouple readings.
- Install heaters by screwing them onto the tool. Never open the ID of the heater by twisting — it will not fit correctly and will fail prematurely.

TEMPERATURE CONTROLLERS

- Controllers must be matched to the heater's amp load, with an appropriate thermocouple sensor input.
- Only use controllers with a "Soft Start" function, which lets the heater burn off any internal moisture before full voltage is applied.

STORAGE

- Store at room temperature in a dry location.

CONNECTIONS

- Protect the adapter head and lead connection areas from liquids and gases to avoid short circuits.
- If using a separate thermocouple, be sure it is not electrically grounded to the heater casing, which could cause feedback to the controller inputs.
- Watch for sharp edges along the lead wire path.
- Account for the maximum temperature of the lead wires during planning to avoid melting during operation.
- Where the heater uses the casing as the second power lead, the tool temperature must stay below the corrosion point.
- Voltage differences have a dramatic effect on wattage output and heater life. Confirm the supply matches the design voltage stamped on the heater.
- Follow standard wiring polarity for internal thermocouples. If the reading drops after power is applied, the thermocouple is most commonly wired backwards.

OPERATION

- All installations must be electrically grounded.
- Do not touch the heating element while in use — it gets very hot.
- Mount the heater so there is no chance of fire from flammable material.

GENERAL INFORMATION

- Check the order confirmation for any other information concerning operation or special applications.
- If lead wires are supplied without insulation or with removable sleeves, the customer must ensure their protection from electricity.

nexthermal®
smart heat management

ENGINEERED WITH PASSION.
DELIVERED WITH DECADES OF EXPERIENCE.

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Delivering trusted smart heat management® solutions for the world's toughest industrial thermal challenges.

Specifications subject to change without notice.