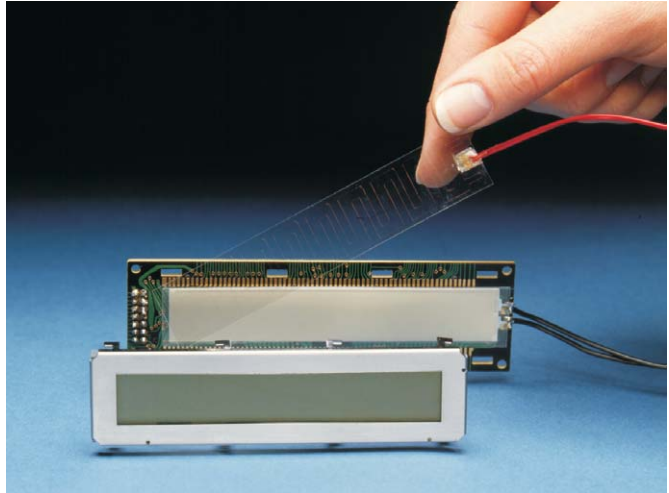


Thermal-Clear™ Transparent Heaters 120°C

Featuring a micro-thin wire heating element laid in a pattern between optical grade polyester sheets, Thermal-Clear heaters provide reliable heat without blocking light.

- ◆ Transmits over 80% of visible light
- ◆ For cold weather operation of LCD's and other applications
- ◆ Rugged, flexible construction
- ◆ Integral temperature sensors optional
- ◆ Rectangular, round, or irregular shapes
- ◆ Uniform or profiled heat patterns



Typical applications

- ◆ Cockpit displays
- ◆ Ruggedized computers
- ◆ Portable military radios
- ◆ Handheld terminals
- ◆ Outdoor card readers
- ◆ Portable and vehicular computers
- ◆ Camera enclosure deicing
- ◆ Defogging windows in environmental chambers
- ◆ Heating microscope stages

Specifications for catalog models

Temperature range: -55 to 120°C (-67 to 248°F).

Insulation: Optical grade polyester is standard. Glass and polycarbonate materials are available on custom models.

Transparency: 82% minimum light transmission over the visible spectrum.

Heating element: Resistive wire, diameter 0.0008" to 0.002" (0.02 to 0.05 mm).

Resistance tolerance: ±10% or ±0.5 Ω, whichever is greater.

Leadwires: PTFE insulated wire is standard. Lead connections are welded and anchored between heater layers for strength. Special terminations are available on custom models.

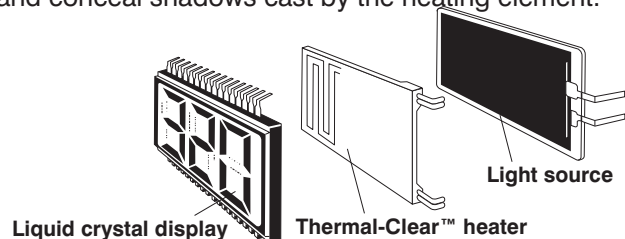
Custom options

- ◆ Integral RTD or thermistor sensors
- ◆ Flex-circuit terminations
- ◆ Rigid materials
- ◆ Custom shapes and sizes to 11" × 22"
- ◆ See section J for custom design assistance

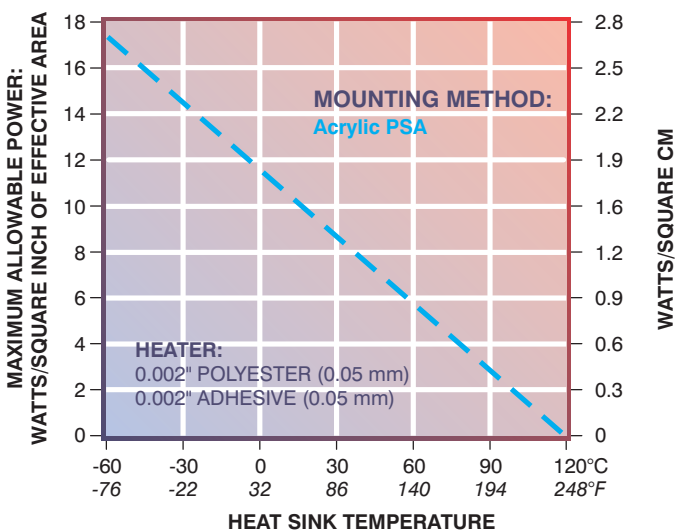
Thermal-Clear™ heaters and LCD's

Minco tests show that most dot matrix LCD's lose sharpness and response speed below 0°C. But you can achieve acceptable performance at much colder temperatures with a Thermal-Clear heater. One to two watts of heat per square inch will keep a typical LCD operating properly in ambients as low as -55°C.

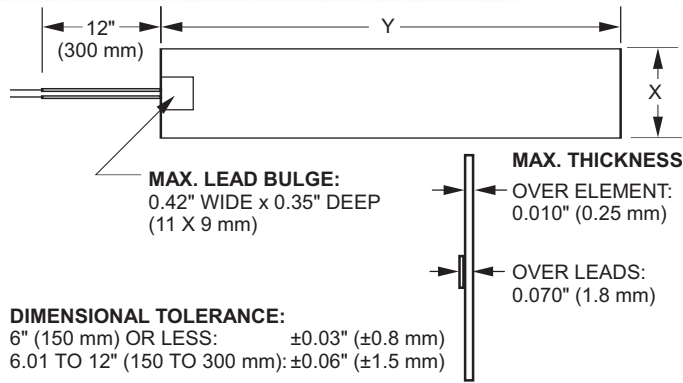
Shown below is a typical installation on a backlit LCD. The heater is sandwiched between the backlight and the LCD. We recommend you also insert a light diffuser between the heater and LCD if there is no diffusion coating on the back of the LCD. Diffusion helps to soften and conceal shadows cast by the heating element.



Maximum watt density, Thermal-Clear™ heaters



Standard Thermal-Clear™ Heaters



How to order heaters

H6700	Model number from table below
R9.0	Heater resistance in ohms
L12	Lead length in inches 12" (305 mm) is standard
A	Heater backing option (see page A-9) A = No backing -55 to 120°C B = Acrylic PSA backing -55* to 120°C
HR6700R9.0L12A ← Sample part number	

*Bonding strength deteriorates rapidly below -32°C. If the heater is not mechanically clamped, avoid excessive vibration and lead pull. Bonding strength recovers at temperatures above -32°C.

Size (inches)		Size (mm)		Resistance options (at 0°C) in ohms**				Effective area (in ²)	Lead AWG	Model number	
X	Y	X	Y								
0.58	2.20	14.6	55.9	3.6	9.0	32.5	89.4	1.26	30	H6700	
0.75	4.00	19.1	101.6	8.8	22.0	79.4	218	3.00	30	H6701	
0.90	2.00	22.9	50.8	4.8	12.0	43.3	119	1.80	30	H6702	
0.90	2.75	22.9	69.9	6.4	16.0	57.8	159	2.48	30	H6703	
0.90	5.75	22.9	146.0	14.1	35.0	126	348	5.18	30	H6704	
1.10	4.40	27.9	111.8	12.0	30.0	108	298	4.84	30	H6705	
1.20	2.75	30.5	69.9	8.0	20.0	72.2	199	3.30	30	H6706	
1.20	3.65	30.5	92.7	11.2	28.0	101	278	4.38	30	H6707	
2.90	5.75	73.7	146.0	9.6	24.0	86.6	238	16.70	30	H6708	
3.00	3.00	76.2	76.2	6.1	16.0	62.4	168	9.00	30	H6710	
4.00	5.00	101.6	127.0	11.8	31.2	122	327	20.00	30	H6711	
6.00	8.00	152.4	203.2	14.8	28.1	70.0	253	695	48.00	30	H6709
1.25 diameter		31.8 diameter		4.3	11.2	43.5	117	1.23	30	H6712	
3.00 diameter		76.2 diameter		8.0	20.9	81.5	219	7.07	30	H6713	
Element wire type and diameter:				Copper 0.0016"	Copper 0.0016"	Copper 0.001"	Nickel 0.001"	Nickel-iron 0.001"			
				0.04 mm	0.04 mm	0.03 mm	0.03 mm	0.03 mm			
Element TCR (Ω/Ω/°C):				0.00427	0.00427	0.00427	0.00672	0.00519			

**Resistance tolerance is ±10% or ±0.5 Ω, whichever is greater

Heaterstat™ Sensorless Temperature Controller

Any Thermal-Clear heater will work with the CT198 Heaterstat™ Sensorless Temperature Controller, which directly regulates element temperature without requiring a separate sensor. See page K-3 for full specifications.

CT198-K4 Evaluation Kit

Contains H15227 Thermal-Clear heater and CT198-4 controller for easy prototyping.

Setpoint: Factory set at 50°C. Adjustable from -40 to 95°C.

Supply voltage: 4.75 to 10 VDC, 5 VDC nominal.

Heater power: 1.7 W at 50°C, assuming 5 VDC.

Heater Dimensions: 0.75" × 4" (19 × 102 mm).

