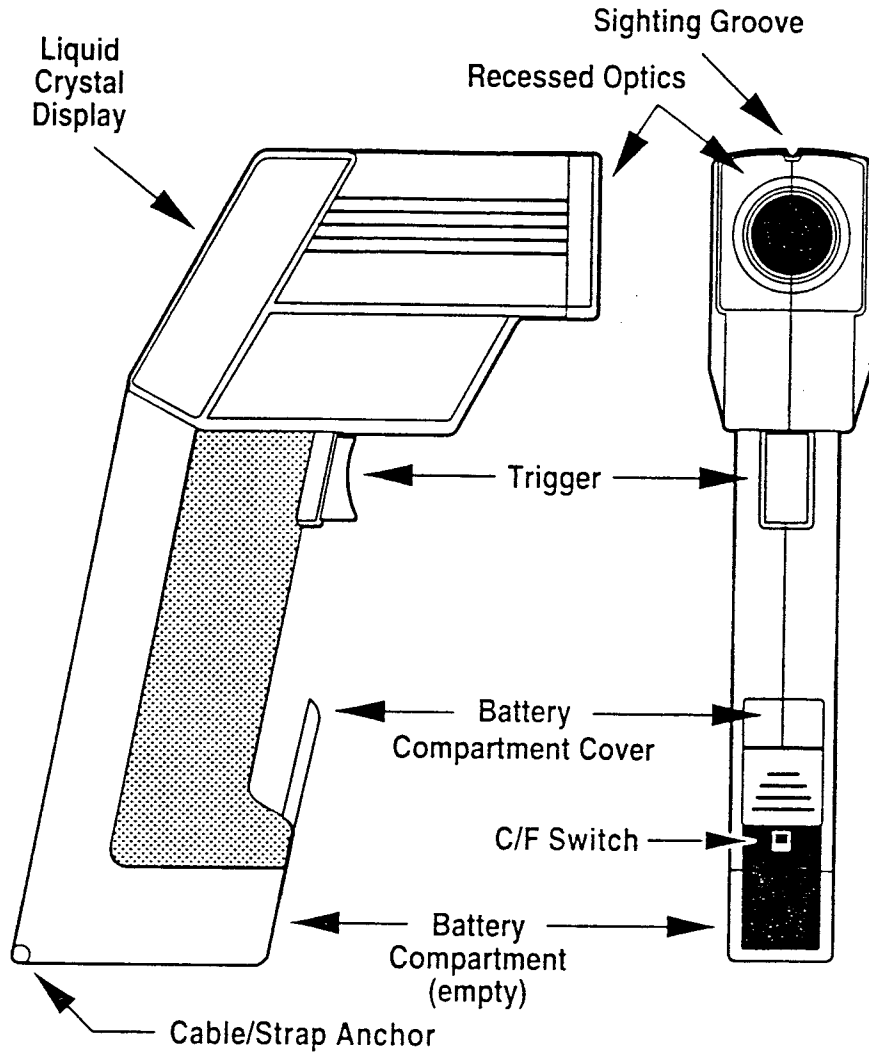


FEATURES



Units are molded from high-strength, solvent-resistant plastic. The optics are recessed for added environmental protection. Attachment anchor is provided for the wrist strap or belt clip accessory.



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Pittsburgh, PA 15205
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Fax: (412) 788-4890

HOW TO DETERMINE EMISSIVITY

Many practical applications of infrared thermometry involve the measurement of objects with high emissivities (painted, worn or oxidized metals, plastics, rubber, paper). It is not necessary to change emissivity for such applications. The emissivity of the Standard Model is internally fixed at 0.95. For greater versatility, the Enhanced Model features a user-adjustable emissivity.

Table 1 lists common emissivity values. If your object is not similar to any the materials given, or extra precision is desired, you can use one of the following methods for determining a specific emissivity value.

(1) Cover a portion of the surface of the target you want to measure with masking tape or flat black paint. The emissivity of both is 0.95. Allow time for the masking medium to reach equilibrium with the temperature of the surface underneath, and then measure the masked areas and the immediately adjacent unmasked area, using an emissivity setting of 0.95. If the two temperatures are much different, emissivity may affect your readings. Compensate by adjusting emissivity (see Enhanced Model operation) until the reading for the unmasked area agrees with the reading of the masked areas when emissivity was set to 0.95. This value should then be used whenever that object or material is to be measured in the future.

(2) If an accurate target temperature can be established using a contact temperature probe, you may adjust the emissivity setting until the IR temperature reading agrees with the contact device reading.

HOW YOUR INSTRUMENT WORKS

The primary elements of an infrared thermometer are an optical system, infrared detector and electronic signal-processing circuitry (see Figure 2). The optical system determines the field-of-view, filters unwanted wavelengths and focuses energy in the selected band onto the detector. The detector generates a corresponding analog signal. The electronic circuitry converts the analog signal to digital, linearizes it, compensates for objects having different emissivity values and produces an output to the liquid crystal display.

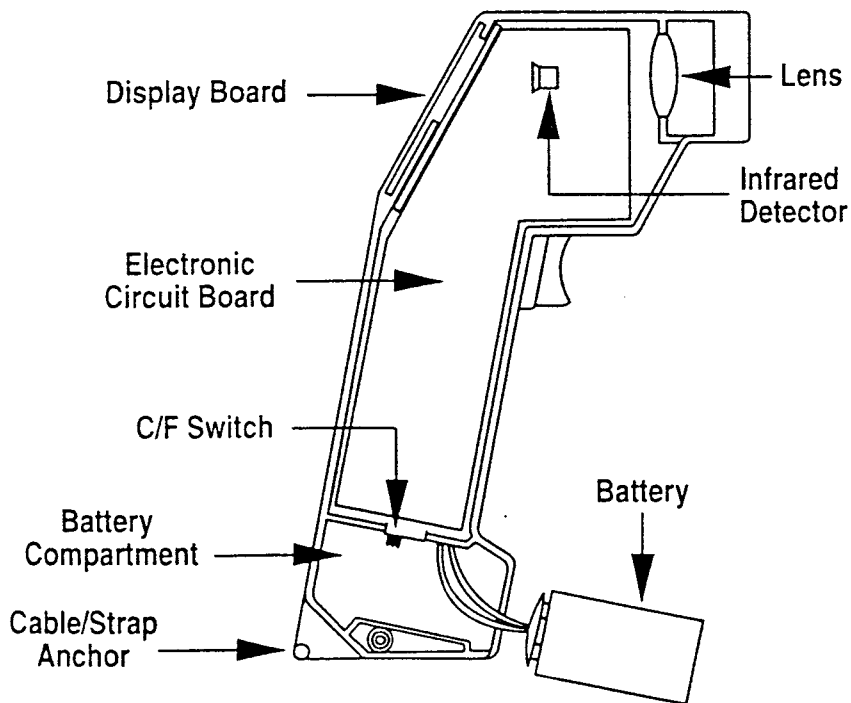


Figure 2

HOW INFRARED WORKS

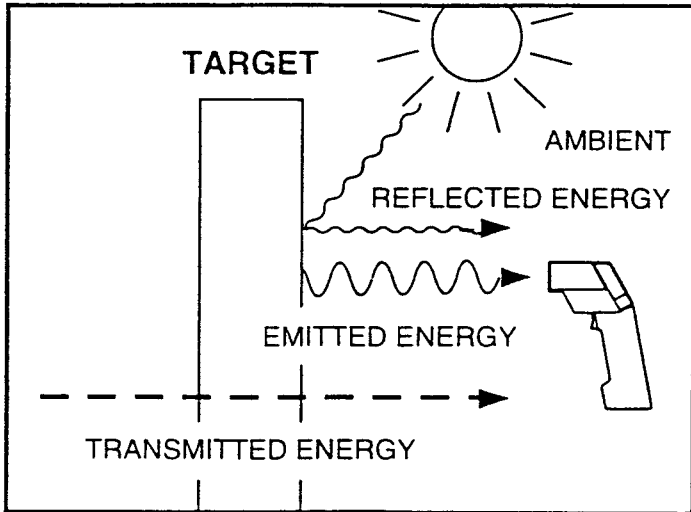
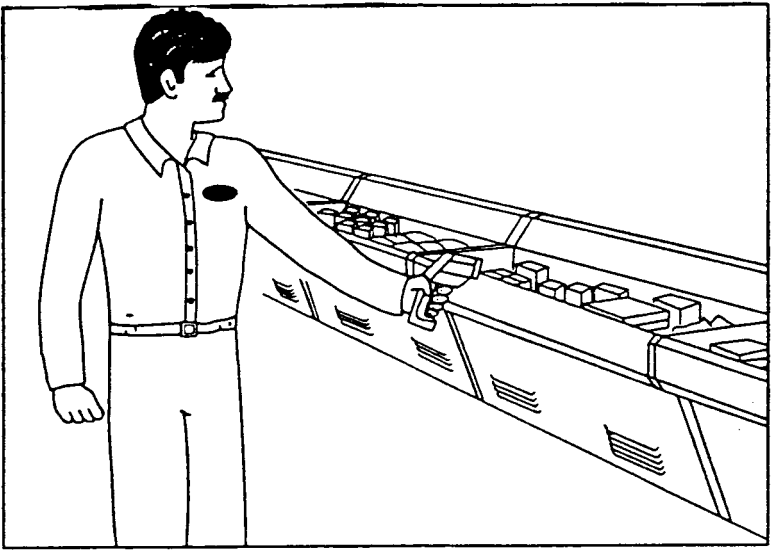


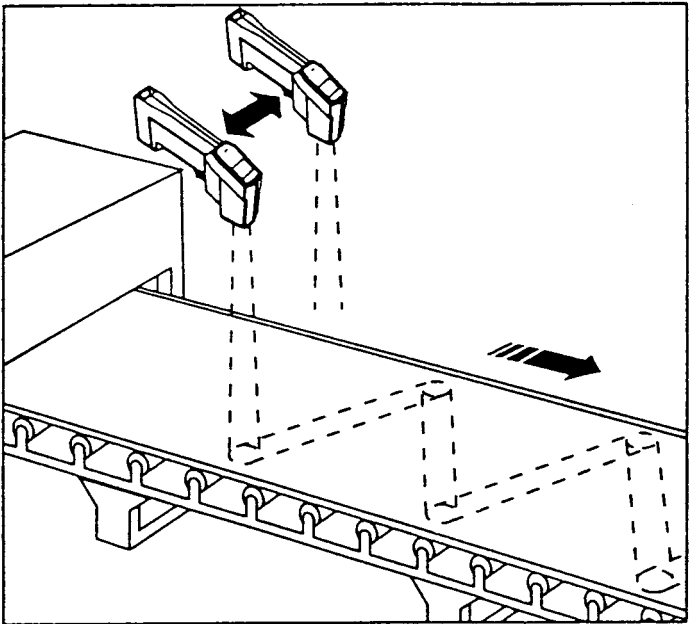
Figure 1

Noncontact temperature measurement is made possible by the fact that all objects emit invisible infrared energy. The amount of energy emitted is proportional to the object's temperature and "emissivity". Emissivity (ϵ) depends upon the material the object is made of and its surface finish. The emitting and reflecting character of the material is quantified by emissivity, which can have values ranging from 0.30 to 1.00.

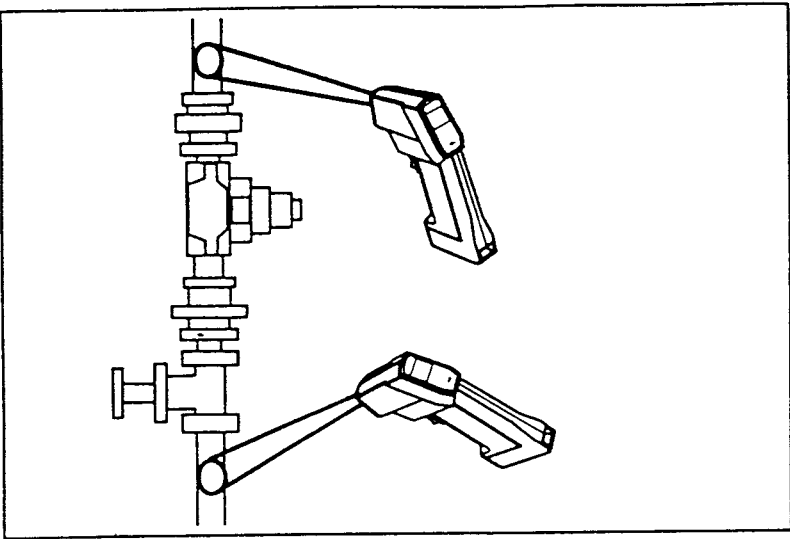
Infrared instruments provide temperature readings by sensing the total energy coming from a target, which is composed of emitted energy, reflected energy and transmitted energy (see Figure 1). For most objects, transmitted energy is zero. Using the given emissivity value (0.95 in Standard Model, user-set in Enhanced Model), the unit calculates the emitted energy and compensates for the effects of reflected energy. The temperature is then figured from the amount of emitted energy. The entire process takes place in a fraction of a second.



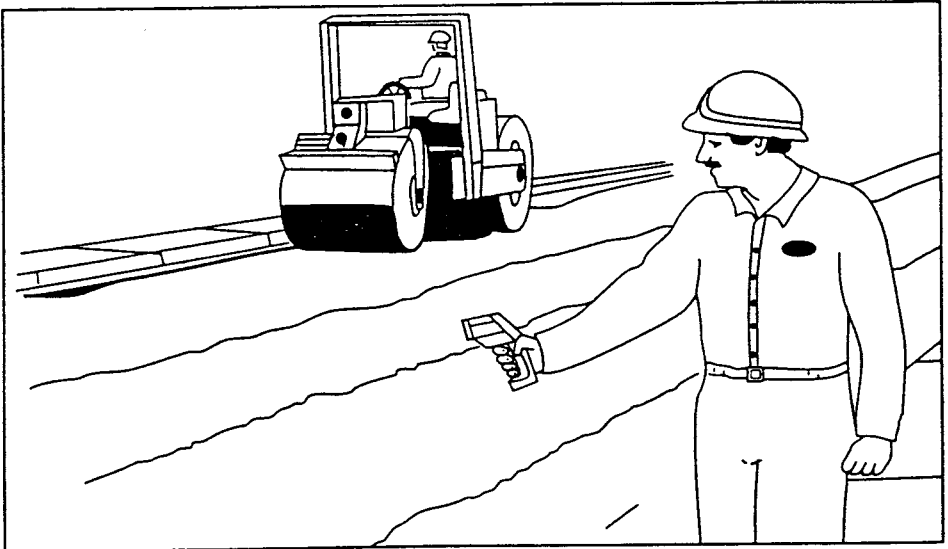
Check temperatures of food and stored products.



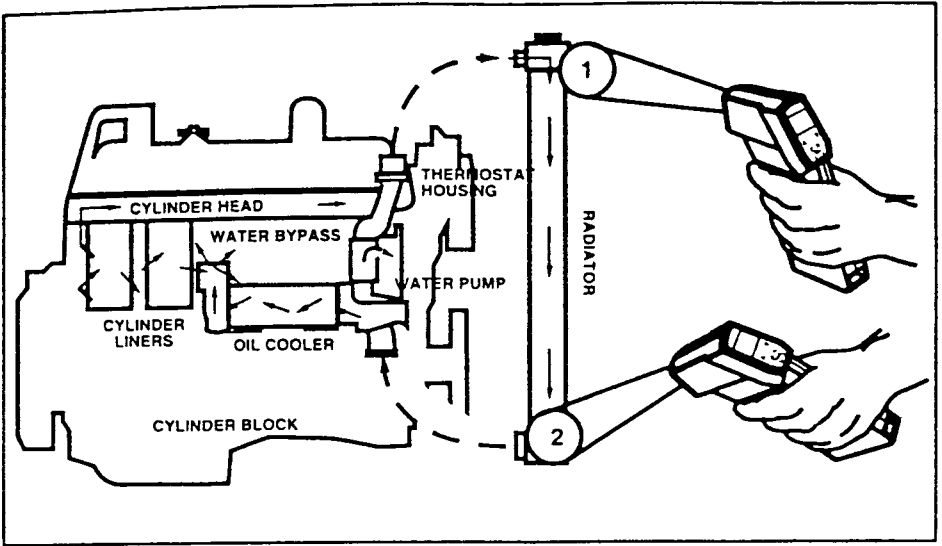
Scan a moving surface to examine a dynamic thermal profile.



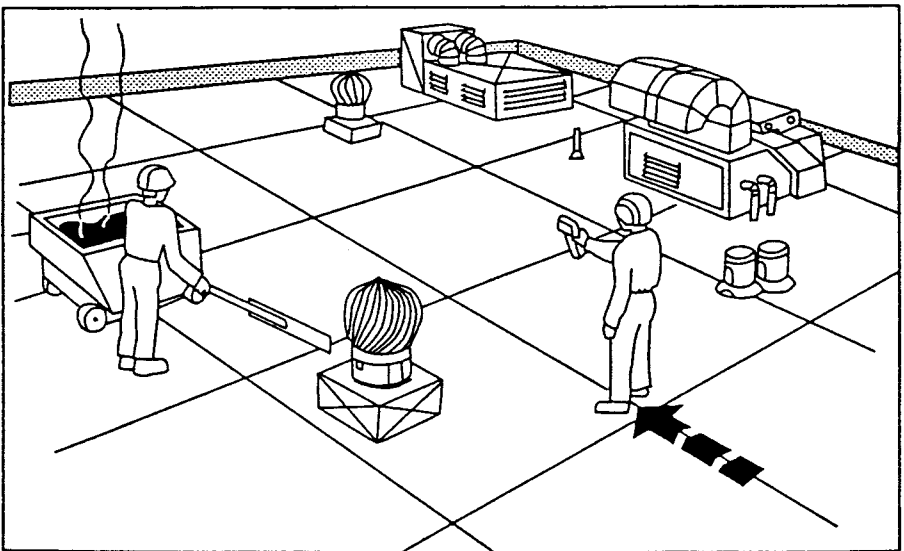
Measure a steamtrap line for temperature differences.
Be sure the diameter of the pipe fills the field-of-view.



Monitor the surface temperatures during asphalt
application to assure high quality results.

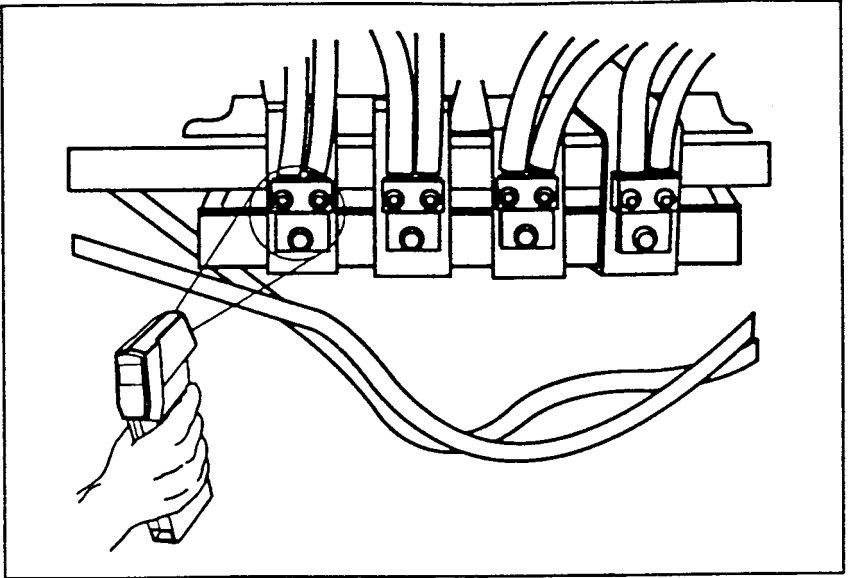


Examine temperature differences in engine blocks to eliminate costly breakdowns.

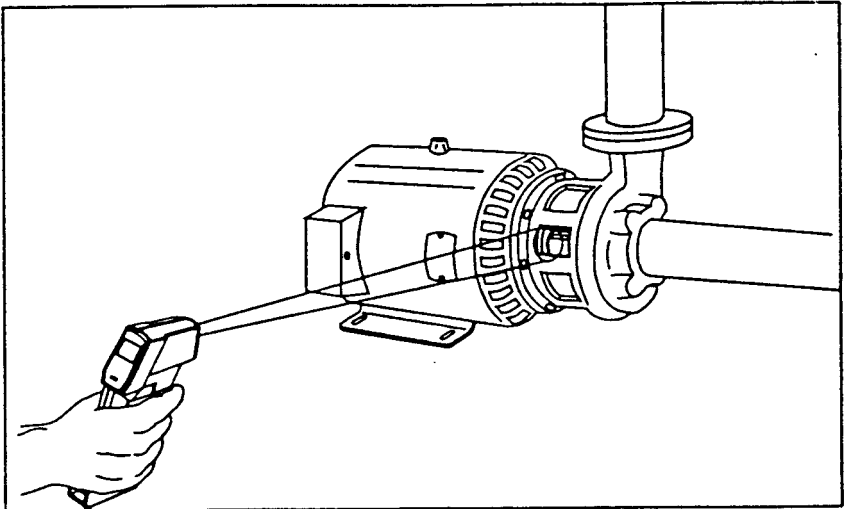


Verify the temperature of asphalt, welded membranes and rooftop HVAC components.

APPLICATIONS



Find hot spots in electrical connections.





Find hot spots in motors and bearings.

MAINTENANCE

<u>Error Code</u>	<u>Description</u>	<u>Action</u>
888 (flashing)	Target temperature is over or under-range.	Select target within unit's specifications.
EE9	Unit has an ambient temperature that is unacceptable.	Allow unit to stabilize within its ambient operating range.
EE1	Recoverable memory failure.	Pull trigger several times. Check Alarm and Emissivity settings.
EE2, EE3,	Electronics error.	Pull trigger several times.
EE4, EE5, EE6, EE7, EE8	Check battery connection and condition.	If not corrected, return for service.

■ Battery

When low battery icon () appears, the battery is low, but readings are still accurate.

Note: When "  " is flashing, replace battery immediately. 9V Alkaline (ANSI/NEDA 1604A, IEC 6LR61). For NICAD batteries, battery life is less than value listed in specs.

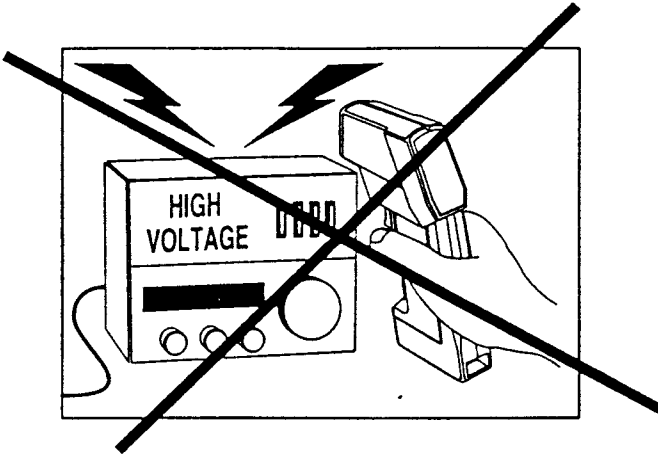
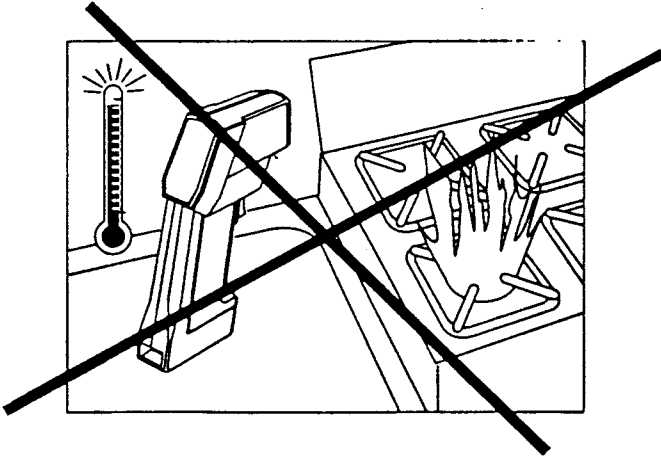
■ Lens Cleaning

- Blow off loose particles using clean compressed air.
- Gently brush remaining debris away with a camel's hair brush.
- Carefully wipe the surface with a moist cotton swab. The swab may be moistened with water or a water based glass cleaner. **DO NOT** use solvents to clean the lens.

■ Case Cleaning

To clean the exterior housing, simply use soap and water or a mild commercial cleaner. Wipe with a damp sponge or soft rag.

CAUTIONS



- **DO NOT** place on or around hot objects $>65^{\circ}\text{C}$ (150°F).
- If the thermometer is subject to large changes in ambient temperatures (hot to cold or cold to hot), allow 30 minutes for temperature stabilization before taking measurements to ensure accuracy.
- **DO NOT** subject unit to large electrical or magnetic fields such as arc welders and induction heaters.
- **DO NOT** touch electrical connections/equipment, or hot objects.

OPERATION

To Measure:

1. Point at target. Make sure the target fills the field-of-view.
2. Pull trigger, read temperature from LCD.
3. Press MODE button to scroll through and select MAX Scan, MIN Scan, ΔT , AVG Scan or Current temp modes.

To Recall Values:

With trigger off, press and release the MODE button, and the last reading will appear. Press MODE button again to recall MAX, MIN, ΔT , AVG or last reading.

Setting HI / LO Alarm and Emissivity:


With trigger off, press MODE (until display flashes), to enter HI / LO ALARM select mode. Use arrows (\blacktriangle \blacktriangledown) to scroll through and select, HI, LO or OFF. Once selected press MODE and use arrows (\blacktriangle \blacktriangledown) to adjust HI or LO ALARM value. When finished, press MODE again to enter EMISSIVITY set mode. Use arrows (\blacktriangle \blacktriangledown) to adjust emissivity. When finished, press MODE again or pull trigger to measure.

Note: For backlight ON/OFF, press (\odot) with trigger pulled or when in RECALL mode.

OPERATION

When measuring the absolute temperature of an object, make sure that the object fills the entire field-of-view. The distance from the object being measured affects the size of the spot measured. When measuring relative temperatures the objects need not fill the field-of-view if they are the same size and at the same distance. See section on Spot Diameters at Target Distances.

Standard Model

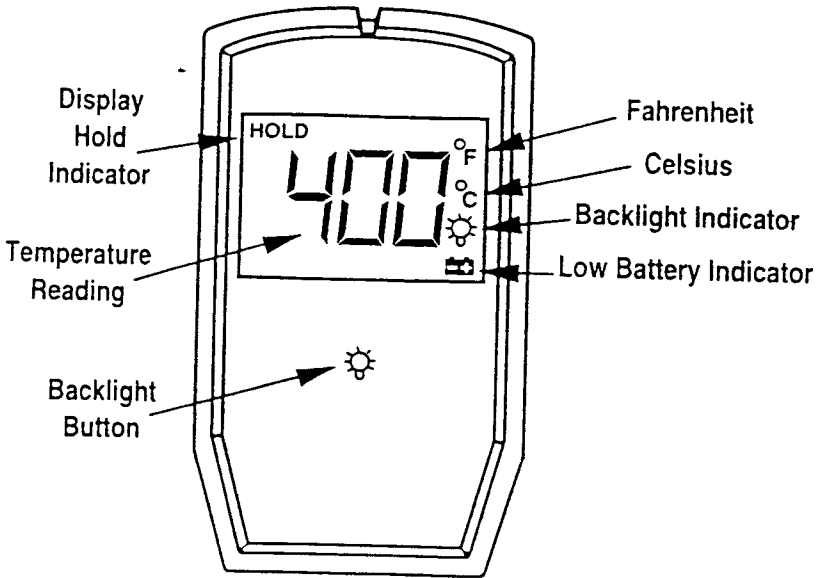
1. Point at target. Make sure target fills field-of-view, see section on Spot Diameters at Target Distances.
2. Pull trigger, read temperature from LCD.
3. Last temperature reading is held for 5 seconds after releasing trigger.
4. For backlight, press dot () while trigger is pulled.

Enhanced Model

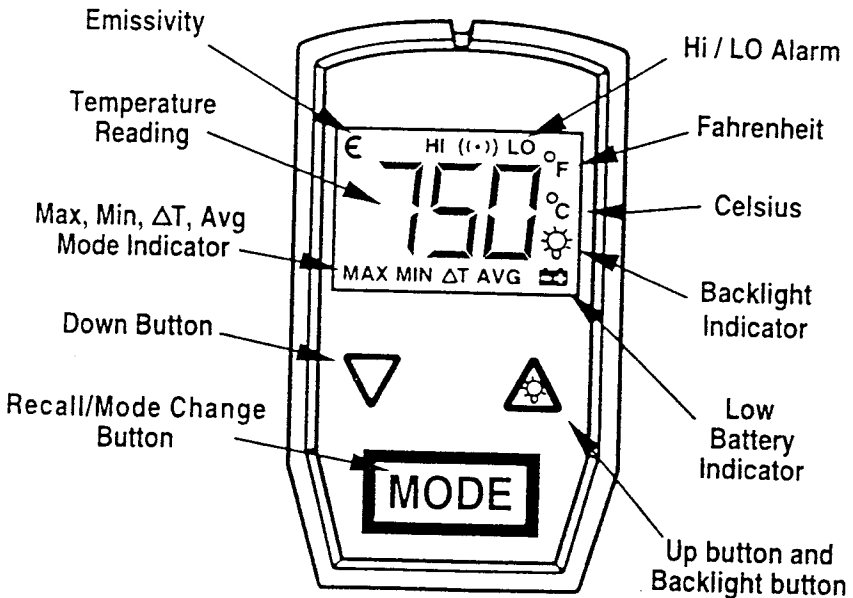
The Enhanced model features MAX Scan, MIN Scan, ΔT (the difference between Max and Min), AVG Scan, adjustable Hi or Lo Alarm, adjustable emissivity and a backlit display. For a discussion of emissivity, see "How To Determine Emissivity."

DISPLAY

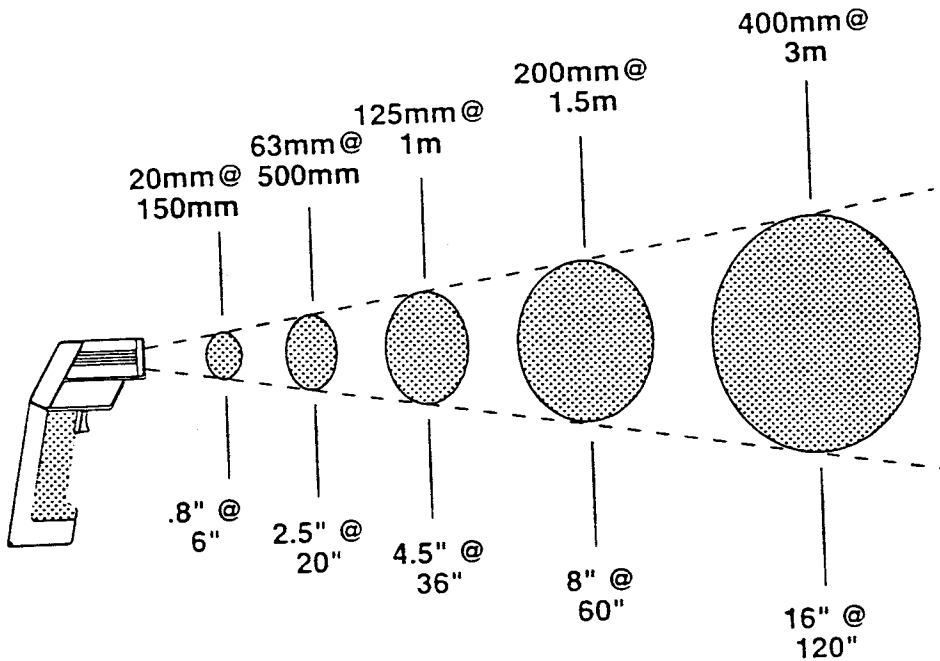
Standard



Enhanced



SPOT DIAMETERS* AT TARGET DISTANCES



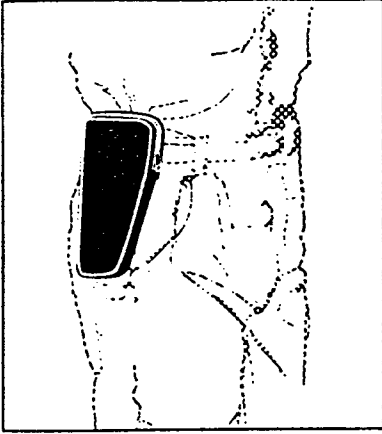
Nominal D:S = 8:1

*Nominal spot diameter at 90% energy.

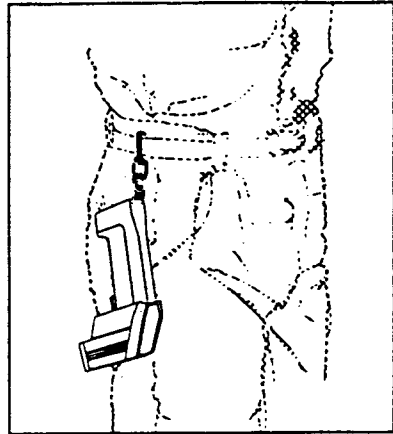
SPECIFICATIONS

SPECIFICATIONS	Standard	Enhanced
Temperature range	-18 to 400°C (0 to 750°F)	
Accuracy	± 2% of Reading or ± 2°C (± 3°F), whichever is greater, @ 23 ± 5°C (73 ± 9°F) ambient operating temperature and a known blackbody emissivity	
Repeatability	± 1% of reading, or ± 1°C (± 2°F), whichever is greater	
Response time (95% response)	500 msec	
Spectral response	7-18 microns nominal, thermopile detector	
MAX, MIN, ΔT, and AVG temperatures		✓
Recall last reading		✓
Display hold	✓	
HI or LO: audible/visual alarm:		✓
LCD backlight	✓	✓
Emissivity	pre-set 0.95	0.3-1.0 digitally adjustable
Temperature display	°C or °F (selectable), 3 digit LCD	
Display resolution	1°C or °F in all modes	
Ambient operating range	0 to 50° C (32 to 120°F)	
Relative humidity	10-95% RH noncondensing, @ up to 30°C (86°F)	
Storage temperature	-25° to 70°C (-13° to 158°F) w/out battery	
Power	9V Alkaline or Nicad battery	
Battery life (Alkaline)	50 hours (backlight not used) 20 hours (backlight used 50%)	
Dimensions	137 x 41 x 196 mm (5.4 x 1.6 x 7.7 in)	
Weight	270 gm (9.5 oz.)	
Accessories	Pouch/wrist strap/belt hook kit Waterproof toolbox	

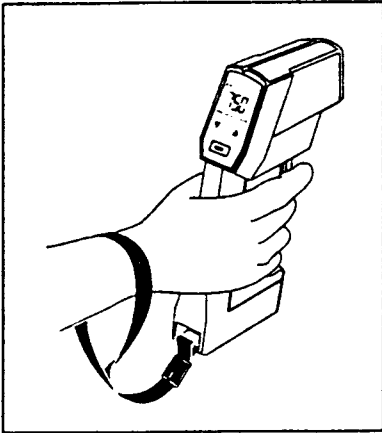
ACCESSORIES



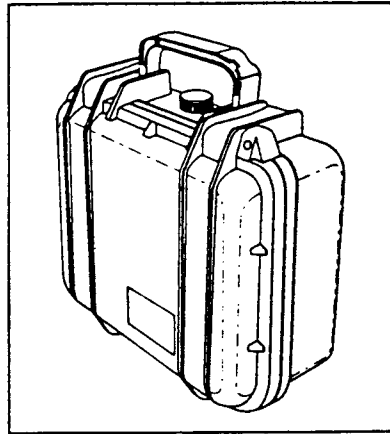
Padded Pouch/Holster



Belt Clip



Wrist Strap



Toolbox

- Pouch Carrying Kit: includes wrist strap, belt clip and padded pouch with 2 belt loops and built-in cable ring for holster use.
- Toolbox: heavy duty, waterproof, dustproof carrying case which holds pouch and/or unit 279 x 254 x 127 mm (11 x 10 x 5 in).

