

# Applications

## Raytek Infrared Thermometers Offer Quick Diagnostics for HVAC/R



Installing and maintaining HVAC systems requires accurate temperature measurements to diagnose duct leakage, supply and return air temperatures, plumbing lines, and other heat-related problems. Technicians have traditionally done this by perching on ladders, crawling on hands and knees, or squeezing around superheated pipes to take readings with a contact thermometer. But there's an easier, faster, safer approach: You just stand a comfortable distance from the target, point the unit at the surface to be monitored, pull the trigger, and read the temperature.

Today, the point-and-shoot method using a Raytek noncontact infrared thermometer has become the procedure of choice for more and more HVAC technicians. The IR thermometer has proven itself to be an indispensable tool. In less than a second it measures an object's surface temperature with great accuracy: 1–4% depending on the model. With a clear line of sight, a technician can measure any target within the instrument's range. Depending on the instrument and target size, precise readings can be made from as far away as 60 feet.

Saving work-hours and preventing down-time has never been easier, faster, or safer. Raytek® has a complete line of reliable and accurate thermometers designed with your specific needs in mind.

**Raytek Infrared Noncontact Thermometers are the professional's choice for:**

- Checking Supply and Return Registers
- Identifying Leaky Ducting
- Locating Broken Ducting
- Isolating Faulty Insulation
- Room Balancing
- Temperature Mapping
- Evaluating Steam Distribution Systems
- Calibrating Thermostats
- Checking Compressor Lines



# Noncontact Thermometers Are Effective Diagnostic Tools



“We use a Raynger MX4 to check ductwork temperatures, and when joint temperatures move above 140°F (59°C), we perform a routine shutdown to clean or replace the failing sections. We never want to experience an emergency shutdown.”

*Steve Cullum*

*First Commercial Building  
Little Rock, Arkansas*

**T**oo often, HVAC systems fail to operate at their optimal level, especially the high efficiency systems that are much in demand today. Frequently, this is because they are not thoroughly tested due to the time and expense involved. Locating problems can be long and labor intensive, especially in large offices and factories where it's necessary to drill holes in ducts to insert thermocouples or thermometers.

Noncontact thermometers solve this problem. Whether you are designing and building a new HVAC system or maintaining an existing one, easy-to-use Raytek noncontact thermometers pay off by giving you instant, accurate temperature readings of most key HVAC components. When compared to contact thermometers, time savings can be measured in hundreds of work-hours yearly, and technicians can do a more thorough job because the speed and ease of operation of a Raytek thermometer allows more frequent gathering of temperature data. Here are a few typical applications:

## Room Balancing

Technicians no longer have to place thermometers on walls, floors, and ceilings to determine room temperature at different strata and wait 15 to 20 minutes for each thermometer to stabilize. A technician simply points the Raytek noncontact thermometer at the base of the wall and by “walking” the readings up the wall in small increments, he can note each time the temperature goes up a degree. Readings are instantaneous. This procedure enables technicians to figure out if vents are properly placed, whether the HVAC unit is large enough for the space being heated or cooled, or if more efficient ducts should be installed.

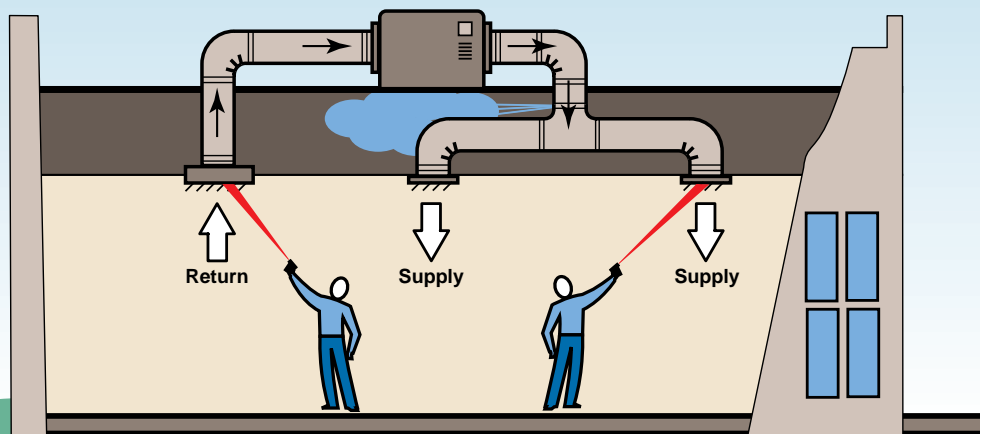
## Supply and Return Registers

A Raytek thermometer allows the technician to check supply and return registers to evaluate whether the temperature difference is correct. The temperature differential between the supply and return registers of a cooling system should fall between 18–22°F (10–12°C). In a heating system this difference should be 30–70°F (17–39°C). A larger variance could indicate an inefficient duct system, dirty filters, and possible problems with the exchange coils.

## Duct Work

Duct joints are constantly undergoing vibration, expansion, and contraction. If they loosen or fail, this can cause the duct to blow hot or cold air into the wrong areas and/or suck in air from surrounding areas. Regularly scanning the surface of ductwork will quickly reveal temperature spikes wherever the insulation has come apart. With a noncontact thermometer, the technician can monitor many feet of ductwork in the time it formerly took for a single reading with a contact thermometer.

A Recent Study Performed  
by the California Energy  
Commission showed the  
average ducting system  
leaked over 25% into the  
attic or crawl space.



## Supply & Return Registers

You can check to see if an HVAC system is cooling or heating properly. Simply check the supply and return registers to see if the temperature difference is correct for the system.

## Steam Distribution Systems

Diagnosing the condition of a steam trap can be dangerous. Pipes may contain live steam, and hot traps are frequently located in inaccessible places. Raytek thermometers allow you to quickly diagnose blown or plugged steam traps from a safe distance as part of an ongoing steam trap maintenance program. Noncontact measurement greatly reduces work-hours by cutting diagnostic time.

## Furnace Performance

A noncontact thermometer allows the technician to test how well a furnace is operating by simply checking the flue temperature. If the difference in temperature rise from the furnace is greater than 60°F (33°C), up to half of the cost of running the furnace is being wasted.

## Other Applications

- Check to see if a coil is sweating by checking the temperature of the condensate line. If they're cold, it's working.
- Check temperature on an emergency relief valve to see if a water heater or boiler has a problem and is ready to blow.
- Check for leaks. If an area of wallboard is wet, a lower temperature reading will be found at the source of the leak.
- Measure the existing air from a coil and at a supply air grill. The difference reveals thermal gain in ductwork located in a hot attic.

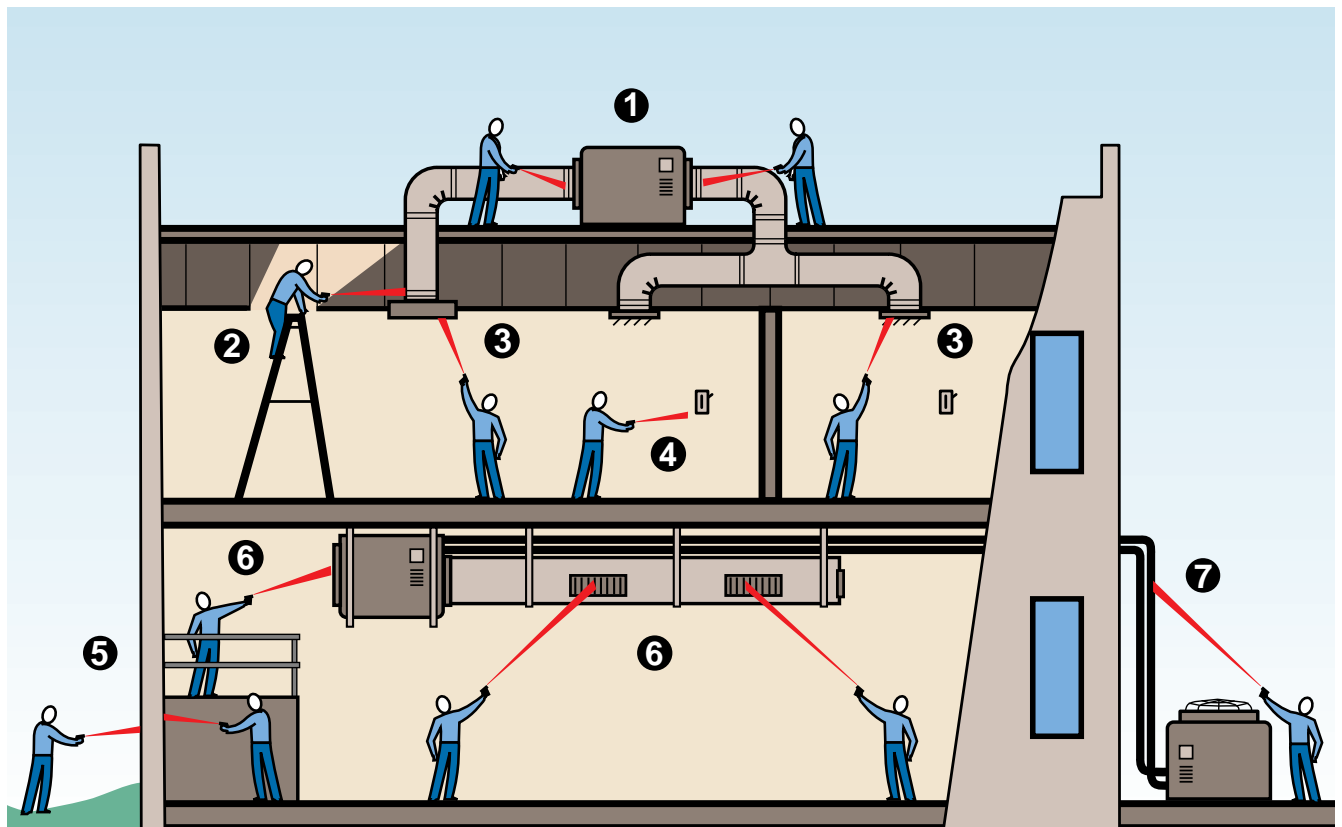
## Get the Job Done Quickly, Easily, and Safely

Raytek portable noncontact thermometers are must-have diagnostic tools for the HVAC/R professional. Their sensitivity, quick response, and ease of use can make the difference between fixing a costly problem and preventing it from occurring in the first place. From the first day you use a Raytek IR thermometer, you'll look at temperature measurement in a whole new context—determined in seconds, not minutes.



"We can measure temperatures quickly and safely, more accurately than before. We just point and shoot to take readings. Then we are able to confirm and show clients hot and cold spots at a glance."

*Dan Richardson  
Unitherm Insulation Systems, Inc.  
Lewisville, Texas*



**Checking for HVAC Problems the Raytek Way:** 1. Check rooftop HVAC unit 2. Check duct joints in attic or crawl space  
3. Check return and supply ducts 4. Measure wall temperatures for room balancing 5. Measure for heat/cold transference on outside wall  
6. Check return and supply on blower/filter unit and ducts 7. Check supply and return pipes from compressor unit

### MiniTemp™ • At Home, At Work, Anywhere

If you're looking for a basic noncontact thermometer for a variety of applications, MiniTemp is the tool for you. It's priced to fit any toolbox and is small enough to fit in your pocket. Choose between MiniTemp MT2, without laser sighting, or MiniTemp MT4 with laser sighting.

|                   |  |
|-------------------|--|
| • Temp Range      | -18 to 260°C (0 to 500°F)                          |
| • Response at 95% | 500 mSec   |
| • Accuracy        | ±2% of reading or ±2°C (±3°F) whichever is greater |
| • D:S             | 6:1  |



MT

### Raynger® IP™ • Compact Close-Focus Plug-in

Measure temperatures of small targets—as small as 2.5 mm (0.1 in). Ideal for measuring extremely small targets. The IP is designed to plug into your thermocouple meter and offers a choice of J or K output.

|                   |  |
|-------------------|--|
| • Temp Range      | -18 to 260°C (0 to 500°F)                          |
| • Response at 95% | 1 Second   |
| • Accuracy        | ±2% of reading or ±2°C (±3°F) whichever is greater |
| • D:S             | 4:1  |



IP

### Raynger® ST™ Pro & ProPlus • The Professional's Choice

The Raynger ST is the most popular noncontact thermometer in the world. It offers an ideal combination of precision and value for the technical professional. Available in four models—ST20, ST30, ST60, or ST80.

Most models feature circular laser sighting. The ST is accurate, compact, reliable, and easy to use—just what a professional needs.

|                    |              |   |
|--------------------|--------------|---|
| • Temp Range       | ST20 Pro     | -32 to 400°C (-25 to 750°F)                                       |
|                    | ST30 Pro     | -32 to 545°C (-25 to 950°F)                                       |
|                    | ST60 ProPlus | -32 to 600°C (-25 to 1100°F)                                      |
|                    | ST80 ProPlus | -32 to 760°C (-25 to 1400°F)                                      |
| • Response at 95%  |              | 500 mSec  |
| • Accuracy         |              | ±1% of reading or ±1°C (±2°F) whichever is greater                |
| • D:S              |              | ST20, ST30 = 12:1, ST60 = 30:1; ST80 = 50:1                       |
| • Special Features |              | ST60, ST80 features contact probe input and data logging capacity |



ST20  
ST30



ST60  
ST80

### Raynger® MX™ • For Those Who Demand Maximum Performance

The Raynger MX features an optically matched coaxial laser sighting system, which precisely and accurately outlines the target measurement area. With its unique combination of features and DataTemp™ software, the MX can adapt to any work environment. Choose from three models—MX2, MX4, and MX4+. Also available is the MX Close Focus (MXCF) special purpose model which will measure very small targets. (D:S 50:1, 6 mm target @ 30 cm, .25 in. target @ 12 in.).

|                   |  |
|-------------------|--|
| • Temp Range      | -30 to 900°C (-25 to 1600°F)                     |
| • Response at 95% | 250 mSec   |
| • Accuracy        | 0.5% of reading ±1°C (±2°F) whichever is greater |
| • D:S             | 60:1   |



MX



#### Vórtex Equipamentos Ltda

Rua São Miguel 1183 - Sala 101 Bairro Itapoã

Belo Horizonte - MG CEP: 31710-350

Tel.: (31) 3427-7700 Fax.: (31) 3427-7792

e-mail: [vortex@vortex.com.br](mailto:vortex@vortex.com.br)

[www.vortex.com.br](http://www.vortex.com.br)

