

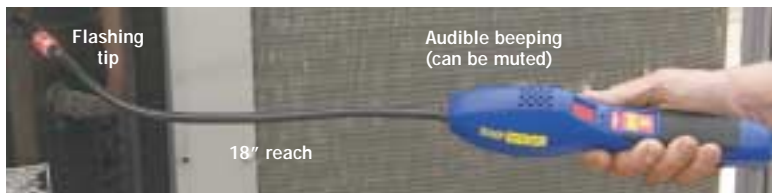


YELLOW JACKET®
Leak Monitors and
Portable Detectors —
locate problems fast and
save money

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YELLOW JACKET® ACCUProbe™ LEAK DETECTOR – heated sensor and Smart Alarm™ to find every leak fast and sure, and know how big

Building on the field-proven original, this improved unit is the only tool you need for fast, easy, and certain leak detection. The heated sensor tip of the YELLOW JACKET® ACCUProbe™ Leak Detector positively identifies the leak source for all refrigerants even those that other detectors miss. That includes HCFCs as small as 0.03 oz./yr.; HFC leaks of 0.06 oz./yr., even R-404A and R-410A; and CFCs (R-12 and R-502).



Frequency of flashes in the tip and audible beeping increases the closer you get to the leak source. You zero-in and the exclusive Smart Alarm™ LED shows how big or small the leak on a scale of 1 to 9. Maximum value helps you determine if the leak needs immediate repair.

Service life of the replaceable heated electrochemical sensor is more than 300 hours with minimal cleaning and no adjustments. Replaceable filters help keep out moisture and dust that can trigger false sensing and alarms.

Independent of the Smart Alarm LED, the unit combines three sensitivity levels with visual and audible signalling, including ultra-high to detect leaks that could be missed with other detection systems.

- Sensor not poisoned by large amounts of refrigerant
- Position probe for close-up or extended 18" detection
- Lightweight for handling comfort
- Replaceable filters help keep out dust and moisture
- Sensor failure mode
- Automatic calibration (no manual recalibration)
- Leak Standard bottle of non-ozone depleting chemical included to verify proper functioning of sensor and electronic circuitry
- 2-year limited warranty (1-year warranty on sensor)

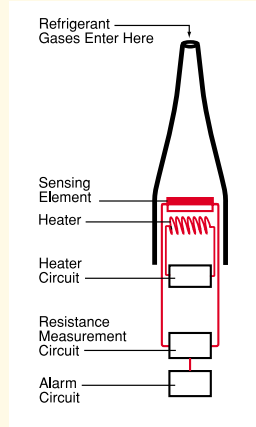
Unit is preset at normal sensitivity, but you can switch to high or low. If there is no response from the flashing tip or beeping signal at normal sensitivity in the general area of a suspected leak, select high sensitivity. This will detect even low levels in the general area and confirm your suspicions. Use low sensitivity as you move the tip over more defined areas of a system, and you will be alerted when the tip encounters the concentration at the leak source.

The frequency of flashing from the heated sensor tip increases as you get closer to a leak and refrigerant concentration increases. You can also turn on the audible alert. Beeping increases in frequency and duration as concentration increases.

Technology Comparison – Heated Sensor or Negative Corona?

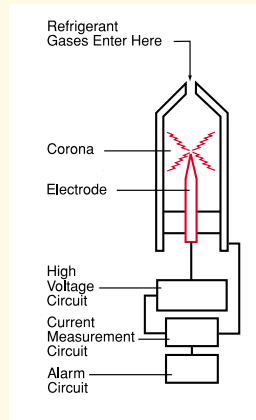
Heated Sensor Leak Detectors

When the heated sensing element is exposed to refrigerant, an electrochemical reaction changes the electrical resistance within the element causing an alarm. The sensor is refrigerant specific with superior sensitivity to all HFCs, HCFCs, and CFCs and minimal chance of false alarms. When exposed to large amounts of refrigerant which could poison other systems, the heated sensor clears quickly and does not need recalibration before reuse.



Negative Corona Leak Detectors

In the sensor of an old-style corona detector, high voltage applied to a pointed electrode creates a corona. When refrigerant breaks the corona arc, the degree of breakage generates the level of the alarm. This technology has good sensitivity to R-12 and R-22, but only fair for R-134a, and poor for R-410A, R-404A, and R-407C. Sensitivity decreases with exposure to dirt, oils and water. And false alarms can be triggered by dust, dirt specks, soap bubbles, humidity, smoke, small variations in the electrode emission, high levels of hydrocarbon vapors, and other non-refrigerant variables.



Specifications

Max sensitivity : 0.06 oz. (1.7 g)/yr.
HFC's R-134a

Max sensitivity : 0.03 oz. (0.9 g)/yr.
HCFC's R-22

Heated semiconductor sensor: Over 300 hours life

Maintenance required: No

Affected by humidity: No

Response time: Very fast

Body length: 10 inches (25.4 cm)

Probe length: 18 inches (46 cm)

Weight: 20 ounces (0.6 L)

Warm up time: 25 seconds or less

Battery type continuous life: 4 AA alkaline, 8 hours

Operating temp. range: 24° to 110°F (-4° to 43°C)

Storage temp range: -4° to 122°F (-20° to 50°C)

Approvals : SAE J1627, CE



UPC#	Description
69365	Heated AccuProbe
69366	Heated AccuProbe European
69367	Heated AccuProbe Japan
69368	Heated AccuProbe Australia/New Zealand
69378	(std w/69368) AC Adapter 230V/50-60 Hz
69380	(std w/69365) AC adapter – 115V/60 Hz
69381	(std w/69366) AC adapter – 230V/50 Hz
69382	(std w/69367) AC adapter – 100V/50-60 Hz

Accessories and Parts	
69383	Kit – sensor, filters and bottle
69384	Replacement sensor and filter
69385	Package 5 sensor filters
69386	Leak sensor bottle
69387	Carrying case with inserts
69388	Carrying holster with clip
69389	Battery cover and screw

Tips for detecting system leaks

1. Inspect entire A/C system for signs of oil leakage, corrosion cracks, or other damage. Follow the system in a continuous path so no potential leaks are missed.
2. Make sure there is enough refrigerant in system (about 15% of system capacity or 50 psi min.) to generate pressure to detect leaks.
3. Check all service access port fittings. Check seals in caps.
4. Move detector probe at 1" per second within 1/4" of suspected leak area.
5. Refrigerant is heavier than air so position probe below test point.
6. Minimize air movement in area to make it easier to pinpoint the leak.
7. Verify an apparent leak by blowing air into suspected leak to clean the area and see if the leak remains..
8. When checking for evaporator leaks, check for gas in condensate drain tube.
9. Use heated sensor type detector for difficult-to-detect R-134a, R-410A, R-407C, and R-404A.

YELLOW JACKET® COMBUSTIBLE GAS DETECTOR – with ultra-sensitive, long life sensor



Hand-held precision equipment detects all hydrocarbon and other combustible gases including propane, methane, butane, industrial solvents, and more. See page 91 for details.

Fluorescent Leak Detection – pinpoint leaks at the speed of light.

AC&R Leaks

Leaks usually start small and grow. When you find a leak early while still small, it's easier and faster to repair, and you save expensive refrigerant. Whether the system runs continuously or only part time, dye solution is ready in the system 24 hours a day to help you find even the smallest leaks with a lightweight UV lamp.

Automotive Leaks

Automotive manufacturers are installing dye in their A/C systems during assembly to make it easier for service technicians to pinpoint leak sources. Dye is always readily visible with a UV beam.

With **YELLOW JACKET® Fluorescent Leak Scanners**, you start by injecting solution into the system. No need to steam or clean area before scanning. Once the solution circulates, leak sources glow in the beam of the UV lightgun. It's that **fast and simple**.

- **Accurate** – The source of every leak glows, even leaks 1/4 oz. per year
- **Reliable** – See leaks indoors or outdoors. There are no problems with halide odors, noxious gases, or false alarms. Seeing and fixing every leak saves you the time of no-charge rework, reduces emissions and helps meet regulations
- **Versatile** – Easy-to-use with all AC&R systems and refrigerant oils
- **Long lasting** – Works for years
- **Energy saving** – A system with a full charge runs more efficiently



- With refrigerant loss, a system can use 25-50% more electricity
- **Harmless** to the system, recovery units, and the environment

Benefits of Fluorescent Scanning

- Find previously undetected leaks

- See exact leak location
- Find leaks more quickly and from a greater distance than electronic detection
- Lightweight, small and easy to carry

Fluorescent Scanning Applications

Put the technology to work wherever you find AC or refrigeration systems:

- A/C splits to window units
- **Commercial refrigeration** from supermarket to small cabinets
- **Property management** such as packaged terminal A/C units
- **Centrifugal systems** including

marine refrigeration and A/C

- **Industrial** hydraulic systems and closed loop water systems refrigeration
- **Chillers**
- **Transportation refrigeration**
- **Automotive** transmissions, cooling system, and A/C

YELLOW JACKET® MICRO LED UV LEAK DETECTION KITS

Use these high visibility lamps to spot leaks on all A/C systems. Individual reflectors surround each of five LEDs recessed for protection in the stainless steel head. 69790 features 3 UV and 2 blue bulbs A/C for detection at greater distances. For greatest contrast with all fluorescent dyes, use 69791 with 5 UV bulbs.

- 110,000+ hour LEDs
- Constant ON or momentary ON switch
- Sealing locks out moisture
- Long life lithium battery included
- Aircraft aluminum body
- Limited lifetime warranty

Continued on next page.



YELLOW JACKET® 3.2 and 2-Watt LED Flashlights



Compact 3.2-watt unit delivers 85 lumens for up to 250' effective range and up to 2-hour continuous non-dimming illumination (40 lumens for up to 175' and 5 hours with 2 watt unit).

Features for both include:

- One piece lens that focuses and projects up to 90% of light in a uniformly circular beam
- Aircraft aluminum body with military grade, Type III anodized finish and sure-grip texture
- Compression sealed for water resistance

Micro LED High Intensity Lamp



Illuminates 120' away with 5 high intensity clear bulbs. Visible at one mile.

- 110, 000+ hour LEDs

- Individual reflectors surround each of 5 LEDs recessed for protection in a stainless steel head
- Lithium battery for over 20 years of light and 10-year shelf life

UPC#	Description
69796	2 watt LED flashlight
69797	3.2 watt LED flashlight
69787	Micro 5 UV LED kit for ACR
69788	Micro UV LED and dye kit for auto
69789	Micro UV LED and dye kit for ACR
69790	Micro UV LED lamp 3 UV bulbs-2 blue bulbs
69791	Micro Pure UV LED lamp 5 UV bulbs
69792	Micro LED lamp clear bulbs for general use
69793	Replacement pouch for LED
69794	Lithium battery

UNIVERSAL PURE UV™ SYSTEM



Patented technology combines special high quality lens and reflector to emit only pure UV light (330-380 nanometers). Efficient in close quarters with power similar to AC lamps. Filter glasses not required.

Universal is your best choice for all dye bases including mineral, AB, PAG, POE, engine, and lubricant.

UPC#	Description
69770	Pure UV – flashlight, adapter and case
69771	Pure UV – 90° adapter and case
69772	Pure UV – 90° transformer and case
69773	Pure UV – 90° battery/charger and case
69775	Pure UV – 90° AC/R master kit w/transformer, A/C dye, coolant dye, oil dye, adapter hose and case
69777	Pure UV – 90° lamp – 230V with case
69410	Replacement bulb
69418	Filter lens
69413	Filter holding ring

MINI UV BLUE SYSTEM



Compact flashlight with patented Dichroic filter produces bright UV Blue light for maximum output in its class.

- Coolant, oil, and fluid dyes
- Durable carrying case
- Use with battery pack or AC transformer



Kit includes:

- Lamp with 65W bulb and UV glasses
- A/C dye syringes plus delivery hose for HVAC/R and auto systems

UPC#	Description
69740	Mini lamp, glasses, clip adapter
69741	Mini lamp above with case
69742	Mini lamp above with A/C, oil and coolant dyes, delivery hoses and case
69419	UV Blue lens – 2"
69423	Bulb for mini



Accessories

UPC#	Description
69401	Battery with case and charger
69403	Battery only
69405	Fast/trickle charger only
69406	AC power transformer

Common Parts

UPC#	Description
69409	Carrying/storage case
69415	Fluorescent viewing glasses for greatly enhanced visibility

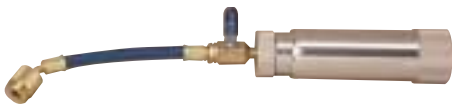


YELLOW JACKET® UNIVERSAL A/C DYE INJECTORS AND HOSE

Universal A/C dye injectors work in AC/R and auto A/C systems. Four 1/4 oz. applications of dye in each disposable tube make it economical, fast and clean. Hose features back flow check valve.

UPC#	Description
69702	Hose plus 2 injectors for AC/R
69703	Auto R-134a hose, coupling & injectors
69705	Injector hose with SealRight™
69706	Auto R-134a injector hose & service coupler

CALIBRATED A/C SCREW INJECTION

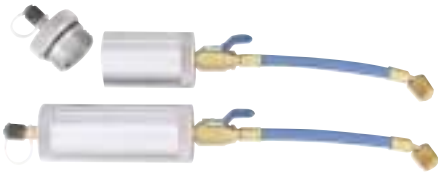


This 2-ounce injector is easy to refill and easy to operate. Calibrations are clearly marked on the injector. Connect

to A/C low side and rotate handle. AC/R and auto models.

UPC #	Description
69730	Calibrated A/C screw injector
69731	Auto R-134a calibrated A/C screw injector with service coupler
69732	Auto R-134a calibrated A/C screw injector without service coupler

DYE AND OIL INJECTORS



- Put oil in after changeout
- Add scanner fluorescent solution
- Add additives to system
- Refrigerant sampling

Body and cap are rugged aluminum with an O-ring seal. 1/4" male fitting at one end with Schrader. A ball valve for control on other end with a short length of hose. Valve depressor in 1/4" female end. 600 psi working pressure.

Saves time on many applications:

- Add oil to system

UPC#	Description
69559	1/4 oz. oil injector
69560	1/2 oz. oil injector
69561	2 oz. oil injector
69562	4 oz. oil injector
69563	"O"-ring 1/4 and 1/2 oz. injector (5 pk)
69564	"O"-ring 2 & 4 oz. injector (5 pk)

For auto injectors see page 112.

LARGE SYSTEM INJECTORS – systems with up to 32 gallons of lubricant



Self contained injection system for inducing up to 8 oz. of universal AC&R dye into the largest systems. Add to the low side. Easily works on all system pressures to 300 PSI, 1.5 oz. per stroke. Hose included with SealRight® end.

UPC #	Description
69555	Large system injector
77950	Large system injector with coupler

DYE APPLICATION AMOUNTS

Application	System size in lbs. of refrigerant	Universal dye amount
Small appliance	up to 4.9 lbs. (2.22 kg)	.25 Oz. (7.5 ml)
A/C or refrigerant systems	up to 25 lbs. (11.34 kg)	.5 oz (15 ml)
Larger systems	above 25 lbs. (11.34 kg)	.5 oz (15 ml) per gal. of oil

Compatible with mineral, alkyl, ester and PAG oil systems.

UNIVERSAL A/C DYE SOLUTIONS



Universal dye for A/C systems with mineral, alkyl, or polyol ester lubricants.

- Field proven and sold worldwide
- Passed thermal stability tests
- One dye for AC/R systems
- Raw material QC assures dye uniformity

UPC#	Description
69711	1/4 oz. (7.5 ml) universal A/C – 24/cs.
69708	1/2 oz. (15 ml) universal A/C – 12/cs.
69709	1 oz. (30 ml) universal A/C – 6/cs.
69710	2 oz. (60 ml) universal A/C – 6/cs.
69712	8 oz. (240 ml) universal A/C – 1/cs.
69713	8 oz. (240 ml) universal A/C – 6/cs.
69803	1 gal. (3.78 L) universal A/C – 1/cs.
69805	5 gal. (18.92 L) universal A/C – 1/cs.
69806	55 gal. (208.19 L) universal A/C – 1/cs.

Oil/fluid and coolant dyes available on page 90.

UNIVERSAL A/C DISPOSABLE INJECTORS

Universal disposable 1 oz. applicator for fast economical dispensing. Universal dye for all common refrigerants and oils.



Two 1/2 oz. applications for regular split systems or four 1/4 oz. applications for small appliances or auto A/C.



Easy to use: connect to system, push in plunger, and then disconnect.

- Less costly and faster than many other methods
- One dye minimizes inventory
- No back-up refrigerant to move dye into system
- Patented

UPC#	Description
69700	1 oz. (30 ml) injector – 6/cs. (12 residential applications/cs.)
69721	1 oz. (30 ml) injector – 2/pkg. (4 residential applications/pkg.)
69727	1 oz. (30 ml) injector – 1/pkg.

YELLOW JACKET® AC POWERED UV LAMP



Lightweight pistol-grip lamp with 10 foot cord plugs into any outlet. Metal housing and lens retention ring with break resistant lens protects the high output 160 watt bulb. Lens filters out virtually all light except pure UV and concentrates the beam like a spot light

for high intensity, contrast, and ease of detection.

Handle stays cool and vinyl-coated heat guard cage around the ring helps keep fingers away from the lens. Cage also provides a handy stand.

Kit includes light gun with AC cord, UV spot bulb with ballast, heat guard cage/stand, high contrast filter, and UV protective glasses.

UPC #	Description
69435	A/C leak scanner lamp kit
69436	Replacement UV bulb with ballast
69468	Replacement UV filter lens
69438	Heat guard lamp stand

FLUORESCENT LEAK SCANNER SYSTEM II



With Scanner System II, you not only accurately pinpoint every leak at the speed of light, but also save prep time. High intensity UV lamp with filter produces almost pure UV to light up fluorescent particles in the solution for the best contrast and fastest, most visible results. Simply connect the disposable pre-filled solution injector tube directly to the AC&R system. There's no solution mess and you eliminate the cost and time of a separate infuser.

3 simple ways to inject system



1. Use refrigerant from tank to move solution into low side while throttling refrigerant flow.

2. Connect high and low sides. Let high pressure gas move solution into the system while throttling refrigerant flow.
3. Add solution to the oil container and then pump solution into the system.

Complete system includes:

- UL Listed UV lightgun with bulb, hand grip and heat guard. 110 volt
- Mineral-based pre-filled fluorescent solution tubes with two bleed valves
- SealRight™ Fitting immediately traps refrigerant in hose when disconnected
- UV-absorbing anti-fogging goggles
- Service manual and carrying case

UPC #	Description
69631	Leak Scanner System II 120V
69632	Leak Scanner System II 230V
69460	Mist infuser 1/2 oz.
69461	Mist infuser 2 oz.
69464	Complete lightgun with bulb, stand
69466	Replacement UV bulb with ballast
69467	Heat guard/stand for new body
69468	Replacement UV filter lens
69474	UV-absorbing goggles
69498	Carrying case
18993	System control valve
69470	Rubber filter holder for lamp
69670	Bleed valve (1/4" SAE threads)
69671	Bleed valve (1/2" Acme threads)

UV detection as preventative maintenance

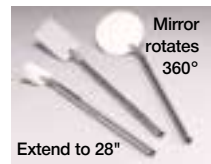
Leaks generally start small. With ultra-violet leak scanners for system surveillance you can keep a small problem from becoming a bigger, more expensive one. After installing the correct dosage of Universal Dye solution, locate leaks quickly.

The *big payback* comes on each subsequent visit. A quick scan of the system reports to you system status on all leaks, so you can repair even the smallest.

Of course UV detection can also be used to confirm leaks and show the customer.

INSPECTION MIRRORS stainless telescoping

Check leaks in hard to see places. Stainless steel mirror on ball joint rotates 360°. Handle telescopes to 28". More mirrors page 111.



UPC #	Description
78100	Round 3 3/4" diameter
78101	Rectangular 3 3/4" x 2"
78102	Rectangular 2" x 1 1/4"

CLEANERS

Scan-off UV Cleaner

Water-based biodegradable spray cleans scanner solution from system.



Natural Degreaser

Heavy-duty biodegradable degreaser removes scanner solution from system.

Hand Cleaner

Cleans solution from hands.

UPC#	Description	Quantity
69698	Natural Degreaser #01020 19 oz.	Indiv.
69699	Hand cleaner 16 oz.	Indiv.
69696	Spray-off solution 8 oz.	Indiv.
69697	Spray-off solution 8 oz.	12/case

YELLOW JACKET FLUORESCENT SCANNER SOLUTIONS – technology to match refrigerant and system volume



Patented disposable pre-filled solution tubes.



AC&R bottles

Different concentrations of Yellow Jacket fluorescent solutions are available to match the refrigerant volume in a system. You also have the choice of bottles for the original system or the disposable pre-filled solution injector tubes for *System II*.

Operating temperature:
-40°F for all solutions. Alkylbenzene in alkylbenzene systems to -100°F.

Injectors and bottles

01

Systems up to 2.9 lbs. gas.

1

Systems with 1 to 4.9 lbs. gas.

2

Systems with 5 to 9.9 lbs. gas.

3*

Systems with 10 to 25 lbs. gas.

4

Large systems use 1/4 oz. per gallon of oil in system.

* When working on split systems, servicemen generally prefer to use solution 3 even if system has 10 lbs. of gas or less.

		Self-infusing injector tubes				Bottles		
Solution concern	System size	Mineral oil system	Ester oil system	Alkylbenzene system	PAG oil system	Mineral Oil system	Ester oil system	Alkylbenzene system
01 (.03 oz.)	up to 2.9 lbs.	69610	69620	69600	69590			
1 (.5 oz.)	up to 4.9 lbs.	69611	69621	69601		69451		
2 (.5 oz.)	up to 9.9 lbs.	69612	69622	69602		69452		
3* (.5 oz.)	up to 25 lbs.	69613	69623	69603		69453		
4 (2 oz.)	Large**					69454	69624	69604
4 (16 oz.)	Large**					69455	69625	69605

* Use on all split systems.

** Only bottles are available for systems with over 75 lbs. of refrigerant. For large systems add 1/4 ounce #4 solution per gallon of oil.

Injectors packaged 6/case. Bottles of solution 12/case. #4 solution individual bottles.

YELLOW JACKET FLUORESCENT SOLUTIONS for non-refrigerant applications

Using your scanner system to help locate leaks in non-refrigeration and non-A/C applications adds value and versatility to your leak scanner system.

The oil and fluid dye solution, and coolant H₂O dye solution, and H₂O auto solution all work similarly to the refrigerant scanner solution above. Pour in the appropriate amount of dye solution and use the UV lamp to find the bright glow.



The oil and fluid dye solution is for finding leaks in oil-based applications such as milling machines and hydraulics, transmissions, power steering, and more. Use one

ounce per 2 gallons of oil.

- Pin point leaks in hydraulic systems such as cherry pickers
- Find seal and gasket leaks in engines, compressors and transmissions
- Locate leaks in gasoline or diesel fuel equipment, offset printing presses, injection-molding machines, locomotive engine oil coolers, and oil-cooled chillers

69584 H₂O solution glows blue at leak sources in large closed-loop water systems such as boilers and sprinklers. Use one pint per 1,000 gallons of water

- Easiest way to detect leaks in storage tanks and other high volume containers, as well as associated piping, valves, condensers, sprinkler systems, pumps, etc.
- Detect water leakage in any enclosed

circulatory system or static system that can be pressurized or agitated



Bright blue glow

Coolant dye to pinpoint leak sources in antifreeze-based automotive water systems such as hydronics and engine radiators. Use one ounce per each gallon of coolant.

UPC#	Description
69584	Fluorescent H ₂ O solution, 16 oz. bottle
69733	1 oz. (30 ml) oil and fluid dye – 6/cs.
69734	1 oz. (30 ml) oil and fluid dye – 24/cs.
69735	8 oz. (240 ml) oil and fluid dye – 1/cs.
69737	1 oz. (30 ml) coolant dye – 6/cs.
69738	1 oz. (30 ml) coolant dye – 24/cs.
69739	8 oz. (240 ml) coolant dye – 1/cs.

Frequently Asked Questions

1. Does the UV scanner light work better than an electronic leak detector?

No one detection system is better for all situations. But, with a UV lamp you can scan a system more quickly and moving air is never a problem. Solutions also leave a telltale mark at every leak site. Multiple leaks are found more quickly.

2. How is the solution different from visible colored dyes?

Unlike colored dyes, YELLOW JACKET® fluorescent solutions mix completely with oil and do not settle out. Lubrication, cooling capacity and unit life are not affected. And there is no threat to valves or plugging of filters. The solutions will also work in a system containing Dyltel.

3. In a system with a mix of mineral and alkylbenzene oil, which scanner solution should be used?

Base your choice of solution on whatever oil is present in the larger quantity. If you don't know which oil is in greater quantity, assume alkylbenzene.

4. How do I test the system?

Put solution into a running system to be mixed with oil and carried throughout system. Nitrogen charging for test purposes will not work since nitrogen will not carry the oil.

To confirm solution in the system, shine the lamp into the system's sight glass. Another way is to connect a hose and a sight glass between the high and low sides, and monitor flow with the lamp. The most common reason for inadequate fluorescence is insufficient solution in the system.

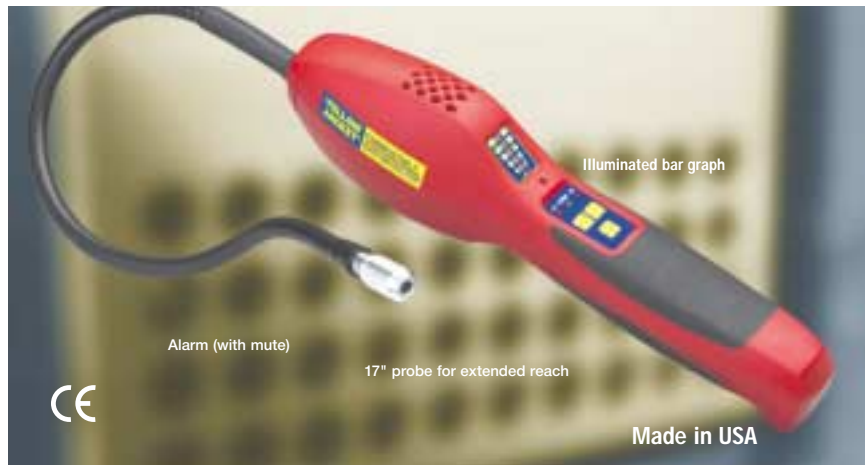
5. What's the most effective way to perform an acid test?

Scanner solution affects the color of the oil slightly. Use a 2-step acid test kit which factors out the solution in the oil, giving a reliable result.

YELLOW JACKET solutions meet or exceed applicable ASHRAE and ANSI tests.

Meets SAE standard J2297 for R-134a UV leak detection.

YELLOW JACKET® Combustible Gas Detector – with ultra-sensitive, long life sensor



Hand-held precision equipment detects all hydrocarbon and other combustible gases including propane, methane, butane, industrial solvents, and more.

Sensitivity, bar graph, and beeping to signal how much and how close

Unit is preset at normal sensitivity, but you can switch to high or low. After warm-up you'll hear a slow beeping. Frequency increases when a leak is detected until an alarm sounds when moving into high gas concentration. The illuminated bar graph indicates leak size.

If no leak is detected in an area you suspect, select high sensitivity. This will detect even low levels in the area to confirm your suspicions. Use low sensitivity as you move the tip over more defined areas, and you will be alerted when the tip encounters the concentration at the leak source.

- Ultra-sensitive sensor detects less than 15 ppm methane and better than 12 ppm for propane. Performs equally well on a complete list of detectable gases including acetylene, butane, and sobutane
- Automatic calibration and zeroing
- Long life sensor easily replaced after full service life
- 2-year limited warranty
- And many more features

Applications

- Gas lines/pipes
- Propane filling stations
- Gas heaters
- Combustion appliances
- Hydrocarbon refrigerant
- Heat exchangers
- Marine bilges
- Manholes
- Air quality
- Arson residue (accelerants)

Specifications

Response time:	Instantaneous
Warm up time:	10 seconds
Power:	4 AA alkaline batteries
Probe length:	17 inches (43.17 cm)
Sensor life:	500 hours
Body length:	10 inches (25.4 cm)
Weight:	20 ounces (.057 kg)
Battery life:	20 hours continuous
Operating temp. range:	32° to 110°F (0° to 43°C)
Approvals:	Intrinsic Safety, CE

UPC#	Description
69373	Combustible gas detector w/case
69301	Sensing Tip
69371	Replacement sensor
69387	Carrying case – blow molded
69388	Carrying holster
69379	Battery cover red and screw

Three reasons to monitor

1. Safety and Legal

ASHRAE 15-2001 safety code for mechanical refrigeration calls for refrigerant monitoring systems to be installed in machinery rooms, industrial occupancy buildings, and refrigerated rooms such as in factories, plants, processes, and high probability systems. Monitors that actuate an alarm and air ventilation are to be located in all areas where refrigerant from a leak could concentrate.



In addition, an increasing number of local regulations govern occupational health and safety, refrigerant use, and fixed monitoring as a way to protect people from hazardous situations:

- Refrigerants are not normally detected and can displace oxygen
- Most refrigerants do not have an odor and exposure to flame generates toxic fumes

2. Economical

With taxes and other factors driving up the costs of refrigerant, catching and repairing a leak early makes good economic sense.

Fast detection and repair also protects your HVAC&R system, helping control maintenance and operating costs.

3. Environmental

Refrigerants represent possible threat to the environment. And many refrigerants are toxic at various concentrations. Early detection and fast repair is common sense protection.

Configure a YELLOW JACKET® Fixed Monitoring System that's right for you.



Refrigerant or ammonia monitor



Refrigerant sensor



Ammonia sensor

With YELLOW JACKET™ Fixed Monitoring Systems for refrigeration leaks, you can configure controllers and remote sensors to meet your requirements for point or perimeter detection. You can **monitor most common refrigerants or ammonia**.

Controllers are available using one or two sensors (shown here) or four or six sensors (see page 94).

The system first emits an intermittent siren and constant orange illumination at the low level, about 100 ppm. At the high level, usually about 1,000 ppm*, the siren is continuous and LED is red to signal a condition that requires immediate action.

To help **minimize false alarms**, all systems wait until "certain" of gas in the air before signalling.

Voltage-free relay switch can activate ventilation or remote alarms, or report to control systems. The system features two relays.

To help resist harsh work environments,

Applications

- Refrigerant storage areas
- Supermarkets
- Refrigeration machinery rooms
- Cold storage facilities
- Walk-in coolers
- Systems with large refrigerant volume
- Marine and fishing fleets
- Small deli stores, ice cream parlors, quick service stores.

Single sensor system

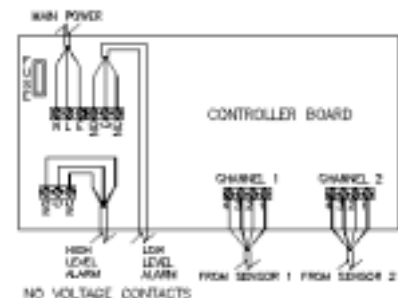
Includes refrigerant monitor with refrigerant sensor or ammonia monitor with ammonia sensor.

controller circuitry is in a coated steel housing. The **maintenance-free** sensors are protected in a high impact ABS casing. All components are designed for **long-life** with mechanical strength and chemical resistance. Sensors will not be poisoned by prolonged exposure to refrigerant.

Easy installation

Systems are factory calibrated. Controllers and sensors mount to any flat vertical surface. For point detection, mount the sensor(s) near the most likely leak source. With perimeter detection, sensors surround the potential leak area. Sensors operate from -20° to 122°F (-29° to 50°C). From -20° to -40°F use with environmental enclosure, page 93.

Typical two sensor, two level installation



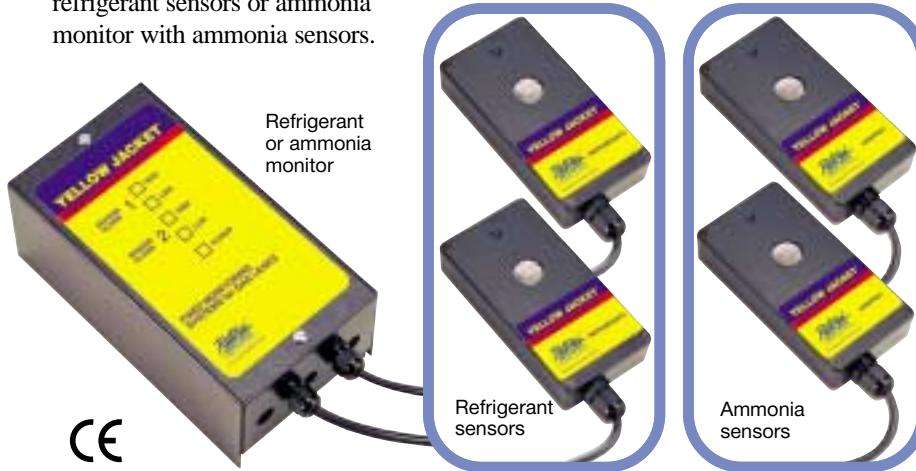
Semi-conductor technology

provides a cost/performance balance that makes YELLOW JACKET systems an attractive alternative to electro-chemical or infrared systems.

* High levels: R-123 is about 300 ppm; ammonia about 150 ppm.

Two sensor system

Includes refrigerant monitor with refrigerant sensors or ammonia monitor with ammonia sensors.



Refrigerant sensor is for **most common CFCs, HFCs, and HCFCs, plus R-134a, R-404A, R-410A, R-407C, and R-123.** Ammonia sensor is for ammonia only.

Specifications

Controller: 7.6" x 4" x 3"; 2.8 lbs.
(193 x 102 x 76 mm; 1.3 kg)

Relays: Dry contact switch;
10 Amp @ 120/250V max

Sensor: 4.3" x 2.2" x 0.9"
(109 x 56 x 23 mm)
Operates to -20°F (29°C)
Sensors can be hard wired up to 200' from controller

Power LED: Green

Alarm 90 dB @ 18" (456 mm)

Cable: 4-wire alarm with max
3.52 ohms/core/1000'

Power: 120VAC, 60 Hz or
230VAC, 50/60 Hz

Operation: Constant power-on
and fault monitoring

UPC # 120V	One and Two Sensor Refrigerant Monitors	UPC # 230V
68004	Single sensor monitor with two level detection	68104
68008	Two sensor monitor with two level detection	68108
68091	Refrigerant sensor for two level monitor	68191
UPC # 12V	One and Two Sensor Refrigerant Monitors	
68010	Single sensor monitor with two levels of detection	—
68011	Two sensor monitor with two levels of detection	—
One and Two Sensor Ammonia Monitors		
68032	Single sensor monitor with two level detection	68132
68036	Two sensor monitor with two level detection	68136
68093	Ammonia sensor for two level monitor	68193
UPC #	Accessories	
68096	500' alarm to sensor cable	—
68097	1,000' alarm to sensor cable	—
68099	Monitor key switch set	—

Reset: Automatic on one level unit. On two level unit, automatic on low level; manual on high level.

MONITOR with 12 volt backup

A single or two sensor, two level monitor that can be located up to 200 feet from the controller. UPC # 68010 and 68011.

ENVIRONMENTAL ENCLOSURE for sensors



A sensor element mounted in an area of high condensation, low temperature to -40°F, or direct airflow can experience a fast

temperature drop causing a false alarm. These vented enclosures maintain the proper operating temperature around the sensor for alarm reliability.



Two versions available: wall mount affixes to any surface and duct mount for sampling air inside plenum ducts.

UPC #	Description
68089	Environmental enclosure
68084	Duct mount enclosure

Integrated Area Monitor



Sensor and controller are combined into a single, compact unit that can be hard wired into any outlet or power supply and detects leaks in the area.

The unit emits a continuous siren and constant red LED illumination at about 1000 ppm. This early warning gives technicians time to find the leak while refrigerant concentration is still low. With adjustable delay, the monitor waits 0-5, 10 or 15 minutes to avoid

false alarms before signalling. Siren can be switched off.

Two voltage-free relays can activate ventilation or remote alarms, or report to control systems. Can also be connected to dedicated 16 unit panel. Expandable indefinitely by connecting control panels.

Size: 3.4" x 5.8" x 2.4" (86 x 147 x 61 mm)

Applications: living spaces, marine, and mechanical rooms.

UPC #	Description
68050	Integrated Area Monitor 115V
68051	Integrated Area Monitor 220/240V
68052	Control panel 115V
68053	Control panel 220/240V

YELLOW JACKET® 4 AND 6 SENSOR MONITORING SYSTEMS



YELLOW JACKET 4 and 6 sensor monitors provide all of the benefits of the 1 and 2 sensor systems (pages 92-93), but increase coverage area and level of coverage with more sensors at greater distances from the controller. Cost per channel are lower. You can locate 4 or 6 sensors up to 500' from the controller.

UPC # 120V	Refrigerant Monitors	UPC # 230V
68016	Refrigerant four sensor monitor with two levels of detection	68116
68024	Refrigerant six sensor monitor with two levels of detection	68124
68091	Refrigerant replacement sensor for two level refrigerant monitor	68191
Ammonia Monitors		
68043	Ammonia four sensor monitor with two levels of detection	68143
68047	Ammonia six sensor monitor with two levels of detection	68147
68093	Ammonia replacement sensor for two level ammonia monitor	68193

See alarm cables on page 93.

Specifications

- Controller:** 10.3" x 10" x 3.2"
(262 x 254 x 81 mm)
6.3 lbs. (2.9 kg)
- Relays:** Dry contact switch;
10 Amp @ 120/250v max
- Power LED:** Green
- Alarm:** 10 dB @ 3 feet (92 cm)
- Sensor:** 4.3" x 2.2" x 0.9"
(109 x 56 x 23 mm)
0.2 lb. (0.1 kg)
- Cable:** 4-wire alarm with maximum 8.8 ohms/core/1000 ft. Sensors can be hard wired up to 500' from controller
- Power:** 120VAC, 60 Hz or 230 VAC, 60 Hz
- Operation:** Constant power-on and fault monitoring
- Reset:** Automatic on one level unit. On two level unit, automatic on low level; manual on high level

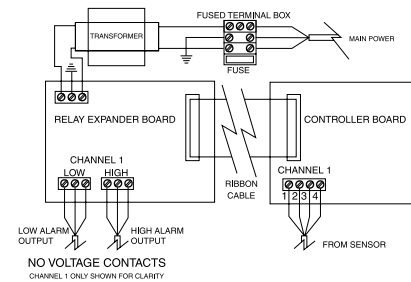
RELAY EXPANDER BOX



Enables the 4 or 6 sensor controller to individualize response to each sensor. For example, sensor one is set to activate a fan and auto dialer while other sensors activate different response systems. If sensor one detects a leak, only its corresponding systems are activated. The other sensors remain in monitoring mode and will respond individually if a leak is detected in their specific area.

Ribbon cable connects the relay expander box to the YELLOW JACKET controller.

Typical Installation



UPC # 120V	Description	UPC # 230V
68028	4 sensor expander box	68128
68029	6 sensor expander box	68129

COMBUSTIBLE REFRIGERANT (HYDROCARBON) GAS MONITORS



The YELLOW JACKET hydrocarbon sensors will detect most hydrocarbons such as methane, butane, propane,

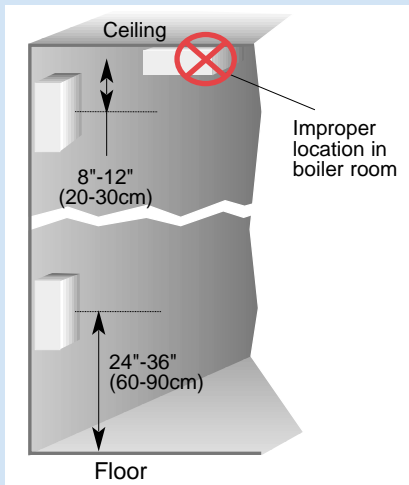
and all other products emerging in refrigerant applications, including:

- Propane (R-290)
- Propene (R-1270)
- Isobutane (R-600a)

Sensors are set at 100 ppm low level, and 1000 ppm for a high level alarm.

UPC # 120V	Hydrocarbon Monitors	UPC # 230V
68064	Hydrocarbon monitor - single sensor with two levels of detection	68164
68068	Hydrocarbon monitor - two sensors with two levels of detection	68168
68094	Hydrocarbon sensor for two level hydrocarbon monitors only	68194

Guidelines on Locating Sensors



Sensors must be powered according to the instruction manual and be within the cable length from the control unit.

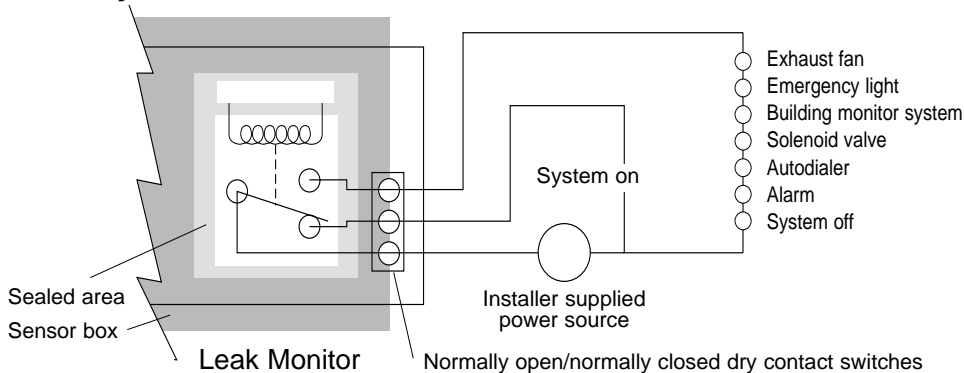
- Do not mount in areas of high heat, direct solar heat, wetness, dampness, or where condensation may form on the sensor
- Do not mount to piping or any structure subject to vibration
- For perimeter detection, place sensors around the area in question to monitor the entire space
- For point detection, place a sensor(s) at a point where you are concerned about a leak, i.e. at the compressor
- For heavier than air gases, place sensors close to the ground
- To help prevent false alarms from stray gas particles such as Volatile Organic Compounds (VOCs), mount sensors 24" TO 26" from the floor

- For lighter than air gases, place sensors high on the walls or ceiling, but convenient for maintenance.
Note: Ammonia is lighter than air at normal temperature but heavier in a cold room
- Take room shape into consideration and mount sensors downstream of any air flow
- In hot rooms, hot air rises to form a barrier below the ceiling and prevents gas from getting to a ceiling-mounted sensor

Mount sensors out of traffic flow areas to prevent bumping.

Contact Ritchie Engineering for detailed suggestions.

Remote Systems Control



All of these related products can be triggered by the monitor alarm. All are available from your local fire alarm or building management suppliers.

Evaluating Refrigerant Monitors

There are two major types of refrigerant monitoring systems – Fixed and infrared (IR). Following is a summary of the differences:

	Fixed monitoring System	IR Systems
Gases Measured	Measures a broad band of most common CFCs, HFCs, and HCFCs, such as: R-11, R-12, R-13, R-22, R-113, R-123, R-134a, R-404A, R-407C, R-410A, R500, R-502 and R-507.	A single sensor must be used for each specific refrigerant.
Cost	Less than \$500 per sensor to measure abroad range of refrigerants.	\$1000 and more per sensor for each refrigerant.
Installation	Controllers mount on any flat surface and then cable is run from the controller to the sensor(s).	Plumbing tube is used to reach sensing points. An additional tube for exhaust is also required.

Once you've chosen between a Fixed Monitoring System or an IR System for your application, you'll have to evaluate the features that a monitor might include.

- **Flexibility is size of controls** – Controllers available for 1, 2, 4 or 6 sensors allow you to buy what you need now and plan to expand in the future
- **Two levels of response** – A system can emit an intermittent alarm at a low level, about 100 ppm, indicating that maintenance is required, and a continuous siren at a high level, usually about 1000 ppm (R-123 high level is about 300 ppm) indicating that immediate action is required
- **Designed to minimize false alarms** – Minimize false alarms by waiting until "certain" that gas is in the air before signaling
- **Individualized response by "zone"** – Relay expander panel allows a 4 or 6 sensor system to be "zoned" for fast, individualized response in a larger application. If one sensor detects a leak, only its corresponding system is activated. The other sensors remain in monitoring mode
- **Sturdy protective housing** – Coated steel housing for controller circuitry and ABS casing for sensors help protect the system and keep it maintenance-free
- **Protection in harsh environments** – An optional vented environmental sensor enclosure protects a sensor that is mounted in an area of high condensation, low temperature to -40°F or direct airflow to avoid a false alarm

Frequently Asked Questions

1. Are calibrated leak testers available to confirm monitor is calibrated correctly?

Ritchie Engineering does not sell calibrated leak testers, but gases for testing leak monitor installations are available through MSA Mine Safety Appliances, 121 Gamma Drive, Pittsburgh, PA 15238-2919. 1-800-672-2222

2. What refrigerants will the leak monitors detect?

Leak monitors will detect most CFC, HFC, and HCFC's. Such as R-11, R-12, R-13, R-22, R-113, R-123, R-134a, R-404A, R-407C, R-410A, R-500, R-502, and R-507. YELLOW JACKET also has leak monitors available for ammonia and hydrocarbon based refrigerants.

3. Can the leak monitor be calibrated for specific applications?

Yes, the YELLOW JACKET leak monitor can be calibrated for specific applications. Contact customer service for your specific need.

4. If the unit goes into alarm, can it switch on the fan? Can it turn off the system at the same time?

The leak monitor has a pair of dry, normally open/normally closed contacts that can handle 10 amps at 115 volts. When the sensor indicates a gas presence higher than the set point, it opens the closed contacts and closes the open contacts which will turn equipment on or off.

5. After a unit goes into alarm and the contacts close, what can it be connected to?

The open contacts can shut the system down, call a phone number, turn on a fan or emergency light, etc.

6. How does the sensor work?

When the sintered metal oxide surface within the sensor absorbs gas molecules, electrical resistance is reduced in the surface allowing electrons to flow more easily. The system controller reads this increase in conductivity and signals an

alarm. Metal oxide technology is proven for stability and performance

7. What is the detection sensitivity level of YELLOW JACKET fixed monitors?

The dual sensitivity system has a low alarm level of about 100 ppm and a high level of about 1000 ppm for most CFC, HFC, and HCFC products. The high level for R-123 is an exception at about 300 ppm. Ammonia detection levels are about 100 ppm low and about 150 ppm high. The alarm level of all YELLOW JACKET single level systems is about 100 ppm.

Detection levels are preset at the factory to cover most situations. If necessary, however, you can order a custom level, or adjust the set point on site.

8. What concentration must be detected?

Depends on the refrigerant. For a more thorough answer, terms established by U.S. agencies must first be understood:

- **IDLH** - Immediately Dangerous to Life and Health
- **TWA** – Time Weighted Average concentration value over an 8-hour work day or a 40-hour work week. (OSHA or NIOSH levels).
- **STEL** – Short Term Exposure Level measured over 15 min. (NIOSH).
- **Ceiling Concentration (c)** which should not be exceeded in a working day (OSHA).

Obviously, the first consideration is IDLH. For most refrigerants, the IDLH is relatively high (e.g. R-12 is 15,000 ppm), and such a concentration would be unusual in a typical refrigerant leak situation. Leak detection, however, is still an immediate condition, so the STEL should be the next consideration, followed then by the 8-hour TWA or Ceiling Concentration. R-22, for example, has a STEL of 1250 ppm and a TWA of 1000 ppm. (The TWA for most refrigerants is 1000 ppm).

The draft UL standard for leak monitors requires gas detection at 50% of the IDLH. In other words, R-12 with a IDLH value of 15,000 ppm must be

detected at 7500 ppm. As with most refrigerants, the TWA is 1000 ppm.

All of the foregoing suggests that for most CFC, HFC and HCFCs, detection at 1000 ppm provides a necessary safety margin for repair personnel. **Ammonia** with a significantly lower IDLH of 300 ppm and a TWA of 25 ppm requires detection at 150 ppm to comply with 50% IDLH requirements. **R-123** has a TWA of 50ppm and an IDLH of 1000 ppm, therefore detection at 100 ppm provides a good margin of safety.

A monitor with a detection threshold of about 100 ppm for any gas provides an early warning so that repairs can be made quickly. This can save refrigerant, money and the environment.

9. Will the system need recalibration?

Factory calibration should be adequate for 5-8 years. Routine calibration is unnecessary when used with intended refrigerants. YELLOW JACKET sensors can not be poisoned, show negligible drift, and are stable long term. You should, however, routinely check performance.

10. Can there be a false alarm?

For monitoring mixtures, the semiconductor must be able to respond to molecularly similar gases. With such sensitivity, false alarms can be possible. Engineered features in YELLOW JACKET monitors help minimize false alarms:

- The two level system waits about 30 seconds until "certain" that gas is present before signalling.
- At about 100-1000 ppm calibration level, false alarms are unlikely.

To prevent an unnecessary alarm, turn off the unit or disable the siren during maintenance involving refrigerants or solvents. Temperature, humidity, or transient gases may occasionally cause an alarm. If in doubt, check with us.