

SECTION 23 64 00
REFRIGERANT LEAK DETECTION SYSTEM FOR EXISTING CHILLER ROOM

PART 1 - GENERAL

1.1 RELATED WORK

- A. Section 01 00 00, GENERAL REQUIREMENTS.
- B. Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES.

1.2 DEFINITION

- A. Engineering Control Center (ECC): The centralized control point for the intelligent control network. The ECC comprises of personal computer and connected devices to form a single workstation.
- B. BACNET: Building Automation Control Network Protocol, ASHRAE Standard 135.
- C. Ethernet: A trademark for a system for exchanging messages between computers on a local area network using coaxial, fiber optic, or twisted-pair cables.
- D. FTT-10: Echelon Transmitter-Free Topology Transceiver.

1.3 SUBMITTALS

- A. Submit in accordance with Specification Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES.
- B. Manufacturer's Literature and Data.
 - 1. Installation instructions.
 - 2. Start up procedures
 - 3. Wiring diagrams, including factory-installed and field-installed wiring.
 - 4. Refrigerant vapor detectors and monitors.
- C. Maintenance and operating manuals.

1.4 REFRIGERANT MONITORING AND SAFETY EQUIPMENT

- A. General: Provide refrigerant monitoring sensor/alarm system and safety equipment as specified here. Refrigerant sensor and alarm system shall comply with ASHRAE Standard 15. The refrigerant monitoring system shall be interfaced with the existing BMS.
- B. Refrigerant monitor shall continuously display the specific gas (refrigerant used) concentration; shall be capable of indicating, alarming and shutting down equipment; and automatically activating ventilation system. On leak detection by refrigerant sensor(s), the following shall occur:
 - 1. Activate machinery (chiller) room ventilation, where available.
 - 2. Activate visual and audio alarm inside and outside of machinery room, with beacon light(s) and horn sounds equipment room and outside

equipment room door(s). Shut down combustion process where combustion equipment is employed in the machinery room.

3. Notify Engineering Control Center (ECC) of the alarm condition.
- C. Refrigerant monitor shall be capable of detecting concentration of 1 part per million (ppm) for low-level detection and for insuring the safety of operators. It shall be supplied factory-calibrated for the apparent refrigerant.
- D. Monitor design and construction shall be compatible with temperature, humidity, barometric pressure, and voltage fluctuations of the machinery room operating environment.
- E. Furnish and install Bacharach Model HGM-MZ Refrigerant Monitor and HGM-RD Remote Display or approved equal as follows. Refer to contract drawings for more information.

General - To provide an automatic and continuous multiple gas, infrared refrigerant monitor designed to measure and display the level of refrigerant gas compounds in multiple monitoring areas.

Monitor system - The monitor equipment shall be a multiple area, self-contained wall or rack mounted device, split architecture design, recommended for eye-level installation with remote sampling probes located in the air flow path of the area where refrigerant gases are most likely to concentrate. The monitor shall provide a read out of the gas concentrations and relays to activate alarms or peripheral systems. The Monitoring system shall support compliance with ANSI/BSR ASHRAE 15-1994 Mechanical Safety Code requirements.

Split Architecture capability:

Consisting of:

The monitoring system will have a front panel display and external key pad which will provide access to set up functions, internal and external diagnostics, including pick up point (Zone) information and historical leak and fault trends screens.

The monitor will also have capability of a remote display module (HGM RD) with the same indicator lights plus back lit LCD display and programming capabilities.

The monitor and Remote display will have password entry protection capability.

Controls and Capabilities:

HGM-MZ Monitor:

The Front Panel Display on the monitor will have three indicator lights. Green - System on and operating, Red - System alarm, Yellow - System fault with a back lit LCD and Key pad for data entry and communication. The monitor will also have the capability for program protection permitted via password.

Alarms: HGM-MZ Monitor:

Monitor to contain an internal alarm provide within the Chiller Room a sound if refrigerant vapor concentration exceeds threshold. Alarm shall be UL listed, and shall provide a visual and an audible alarm with a sound pressure level of at least 15 dBA above operating ambient sound pressure level of the Chiller Room.

Monitor will have the ability of three (3) levels of refrigerant alarm and one (1) system fault alarm. Refer to table "A" for recommended settings. The relays are user defined and adjustable, latching (manual) or non-latching (auto).

Water Trap: Internal hydrophobic water trap filter within the HGM MZ to protect infrared sensor.

Remote Display HGM-RD: The monitoring system will have available an accessory remote display module "RD" capable of controlling four (4) 16 point HGM-MZ monitors, (total of 64 sampling zones). The RD will also display all information available on the individual HGM-MZ monitors.

Alarms HGM-RD : Two (2) user defined alarms.

All relays are SPDT, 5 amp, 120 VAC rated.

Multi point Capability: The Monitor shall be of the sample draw type with multiple pick up point (Zone) capability.

Multiple Refrigerant gas detection system: System software gas library allows selection from 38 different refrigerant gases per zone.

Coverage: HGM MZ: 4 point standard, with field expandable capability to 16 points in 4 point increments.

Response Time per zone: 5 to 300 seconds - depending on air sample tubing length.

Monitoring Distance: up to 1,200 feet per sample point.

Technology and Measurement:

Detector Type: Infrared Non-Dispersive. The Infrared Non-Dispersive detector will be of the type that does not require yearly gas calibration.

Detector Re-zero: Automatic - user definable re-zero frequency.

Sampling Mode: Automatic and continuous or manual.

Measuring Range: 0 to 10,000 PPM.

Sensitivity: All gases 1 PPM. (R-11 excluded)

Accuracy: All gases: +/- 1 PPM, +/- 10% of reading from 0 to 1000 PPM.

Temperature Drift: +/- 0.3% of reading °C, between purge cycles (5 minutes)

Operating Temperature: 32°-113°F (0°-45°C).

Ambient Humidity: 5% to 90% (non-condensing).

Power: 100 to 240 VAC +/- 10%, 50/60 HZ, 21 Watts.

Power consumption: HGM MZ - Less then 21 watts, HGM RD - less then 5 watts.

Size / Dimensions: HGM MZ - 17" X 12" X 5.5" - 15 lbs. HGM RD - 11" X 10" X 3" - 5 lbs.

Communications:

HGM-MZ Monitor: The Monitor has standard full two-way communications through RS-485 (MODBUS-RTU), HGM-MZ / RD and building management system maximum distance via RS-485 is 4500 feet.

HGM-MZ Monitor Communications Options: The Monitor will have the capability to utilize optional communications packages like, Lon Works and JCI N2 with option card a dual-loop 4-20mAdc output is available.

HGM MZ -RS-232C: Port for local / modem communications used to upload software updates and additional gasses into onboard gas library- special configuration software available upon request.

Trend / Data logging: User defined timing of PPM trend - up to 100 data entries per zone. Graphic display of trend data, alarm log and fault log provided.

Manufacturer and warranty Information:

Manufacturing: Subject to meeting all specified requirements: Bacharach model HGM MZ and HGM RD remote display module. (No known equal exists.).

Certification: Tested to UL #61010-1 and CE Mark.

Warranty: Two (2) years on parts.

Accessories provided:

Purge line charcoal filter (with bracket), purge line end filter with bracket, air sample end filters with brackets and installation / operations manual is provided.

Table A

Recommended Level/Alarm Level Settings

FACTORY RECOMMENDED Alarm Set Range and Recommended Settings										
Refrigerant Type	HGM-MZ Alarm Set Range							*Recommended HGM-MZ Set points		
	*AEL (PPM)	Alarm 1 Set Point		Alarm 2 Set Point		Alarm 3 Set Point		Alarm 1	Alarm 2	Alarm 3
		Min (PPM)	Max (PPM)	Min (PPM)	Max (PPM)	Min (PPM)	Max (PPM)	(PPM)	(PPM)	(PPM)
CFC										
R11	1000	100	980	100	990	120	1000	100	300	500
R12	1000	25	980	35	990	45	1000	100	300	500
R113	1000	25	980	35	990	45	1000	100	300	500
R114	1000	25	980	35	990	45	1000	100	300	500
R502	1000	25	980	35	990	45	1000	100	300	500
HCFC										
R22	1000	25	980	35	990	45	1000	100	300	500
R500	1000	25	980	35	990	45	1000	100	300	500
R503	1000	25	980	35	990	45	1000	100	300	500
R124	1000	25	980	35	990	45	1000	100	300	500
401a (MP39)	1000	25	980	35	990	45	1000	100	300	500
402a (HP80)	1000	25	980	35	990	45	1000	100	300	500
402b (HP81)	1000	25	980	35	990	45	1000	100	300	500
409a	1000	25	980	35	990	45	1000	100	300	500
HCFC										
R123	50	25	980	35	990	50	1000	25	35	50
HFC										
R410a (AZ20)	1000	25	980	35	990	45	1000	100	300	500
R507 (AZ50)	1000	25	980	35	990	45	1000	100	300	500
R404a (HP62)	1000	25	980	35	990	45	1000	100	300	500
R134a	1000	25	980	35	990	45	1000	100	300	500
R407c (9000)	1000	25	980	35	990	45	1000	100	300	500
(407A)	1000	25	980	35	990	45	1000	100	300	500
R508b	1000	25	980	35	990	45	1000	100	300	500
R23	1000	25	980	35	990	45	1000	100	300	500
R408a	1000	25	980	35	990	45	1000	100	300	500

* Allowable Exposure Level (AEL) ASHRAE 34-1992
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VA Project No: 630-08-104
Replace HVAC Equipment/
AC Chiller Leak Detection System

PART 3 - EXECUTION

NOT USED

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