Critical Environment Technologies

AST-IRT Infrared Refrigerant Analog Transmitters

OPERATION MANUAL - Rev-B September 7, 2009

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1.0 DESCRIPTION: The AST-IRT non-dispersive IR refrigerant analog transmitter was designed to detect the presence of specific refrigerant gases within an enclosed space. The sensor is mounted within the space to be monitored and connected by means of wiring and conduit or cable and conduit to a monitoring device such as one our control panels or a BAS. Each sensor is calibrated for a specific refrigerant gas. There two models of IR transmitters for each gas. Machine room, for most applications above freezing and Cold Room, for low temperature refrigerated room applications. There three enclosure options: NEMA-3R (aluminum (pictured), water tight ABS fiberglass for wash down protection. Stainless Steel NEMA-3R for special applications. The IR sensor is a reliable method of monitoring for refrigerant gas leaks in environments that contains gasoline, diesel and propane exhaust and fumes from solvent, paints, cleansers and other interfering factors.

Typical Applications: HVAC Chiller Equipment Rooms Wineries Refrigeration Mechanical Rooms Bakeries Food Processing Plants Refrigerated Rooms

2.0 SPECIFICATIONS:

Sensor Type:	Non-Dispersive infrared, calibrated to a specific refrigerant gas
Detectable Gas Types:	R11 R12 R22 R114 R123 R134A R401A(MP89) R401B(MP66) R402A (HP80) R404A (HP62) R407C (9000) R408A (FX10) R409A (FX56) R410A R500 R502 R501A
Calibration Adjustment:	Zero adjustment recommended at six month intervals
Enclosure:	Standard: Painted Aluminum Optional: Water tight ABS Fiberglass Optional: Stainless Steel
Size:	Standard: 12.9” (327 mm) X 4.8” (122 mm), 2.5” (62 mm)
Weight:	Standard: 2 pounds (900 grams)
Range:	0 - 1032 ppm
Sensitivity:	+/- 1 ppm at 25 degrees C, 45% RH
Resolution:	1 ppm
Accuracy:	+/- 5 ppm plus 2% over full scale
Response time:	Under 60-seconds
Operating Temperature;	Standard: 0 - 43 degrees C (32 - 110 degrees F) Freezer Room: -40 - 43 degrees C (-40 - 110 degrees F)
Humidity:	0 - 90% RH non-condensing
Certification:	ETL
Output:	4 - 20 mA linear over entire scale
Power & Wiring:	10 - 32 VDC, 0.4 Amps, 3-conductor, 18-guage shielded

2.0 SPECIFICATIONS, CONT'D…..

Warm Up Time:	Readings will stabilize in 3-hours. Cold rooms at least 18-hours
Ambient Air Flow:	Less than 3 ft. / sec.

3.0 ENCLOSURE DIMENSIONAL DRAWINGS

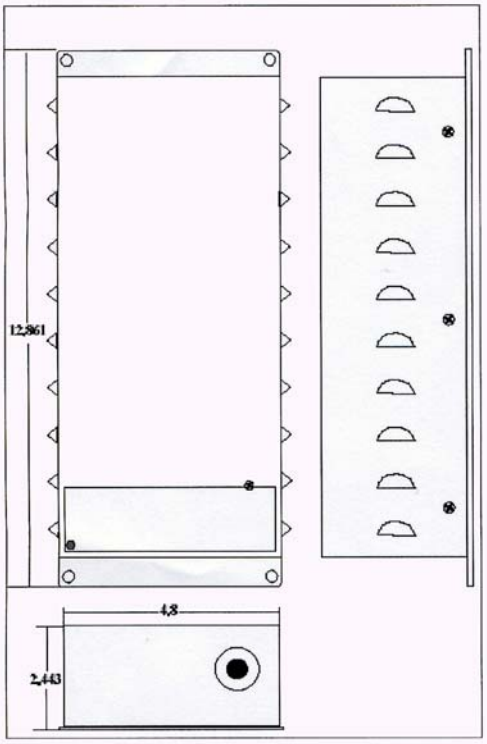

Fig. 4 Nema 3R Aluminum Enclosure Dimensions

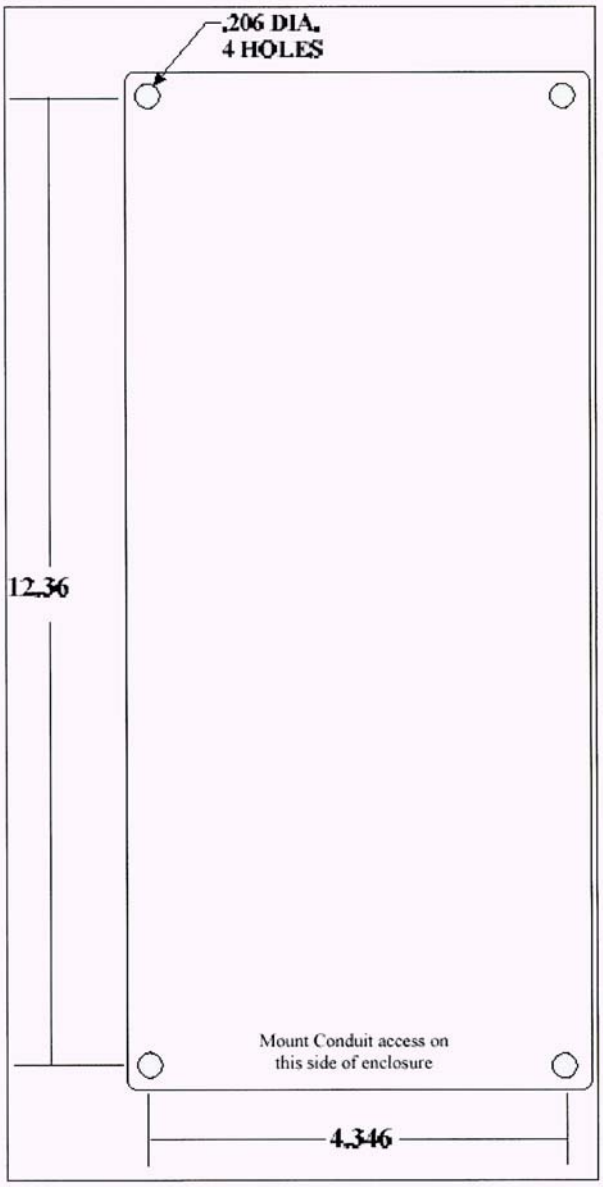

Fig. 5 Mounting Diagram, Nema 3R Encl.

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4.0 INSTALLATION DETAILS:

4.1 SENSOR PLACEMENT: The analog sensor/transmitter must be placed in locations that a refrigerant gas is likely to occur and where leaked refrigerant gas is likely to concentrate so as to provide warning of a potential hazardous condition. Mounting locations are dependent upon the application and the refrigerant gas to be monitored. The enclosure has a 3/4" conduit knockout hole in the bottom so the transmitter must be mounted vertically.

All mounting locations must be a fixed, well supported wall, pole or frame with little or no vibration. Sensors must be placed in locations that will prevent damage from forklift trucks, carts and other moveable devices.

4.1 MOUNTING HEIGHT: For Halocarbon refrigerants such as R11, R22, R123, R134A, R404A, etc. [lace sensor 18" to 24" from the floor.

Prior to placement of the IR transmitters, the room air currents need to be determined. Air currents can be determined through the use of smoke candles. The air currents of every potential condition should be analyzed. The maximum air flow rate past the sensor should not exceed 3-feet per second. Air velocity past the sensor can be determined by lighting a match close to the sensor. If the match is blown out by the air current, mounting the sensor inside a pull box with the knockouts opened slightly or some other method of damping the air must be used.

4.2 APPLICATION INFORMATION

EXHAUST FAN ON: Air currents within a machinery room exhaust fan must be determined. Identify locations that are "downwind" of the potential leak source. Locate one sensor near the air intake duct of the exhaust fan, but not directly in the duct so the sensor is not subject to the full force of the duct air.

EXHAUST FAN OFF: In applications where the machinery room exhaust fan can be shut off, identify air currents of the machine room with the fan off. Locate a position "downwind" of the potential leak source with the fan off. This location may be omitted if the exhaust fan is to be operated continuously.

REFRIGERATED ROOMS: Determine the direction of the discharge air from the evaporator coil. Allowing a reasonable alarm delay time for temperature compensation and violent air circulation may be necessary. Unusual temperature swings could cause the sensor readings to temporarily rise or lower causing nuisance alarms. If a sensor is placed in a multi-use room where different temperatures will be used dependent upon the product stored, it may necessary to re-zero the sensor when the proper product temperature has been achieved.

HALOCARBON REFRIGERATION SYSTEMS: Mount the sensor on a wall near the return air vents of the evaporator coil or within between ten to twenty feet of a doorway exiting the room to a space. Also 18" to 24" above the finished floor. Use of a "J" box or some other form of protection for the sensor may be necessary.

MOUNTING: The sensor must be mounted with the wire terminal blocks oriented to the lower right and the sampling chamber in a vertical position. Failure to mount the sensor in this fashion may result in false or inaccurate readings and cam allow moisture to enter the enclosure and destroy the sensor.

CABLE RUNS: All cabling / wiring must avoid running parallel to high voltage (48VDC or greater or any AC voltage wiring. Cable must be greater than 12" from high voltage wiring or conduit. Avoid running cable near all inductive loads, such as motors, fluorescent fixtures or transformers. Depending upon local codes, sensor cabling may be run loose or be placed in conduit used exclusively for low voltage control wiring.

For cable runs of 0 - 1000' use 18 gauge, twisted, 3-conductor, shielded, stranded wire.

TERMINATIONS:
P1-4 = Ground
P1-3 = 10 - 32VDC+
P1-2 = Ground (not used)
P1-1 = Signal output

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5.0 OPERATION

Check power in and polarity, it should be 10 - 32 VDC. Warm up time is important to allow time for the sensor to acclimate to the environment. A 3-hour warm up is recommended, 18-hours for cold room applications.

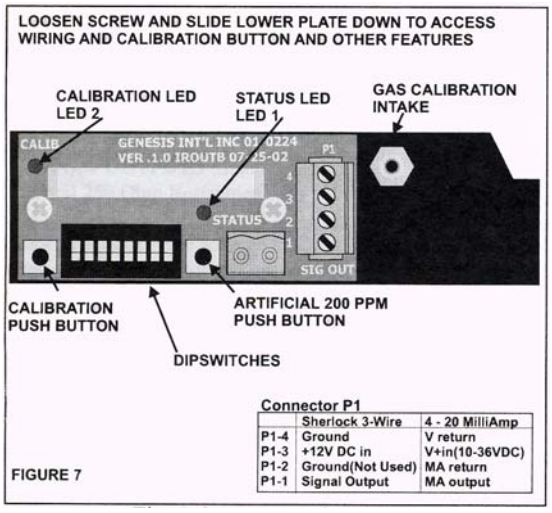
5.1 CALIBRATION AND ZEROING OF SENSOR: The infrared sensor is factory calibrated, however temperature and air quality and other variances make it necessary to calibrate and zero out the sensor at the time of set up in the field and every 6-months. Push-button zero calibration should be accomplished ONLY after sensor has been acclimated to the environment for at least 3-hours (18-hours is recommended for low temperature applications).

Zero calibration is all that is required to be performed in the field. Ensure no refrigerant gas is present during performance of zero function. Loosen securing screw and slide plate to the left. Depress and hold red push-button for at least 8-seconds until the red calibration LED illuminates then release button. The push-button is located to the left side of the DIP switch.

The red LED will go out. If not, make sure DIP switch-6 is off. Consult factory if calibration LED stays on or keeps flashing after zero calibration or during normal operation.

Span calibration should not change and as such is not required.

NOTE: Reference drawing below for all procedures indicated above.



Connector P1

	Sherlock 3-Wire	4 - 20 MilliAmp
P1-4	Ground	V return
P1-3	+12V DC in	V+in(10-36VDC)
P1-2	Ground(Not Used)	MA return
P1-1	Signal Output	MA output

FIGURE 7

6.0 QUICK START INSTRUCTIONS

Mounting the sensor/transmitter: The transmitter must be mounted in a fixed location and in the proper orientation. See page-4, section 4.1 for more information.

Wiring the sensor/transmitter: Use only approved wire and double check for proper and secure connections.

Applying power: Check power in and polarity. It should be 12 to 24 VDC. Warm up time is important to allow time for the sensor to acclimate to the environment. 3-hours minimum is recommended (18-hours for low temperature applications.).

Calibration zeroing of sensor: The infrared sensor is factory calibrated, however the temperature and air quality and other variances make it necessary to calibrate and zero out the sensor at the time of set up in the field and every 6-months. See page-5, section 5.1.

Test sensor/transmitter: The sensor may be tested by depressing push-button-1 and holding for 6 to 8-seconds then release it. This simulates a gas concentration of approximately 200 ppm.

7.0 TROUBLESHOOTING

LED L-1 will indicate if the sensor microprocessor is operating and if the sensor is in test mode using push-button-1. When the microprocessor goes through start-up, it will turn on L-1 and keep it on unless the microprocessor detects a failure of any of the sensor components.

LED L-2 is used for calibration of the sensor and is normally off. When the push-button calibration is done, L2 will turn on in about 8-seconds then turn off when push-button is released.

LED STATUS	CONDITION	SOLUTION
L1 On steady	Sensor is operating properly	Sensor is working within acceptable limits
L1 Off	Sensor is not powered up	* Check power connection. Ensure that wire connections are secure and correct polarity. * Microprocessor detects an error in the sensor hardware or microprocessor failure. Contact CETCI service dept.
L1 Flashing	* Switch-5 is on and there is 200 ppm reading on sensor * Microprocessor detects an error In sensor signal	Switch DIP-5 to other position
L2 Off	Sensor is operating properly	Sensor is working within acceptable limits
L2 Flashing	Microprocessor failure	Call CETCI service dept.
L2 On Steady	Sensor is on factory calibration	Turn DIP-6 switch off and wait at least one full minute for L2 to turn off and do push-button calibration again