K-CON®

KSIR-01 INFRA-RED STANDALONE REFRIGERANT GAS DETECTOR

Installation Manual

Instructions for :-

KSIR-01 Infra-Red Standalone Refrigeration Gas Detector

For safe and correct use please read the installation manuals supplied with the equipment.

Manufactured on behalf of
MITSUBISHI ELECTRIC UK

MITSUBISHI ELECTRIC

Contents

Safety precautions

Before installation and electric work

Before installing the unit, make sure you read all the “Safety precautions”.

Symbols used in the text

⚠ Warning: Describes precautions that should be observed to prevent danger of injury or death to the user.
⚠ Caution: Describes precautions that should be observed to prevent damage to the unit.

⚠ Warning: Carefully read the labels affixed to the main unit.

⚠ Warning:

- Ask the dealer or an authorised technician to install the unit.
  Improper installation by the user may result in water leakage, electric shock, or fire.
- Use the specified cables for wiring. Make the connections securely so that any outside forces acting on the cables are not applied to the terminals. Inadequate connection and fastening may generate heat and cause a fire.
- Never repair the unit. If the controller must be repaired, consult the dealer.
  If the unit is repaired improperly, electric shock, or fire may result.
- When handling this product, always wear protective equipment. EG: Gloves, full arm protection namely boiler suit, and safety glasses.
  Improper handling may result in injury.
- If refrigerant gas leaks during installation work, ventilate the room.
  If the refrigerant gas comes into contact with a flame, poisonous gases will be released.
- Install the controller according to this Installation Manual.
  If the unit is installed improperly, electric shock, or fire may result.
  Have all electric work done by a licensed electrician according to "Electric Facility Engineering Standard", "Interior Wire Regulations" and the instructions given in this manual and always use a special circuit.
- If the power source capacity is inadequate or electric work is performed im-properly, electric shock and fire may result.
  Keep the electric parts away from any water - washing water etc…
  Contact may result in electric shock, fire or smoke.
- After completing installation work, make sure that refrigerant gas is not leaking.
  If the refrigerant gas leaks and is exposed to a fan heater, stove, oven, or other heat source, it may generate noxious gases.
- Do not reconstruct or change the settings of the protection devices.
  If the pressure switch, thermal switch, or other protection device is shorted or operated forcibly, or parts other than those specified by Mitsubishi Electric are used, fire or explosion may result.

To dispose of this product, consult your dealer. Do not use a leak detection additive.

Precautions for devices that use R410A refrigerant

⚠ Caution:

- Do not use the existing refrigerant piping.
  The old refrigerant and refrigerator oil in the existing piping contains a large amount of chlorine which may cause the refrigerator oil of the new unit to deteriorate. Use refrigerant piping made of C1220 (CU-DHP) phosphorus deoxidized copper as specified in the JIS H3300" Copper and copper alloy seamless pipes and tubes". In addition, be sure that the inner and outer surfaces of the pipes are clean and free of hazardous sulphur, oxides, dust/dirt, shav-ing particles, oils, moisture, or any other contaminant.
  Contaminants on the inside of the refrigerant piping may cause the refriger-ant residual oil to deteriorate.
- Store the piping to be used during installation indoors and keep both ends of the piping sealed until just before brazing. (Store elbows and other joints in a plastic bag.) If dust, dirt, or water enters the refrigerant cycle, deterioration of the oil and compressor problems may result.
- Use ester oil, ether oil or alkylbenzene (small amount) as the refrigerator oil to coat flares and flange connections.
  The refrigerator oil will degrade if it is mixed with a large amount of mineral oil.
- Use liquid refrigerant to fill the system.
  If gas refrigerant is used to seal the system, the composition of the refrigerant in the cylinder will change and performance may drop.
- Do not use a refrigerant other than R410A.
  If another refrigerant (R22, etc.) is used, the chlorine in the refrigerant may cause the refrigerator oil to deteriorate.
- Use a vacuum pump with a reverse flow check valve.
  The vacuum pump oil may flow back into the refrigerant cycle and cause the refrigerator oil to deteriorate.
  Do not use the following tools that are used with conventional refrigerants. (Gauge manifold, charge hose, gas leak detector, reverse flow check valve, refrigerant charge base, vacuum gauge, refrigerant recovery equipment.)
- If the conventional refrigerant and refrigerator oil are mixed in the R410A, the refrigerant may deteriorate.
  If water is mixed in the R410A, the refrigerator oil may deteriorate.
  Since R410A does not contain any chlorine, gas leak detectors for conventional refrigerants will not react to it.
- Do not use a charging cylinder. Using a charging cylinder may cause the refrigerant to deteriorate.
  Be especially careful when managing the tools.
- If dust, dirt, or water gets in the refrigerant cycle, the refrigerant may deteriorate.

Safety precautions

Before installation

⚠ Caution:

- Do not install the unit where combustible gas may leak.
  If the gas leaks and accumulates around the unit, an explosion may result.

⚠ Caution:

- Ground the unit.
  Do not connect the ground wire to gas or water pipes, lightning rods, or telephone ground lines. Improper grounding may result in electric shock.
- Install the power cable so that tension is not applied to the cable.
  Tension may cause the cable to break and generate heat which may, in turn, cause fire.
- Install a leak circuit breaker, as required.
  If a leak circuit breaker is not installed, electric shock may result.
- Use power line cables of sufficient current carrying capacity and rating.
  Cables that are too small may leak, generate heat, and cause a fire.
- Use only a circuit breaker and fuse of the specified capacity.
  A fuse or circuit breaker of a larger capacity or a steel or copper wire may result in a general unit failure or fire.
- Be very careful regarding product transportation.
  Two people should be used to carry products of 20kg or more.
- Some products use PP bands for packaging. Do not use any PP bands for a means of transportation.
- Safely dispose of the packing materials.
  Packing materials, such as nails and other metal or wooden parts, may cause stabs or other injuries.
  Tear apart and throw away plastic packaging bags so that children will not play with them - If children play with a plastic bag which has not been torn apart, they face the risk of suffocation.

Before starting the test run

⚠ Caution:

- Do not touch the switches with wet fingers.
  Touching a switch with wet fingers can cause electric shock.
- Do not touch the refrigerant pipes during and immediately after operation.
  During and immediately after operation, the refrigerant pipes may be hot or cold, depending on the condition of the refrigerant flowing through the refrigerant piping, compressor, and other refrigerant cycle parts. Your hands may suffer burns or frostbite if you touch the refrigerant pipes.
- Do not operate the air conditioner with the panels and guards removed.
  Rotating, hot, or high-voltage parts can cause injuries.
- Do not turn off the power immediately after stopping operation.
  Always wait at least five minutes before turning off the power. Otherwise, water leakage and other problems may occur.

Disclaimer

Warranty:

All products manufactured on behalf of Mitsubishi Electric UK are warranted against defective materials for a period of three years from the date of delivery to the original purchaser.

⚠ **Warning:**

Mitsubishi Electric UK assumes no liability for damages consequent to the user of this product. We reserve the right to change this manual at any time without notice. The information furnished by us is believed to be accurate and reliable. However, no responsibility is assumed by us for its use, nor for any infringements of patents or other rights of third parties resulting from its use.

KSIR-01 Installation

The KSIR-01 HFC Sensor is designed to be installed in a vertical position with the side louvres at the top. The sensor should be sited in a position out of direct sunlight and in an area not subject to washing with jets of water.

To ensure continued reliable operation of the KSIR-01 HFC Sensor, the following installation guidelines should be observed:

CAUTION

The calibration of the sensor may be affected by excessive direct sunlight. If it is necessary to install the sensor unit in a sunlit area, provide an adequate sunshade for the sensor unit.

The IR sensing element (Figure 1 below) must not be tampered with or removed from the enclosure. Precautions should be taken to ensure that debris, dust and dirt does not enter the IR sensing element. The sensor should only be fitted after completion of any building works to reduce the possibility of debris polluting the sensor.

Mount the sensor unit in a position that minimizes the risk of mechanical damage.

MECHANICAL INSTALLATION

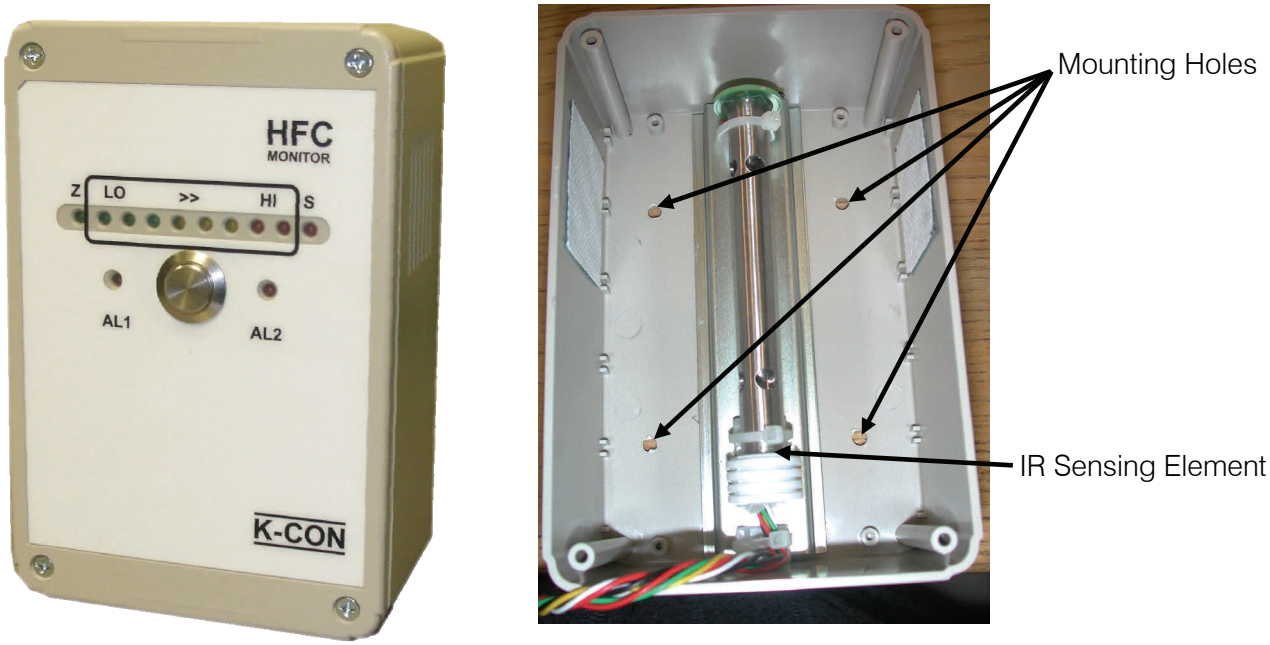
The enclosure is provided with four 4mm predrilled holes for mounting on a wall etc. It is important that screws used for mounting the enclosure should not be tightened excessively thus damaging the enclosure. The case dimensions and the hole positions are given in Figure 2.

Access to the inside of the enclosure is gained by removing the 4 screws at the edges of the enclosure, carefully removing the lid. Protect the exposed printed circuit board components during installation. The inside of the case is shown in Figure 1 and 3.

Mount the sensor unit as close as practical from the floor or ground (150mm - 250mm), preferably directly beneath the air conditioning unit.

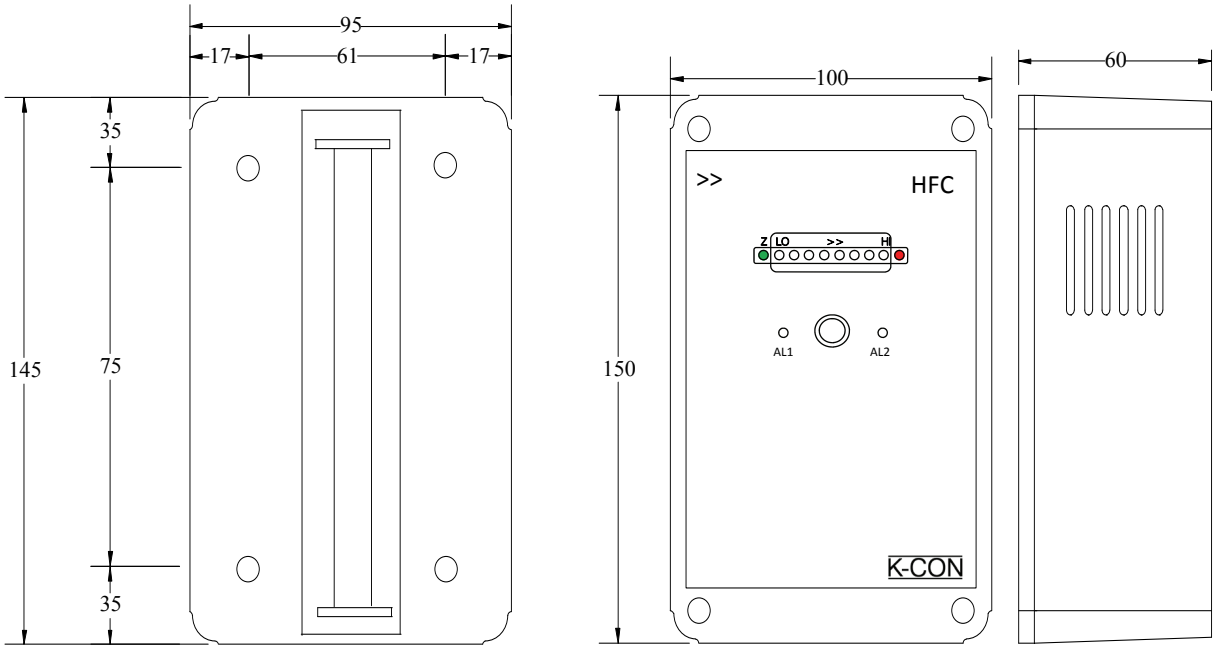
The sensor unit should be installed in a location where it is easily accessible for repairs.

Figure 1:-

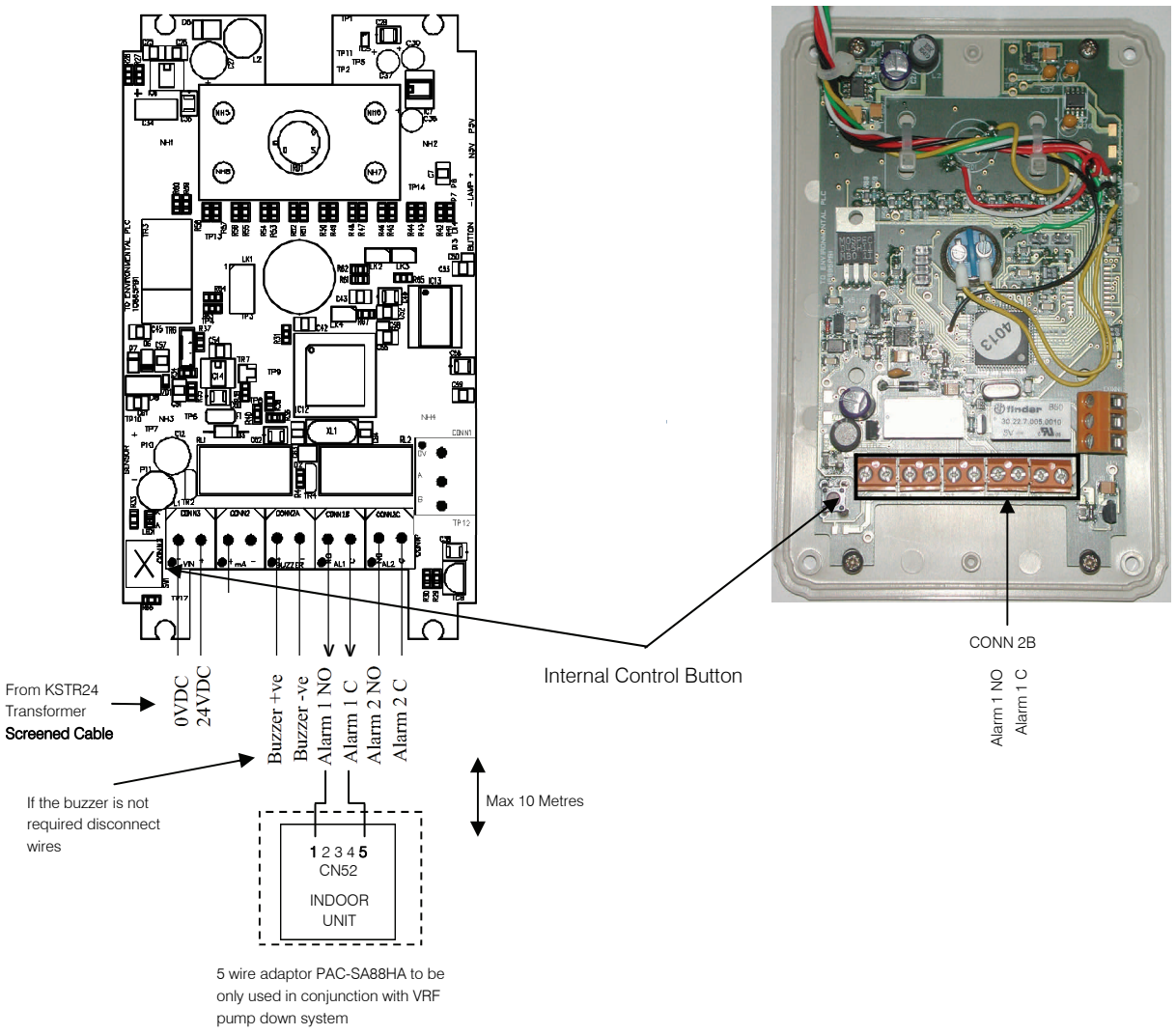


KSIR-01 Installation

Figure 2 – Showing the Case Dimensions



ELECTRICAL INSTALLATION
Figure 3:- Electrical Connections



KSIR-01 Installation

Table 1:- Electrical Connections

Connection	Function	
CONN 3 V IN -	Power 0v	Screened cable must be used
CONN 3 V IN +	Power +9 to +24 v DC	
CONN 2A BUZZER +	Connection for external buzzer	
CONN 2A BUZZER -	Connection for external buzzer	
CONN 2B AL1 NO	Volt free alarm contact (AL1) (500ppm R410A) *	
CONN 2B AL1 C	Volt free alarm contact (AL1)	
CONN 2C AL2 NO	Volt free alarm contact (AL2) (1500 ppm R410A)	
CONN 2C AL2 C	Volt free alarm contact (AL2)	

Notes:-

The buzzer can be disconnected by removing connections CONN 2A + & -.

Connection & Terminal Functions.

* AL1 recommended connection, see note above.

Figure 3 & Table 1 show the electrical connections. Electrical cable entry to the enclosure should be through the bottom of the enclosure.

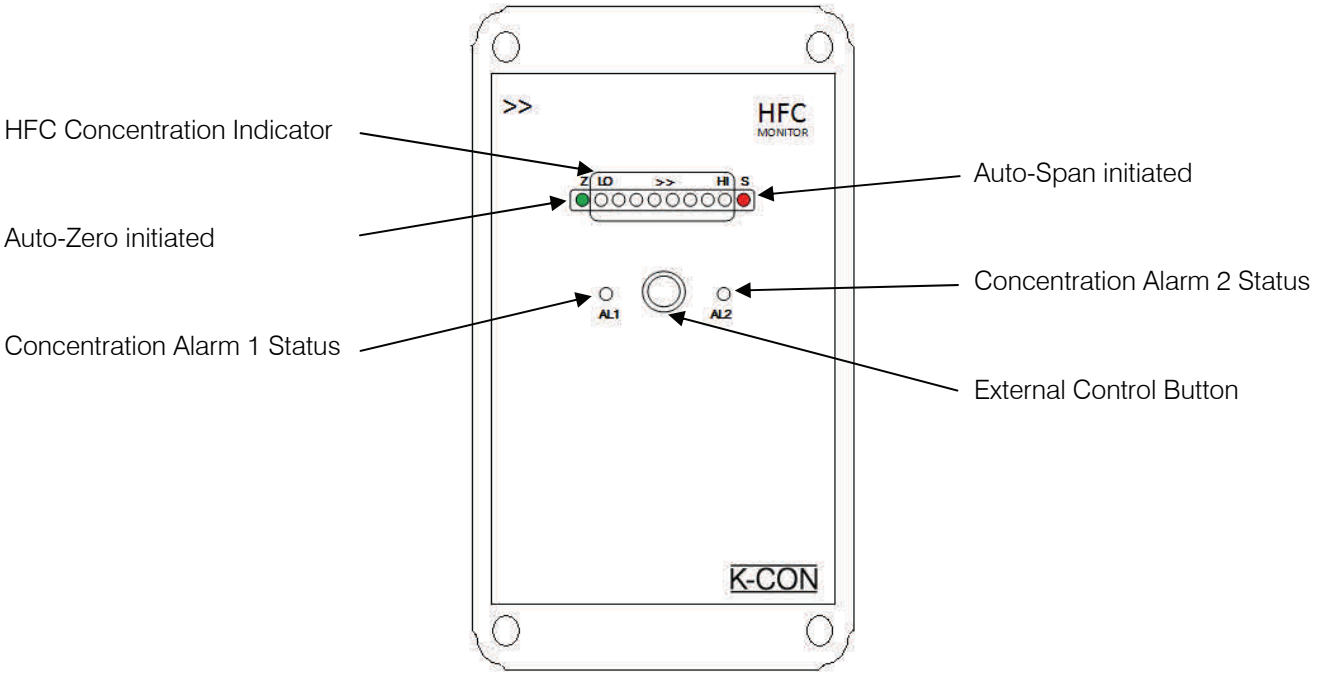
Predrilled holes for cable glands are NOT provided. It is recommended that PG7 type glands be used; the number required being determined by the application.

Two holes are provided in the bottom of the enclosure. These are drain and vent holes and should not be obstructed.

After wiring, the lid with sensor assembly shall be screwed back onto the enclosure ready for commissioning.

KSIR-01 Installation

Figure 4:- Front Panel Functions



Please refer to Figure 4 for the position of LEDs and button.

The HFC concentration is displayed visually on the *"HFC Concentration Indicator"*. Lower HFC concentrations are displayed by the green LEDs at the left of the display (marked "LO") and the highest on the red LEDs at the right of the display (marked "HI". As the concentration of Freon increases the number of LEDs illuminated will increase from left to right (8 in total). All 8 LEDs will illuminate when the concentration reaches and exceeds the range of the KSIR-01

The red LEDs marked "*Concentration Alarm 1 (AL1)*" and "*Concentration Alarm 2 (AL2)*" will illuminate when the Freon concentration exceeds the set point value. At the same time the alarm relays (if fitted) will actuate and the associated contacts for buzzer and alarms will change state. The set points for the alarms and latch facility are factory set only .

STARTUP

Ensure the voltage applied to the PCB is between 12 and 24Vdc.

On application of power, the LEDs associated with the "*HFC Concentration Indicator*" will flash in sequence for a few seconds and the sensor will commence its warm up procedure. This is indicated by the flashing of the green "*Auto-Zero initiated*" LED. The sensor will steady after five minutes, but allow approximately one hour to settle to ambient temperature.

At the end of the warm up period (5 minutes) the *"HFC Concentration Indicator*" will be "steady".

The zero point (0ppm HFC) will have been established in the factory using nitrogen or HFC free air. In its intended application the KSIR-01 HFC Sensor may have its zero point set using air thus eliminating any offset due to the natural presence of HFC's in the atmosphere. Please refer to Auto-Zero Initiation overleaf.

KSIR-01 Installation

OPERATION

Internal & External Control Buttons

These buttons may be used to initiate Auto-Zero, Auto-Span and cancel any latched concentration alarms.

The "*Internal Control Button*" (see Figure 1 for location) will perform all the above functions. However, the "*External Control Button*" will only allow any concentration alarms to be reset unless fully activated at the factory. All alarms are factory set to be non latching.

The functions of the Control Buttons are activated as follows:-

Press the *"Internal Control Button"* (see Fig3) then release the button when the required sequence of LED's are lit. This will colour sequence the *"HFC Concentration Indicator*". (DO NOT RELEASE ON YELLOW STATUS)

The *"HFC Concentration Indicator*" will continue to sequence its colours whilst the button remains pressed.

The sequence of colours on the display is as follows:-

All LEDs on the *"HFC Concentration Indicator*" illuminated. The KSIR-01 Freon Sensor will return to normal operation, no action will have been initiated.

All 3 RED LEDs illuminated. This will cancel all latched concentration alarms. NB the alarms will immediately be reactivated if the HFC concentration is above its alarm set point after cancellation.

All 3 GREEN LEDs illuminated. This will start the Auto Zero procedure. The green LED marked "Z" will illuminate during this automatic procedure. This will not operate or show if the "External Control Button" is pressed.

All 3 YELLOW LEDs illuminated. DO NOT RELEASE THE INTERNAL BUTTON WHEN ALL 3 LED's ARE LIT. This is a function that should only be carried out by a qualified engineer, please contact Mitsubishi Electric if this action is accidently achieved.

Auto-Zero

This function will set the output to 0ppm HFC (0% HFC), 4.0 mA based upon the concentration of HFC inside the enclosure. If a true zero-point at 0ppm HFC is required instead of the HFC concentration inside the enclosure then nitrogen gas should be used to fill the enclosure.

KSIR-01 Installation

ROUTINE MAINTENANCE

The design of the sensor unit is such that no adjustment or calibration should be necessary for extended periods of 2 years or longer. However, it is recommended that a system function check is performed more frequently at 3 to 6 monthly intervals depending on the application and local ambient conditions.

To perform this task, simply allow a small amount of test gas (acetone) to be released around the perimeter of the sensor (please ensure front cover is fitted and ensure that the sensor alarms are activated. Then cancel the alarms using the front button (if the sensor is not latched).

Use the internal control button on the PCB board if you have a latched sensor. Press the button on the internal board until all 3 red LED lights are illuminated and release, this will cancel any latched alarms.

Please note; that during this procedure, if there is still a presence of gas in the air, then the LED display and alarms will again be activated.

The sensor should return to a single green LED being lit once the presence of the test gas has been cleared. Routine Maintenance complete.

If the unit ever becomes defective then it is necessary to refer the unit to Mitsubishi Electric UK.

Please note there are no User Serviceable parts on the KSIR-01 HFC Sensor.

WARRANTY

When the KSIR-01 HFC Sensor is operated in accordance with conditions described in this manual the standard warranty is three years from the date of purchase.

SPARES

There are no spare parts associated with the KSIR-01 HFC Sensor

KSIR-01 Installation

Please be sure to put the contact address/telephone number
on this manual before handing it to the customer.

MITSUBISHI ELECTRIC UK

MITSUBISHI ELECTRIC UK, TRAVELLERS LANE, HATFIELD, HERTFORDSHIRE, AL10 8XB