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1.0 Installation Procedures

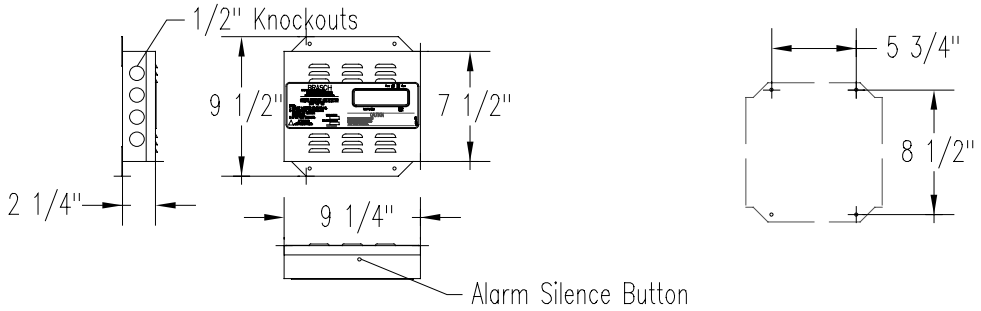
1.1 MOUNTING:

The Refrigerant Detector must be mounted indoors and kept dry at all times. This detector should be mounted in a well-populated area, and placed so the display can be easily seen. Since refrigerant vapors are heavier than air, this unit should be as close to the floor as possible at a maximum of 5 Feet above the floor. Figure #1 shows the mounting hole locations. Mount the detector to a rigid surface using #10 hardware.

CAUTION:

Leave a minimum of 2" clearance to other surfaces, and under no circumstances should the ventilation louvers in the cover be blocked. Be sure that metal shavings and other contaminants are removed from inside the detector.

Figure #1 Mounting Hole Locations



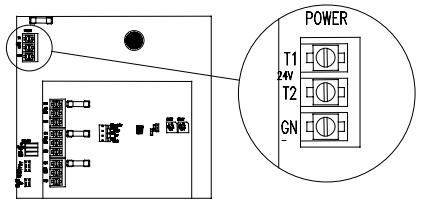
1.2 WIRING:

1.21 Input Power Wiring

Use only qualified personnel for the installation of this detector. All wiring should be done in accordance with local codes and the latest edition of the National Electrical Code (ANSI/NFPA 70).

This detector requires an input voltage of 24 VAC, 50/60 Hz at a load rating of 28 VA. If a grounded 24 VAC supply voltage is supplied, then the hot line should be wired to terminal T1 and the grounded line should be wired to T2. Brasch Manufacturing Co., Inc. can provide a step-down transformer for changing 208-240 VAC or 120 VAC at 50/60 Hz to 24 VAC at 50/60 Hz. See the 6.0 Accessories Section (Page 7) for the transformer part numbers. The supply circuit must include a disconnect device or switch located close to the detector and marked as the disconnect device for the detector. This will assure continued operation without interruption from remote failures. To provide noise suppression the input power must be wired, as shown in Figure #2 (Page 2), with the ground connected. Use copper conductors only, rated for a minimum of 250 volts, 14 AWG.

Figure #2 Input Power Wiring



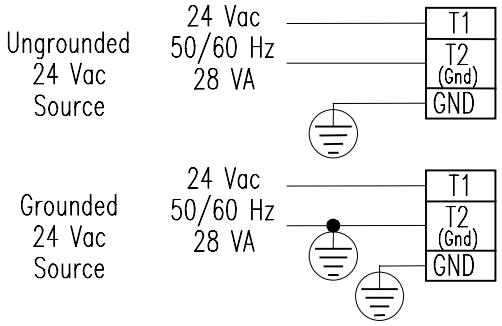
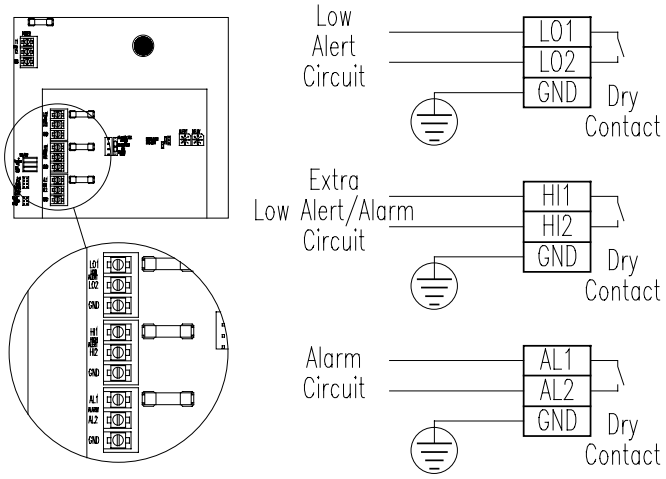


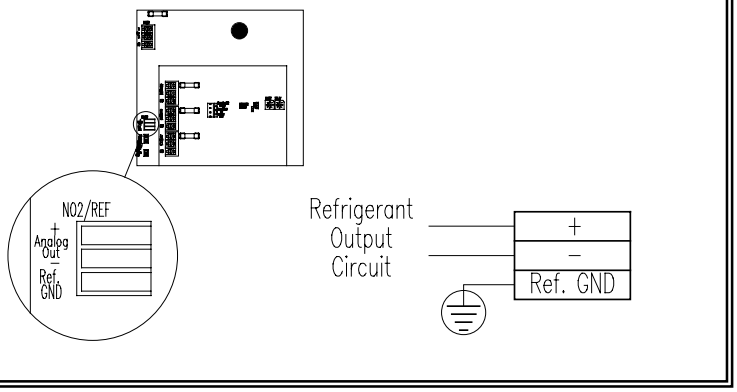
Figure #3 Alert and Alarm Contact Wiring



1.22 Alert and Alarm Contact Wiring

See the 4.0 Specification Section (Page 6) for the ratings on the alarm and alert relay contacts. Use copper conductors only, rated for a minimum of 250 volts, 14 AWG. Figure #3 shows the wiring for the alarm and alert contacts. This detector was designed so that the alert and alarm relay contacts close when power is lost to the detector. This will attempt to keep the zone ventilated until power is restored to the detector.

Figure #4 Proportional Output Wiring



1.23 Proportional Output Wiring

See the 4.0 Specification Section (Page 6) for minimum/maximum loads for the proportional outputs. The wiring of the proportional output signals is done by lifting the white lever, inserting the signal wire and pressing the white lever flat. Use copper conductors only, rated for a minimum of 250 volts, with a minimum wire size of 26 AWG (22 AWG maximum). Figure #4, Proportional Output Wiring shows the wiring to a remote DDCS or BMS.

2.0 Unit Operation

The Refrigerant Gas Detector can sense any one of twelve refrigerant gases. Any of the following are available; R-11, R-12, R-22, R-23, R-113, R-123, R-134a, R-141b, R-142b, R-152a, R-500 or R-502. Each Refrigerant gas detector is calibrated for one of these gases and an identifying sticker is placed on the front cover of the unit. Changing the calibration refrigerant will require a new factory calibration.

When power is applied to the Refrigerant Gas Detector the green power LED will illuminate. This LED will stay ON as long as power is supplied to the detector. If the power ON LED should go out, see the 5.0 Troubleshooting Section (Page 7) for help.

This Refrigerant Gas Detector has seven modes of operation (Normal, Pre-Alert, Alert, Post-Alert, Alarm, Sensor Failure, and Purge). Upon the application of power the unit will enter the Purge mode and remain in this mode for 5 minutes.

In the Purge mode the green power LED illuminates and the yellow sensor LED will flash on and off. In this mode the gas detector cleans and prepares the sensor for operation. Upon the completion of this mode the detector will turn off the yellow sensor indicator entering the Normal mode.

In the Normal mode the detector monitors the concentration of refrigerant and generates the proportional output signal. If the concentration of refrigerant remains below the adjustable alert level, output relays will remain off. If the concentration of refrigerant exceeds the adjustable alert level, the detector will enter the Pre-Alert mode.

In the Pre-Alert mode the red alert LED will flash on and off being off for a longer time than on. If the concentration of refrigerant stays above the adjustable alert level for the adjustable time delay, the detector will enter the Alert mode.

In the Alert mode the red alert LED will turn on and the alert output relay contacts will close. If the concentration of refrigerant decreases to below the adjustable alert level, the detector will enter the Post-Alert mode. If the concentration of refrigerant remains above the adjustable alert level for a fixed 15 minutes, the detector will enter the Alarm mode.

In the Post-Alert mode the red alert LED will flash on and off being off for a shorter time than on. If the concentration of refrigerant stays below the adjustable alert level for the adjustable time delay, the detector will enter the Normal mode.

In the Alarm mode the red alert LED and the red alarm LED will be on, the internal audible alarm will sound and the alarm relay contacts will close. Pressing the alarm silence switch located on the bottom of the unit will silence the internal audible alarm. The detector will remain in the Alarm mode until the level of refrigerant falls below the adjustable alert level. The internal audible alarm circuit will be activated as soon as the refrigerant level drops below the adjustable alert level. Brasch Manufacturing Company, Inc. can supply the optional external alarm. See the 6.0 Accessories Section (Page 7) for associated part numbers.

An additional safety feature of the detector is a continual internal sensor test. Should something cause the sensor to malfunction the detector will enter the Sensor Failure mode. Upon entering this mode the detector will turn on the yellow sensor LED, generates a 0 proportional output signal, turns on the red alert LED and closes the alert relay contacts. This will keep the zone ventilated until the sensor malfunction is corrected.

Additional field selected options of extra alert or alarm relay contacts are available. The option allows an extra set of relay contacts to be configured to operate in conjunction with either the alert contacts or the alarm contacts.

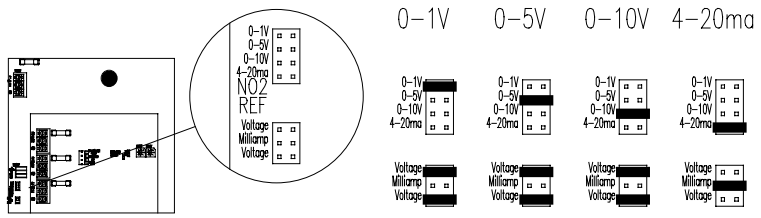
3.0 Operational Settings

3.1 PROPORTIONAL OUTPUT OPTIONS

The gas detector has four different proportional output options that are selectable on the transmitter board. The four options are 4 – 20 maDC current loop, 0 – 1 VDC voltage output, 0 – 5 VDC voltage output and 0 – 10 VDC voltage output. Any of the four options can be connected to a Direct Digital Control System (DDCS) or Building Management System (BMS). See 4.0 the Specification Section (Page 6) for the input impedance for each of the proportional outputs.

The output option is selected using a jumper and pin combination. See Figure #5 for location on the transmitter board. To change the setting, **turn off the power to the unit** and remove the cover. Place jumpers in the proper locations for the desired proportional output. Replace the cover and restore power to the detector.

Figure #5 Selection of Proportional Output Option



The proportional output is controlled by the concentration of refrigerant (See Table #1). If at any time a value of 0 maDC or 0 VDC is measured at the output, the gas detector has had a power or sensor failure (See 5.0 Troubleshooting, Page 7).

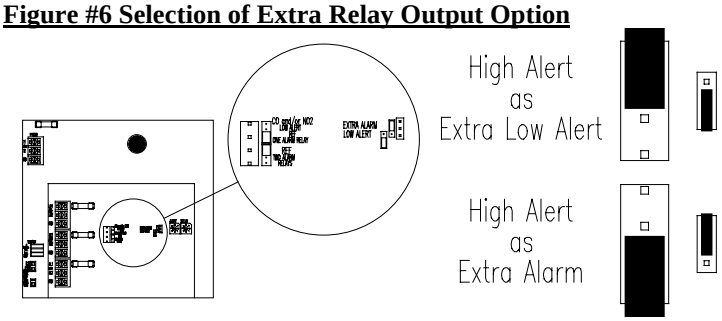
TABLE #1 Proportional Output Values

Refrigerant PPM	4 – 20 maDC Output Level	0 – 1 VDC Output Level	0 – 5 VDC Output Level	0 – 10 VDC Output Level
0	4.0	0.20	1.0	2.0
80	5.6	0.28	1.4	2.8
160	7.2	0.36	1.8	3.6
240	8.8	0.44	2.2	4.4
320	10.4	0.52	2.6	5.2
400	12.0	0.60	3.0	6.0
480	13.6	0.68	3.4	6.8
560	15.2	0.76	3.8	7.6
640	16.8	0.84	4.2	8.4
720	18.4	0.92	4.6	9.2
800	20.0	1.00	5.0	10.0

3.2 EXTRA RELAY OUTPUT OPTIONS

The gas detector can be configured to supply an extra set of relay contacts for customer use. The extra relay contacts can work in conjunction with the alert relay contacts or the alarm relay contacts. These can be used to control additional remote devices or as a alternate set of contacts in case the primary relay contacts should fail.

Figure #6 Selection of Extra Relay Output Option



The extra relay output option is selected using a jumper and pin combination. See Figure #6 for location on the output board. To change the setting, **turn off the power to the unit** and remove the cover. Place jumpers in the proper locations for the desired fan output option. Replace the cover and restore power to the detector.

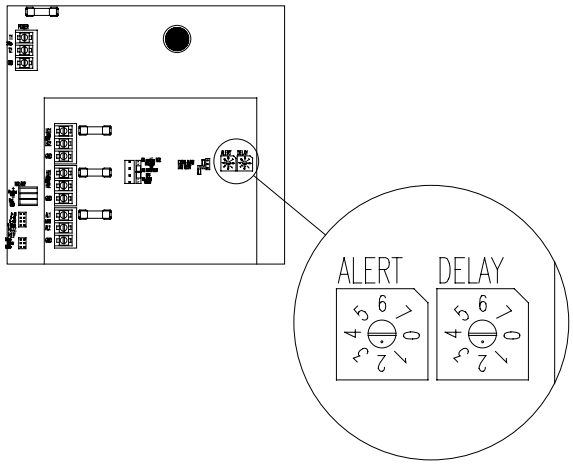
3.3 ALERT SETTING:

The factory setting for the alert is set at 200 PPM of refrigerant and can be adjusted from 50 to 800 PPM. Table #2 presents the switch settings and the detection level (PPM) of refrigerant. The alert rotary switch is located on the output board (see Figure #7). To change the setting, **turn off the power to the unit** and remove the cover. Rotate the alert rotary switch to the required alert level PPM per Table #2. Replace the cover and restore power to the detector.

TABLE #2 Alert Setting

Alert Rotary Switch Setting	Alert PPM Setting
0	50
1	100
2	150
3	200
4	300
5	400
6	600
7	800

Figure #7 Alert and Time Delay Settings



Factory default setting is rotary switch setting 3, 200 PPM.

3.4 ALERT TIME DELAY SETTING:

The time delay between the detector sensing refrigerant and turning on or off an alert relay is adjustable from 0 to 7 minutes in increments of 1 minute. The delay rotary switch is located on the output board (see Figure #7). Use Table #3 (page 6) to determine the switch setting for the desired time delay. To change the setting, **turn off the power to the unit** and remove the cover. Rotate the delay rotary switch to the required time delay per Table #3 (Page 6). Replace the cover and restore power.

TABLE #3 On/Off Time Delay Setting

Delay Rotary Switch Setting	On/Off Time Delay Setting (Minute(s))
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7

Factory default setting is rotary switch setting 0, 0 Minutes.

4.0 Specifications

Output Relay Contact Ratings: 125 VAC 50/60 Hz: 5 Amp Resistive
250 VA Inductive
1/8 HP Motor
24 VAC 50/60 Hz: 24 VA Inductive

Extra Relay Operation: Choice of Low Alert or Alarm Operation.
Extra relay operation is field selectable.

Proportional Outputs:

4 – 20 maDC	250Ω Maximum
0 – 1 VDC	1000Ω Minimum
0 – 5 VDC	1000Ω Minimum
0 – 10 VDC	1000Ω Minimum

Proportional outputs are field selectable.

Calibration: The main transmitter module should be re-calibrated every three years.
Contact the factory for re-calibration information and pricing.

Ratings:

	Input Power:	24 VAC, 50/60 Hz, 28 VA
	Humidity:	10% to 90% (Non-Condensing)
Temperature:	Storage:	-50°C to 120°C (-58°F to 248°F)
	Operating:	-15°C to 40°C (5°F to 104°F)

Installation Category: II (local level, over-voltage transients less than 500 volts)

Indicators(LED Type):

Green LED:	Power ON
Yellow LED:	Sensor Failure
Red LED:	Low Alert
Red LED:	Alarm

Numeric Display: 4-Digit seven-segment display
Character height is 0.56 inches.

Dimensions: 7 5/8”H x 9 1/8”W x 2 1/4”D
Weight:4 pounds

Fuse Rating: Main Supply: 5x20MM, Time-Lag, 1.25 Amps
Switching Relays: 5x20MM, Time-Lag, 5.0 Amps

5.0 Troubleshooting

CAUTION:
Only qualified personnel should attempt to service this equipment. All power sources must be disconnected before removing the cover of this detector.

1. Power LED not on:
   A. Check for 20.4-26.4 VAC at terminals T1 & T2 (see Figure #2, Page 2).
   B. Check circuit board fuse for continuity. If the fuse needs to be replaced use only the rated fuse listed in the 4.0 Specifications Section (Page 6).
   C. Consult the factory.

2. Sensor failure light is on:
   A. Remove sensor and reinstall noting correct terminal markings.
   B. Replace transmitter board (includes sensor and calibration).
   C. Consult the factory.

3. Unit calls for Low alert, High alert or Alarm but remotely connected devices don't respond.
   A. Check all remote wiring and remote power sources for correctness.
   B. Check the Relay fuses located next to Output and Alarm terminals for continuity. If the fuse needs to be replaced use only the rated fuse listed in the 4.0 Specifications Section (Page 6).
   C. Consult the factory.

4. For any other situation please consult the factory.

6.0 Accessories

Transformers:*

120 VAC to 24 VAC @ 36VA	36T120N1
120 VAC to 24 VAC @ 75VA	75T120N1
208-240 VAC to 24 VAC @ 36VA	36T240N1
208-240 VAC to 24 VAC @ 75VA	75T240N1

Other voltage levels are available upon request.
* Transformers supplied in a NEMA 1 enclosure intended for indoor use.

External Alarms:

4" x 4" Electro-mechanical vibrating horn. Rated for at least 94 Decibels at 10 feet. The alarms are available in different input voltages, and are listed below.

24 VAC @ 0.9 amps	AL350F24AC
120 VAC @ 0.2 amps	AL350F120AC

Sensor Re-calibration: Factory re-calibration of transmitter board including new sensor.

Contact the factory for complete information and pricing.

Limited Warranty

Brasch Manufacturing Co., Inc warrants gas transmitters, gas detectors, gas detector control panels and accessories for a period of one year from the date of shipment against defects in material or workmanship. Should any evidence of defects in material or workmanship occur during the warranty period, Brasch Manufacturing Co., Inc will repair or replace at its own discretion, without charge. The company shall not be held responsible for any charges in connection with removal or replacement of allegedly defective equipment, nor for incidental or consequential damages.

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