

222-1X DETECTOR

INSTALLATION AND OPERATIONS MANUAL IMA-2221SY0

NOTE: The 222-1X detector is extremely sensitive to visible and near infrared light. It must be mounted on the pneumatic duct or vessel and completely shielded from any light or false alarms will occur. There can be no screw holes, open seams or cracks of any sort. Prior to operation, ensure any cracks or holes are sealed as they may pass infrared light and cause false alarms.

The 222-1X detector is housed in an outdoor NEMA 4X rated aluminum enclosure with FM, CSA, ATEX and IECeX approvals. It is designed for mounting onto the surface of a pneumatic duct or vessel. The detector mounting allows for easy removal to facilitate periodic cleaning of the lens surface.

Each detector is equipped with an infrared light source located behind the protective sapphire lens. This light source is used to test the opposing detector. In this way each detector can verify the sensitivity of the opposing detector.

SPECIFICATIONS

Sensitivity = $0.1 \mu\text{W}/\text{cm}^2$
Response Time = 0.5 ms
Half Power Cone of Vision = 100 degrees
Spectral Response = 0.4 - 1.1 microns
Response Peak = 0.9 microns
Temperature Range = -40°F to 140°F (-40°C to 60°C)
Operating Voltage 24 – 28 VDC
Current = 15 mA operating, 35 mA alarm

DETECTOR LOCATION

When mounting Detectors on pneumatic ducts, they should not be located close to branch lines or they may become obscured by dust due to turbulent air flow. Detectors should be placed 2.5 X last branch diameter down stream from that branch (Db).

SPRAY ASSEMBLY LOCATION

If you are spraying water in the duct, you must allow for the worst case (longest possible time) for the extinguishing water curtain to be established. The time allowed must include the delay time of the detector, the control unit, the solenoid valve assembly and the time for the water pattern to establish across the entire duct.

Although this detector is compatible with many Fire Alarm Control Panels or Programmable Logic Controller, it is only approved as an extinguishment system when used with a dedicated and approved Control Panel from Hansentek.

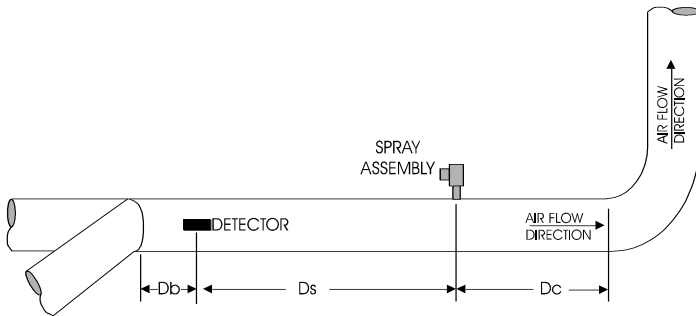
Once the worst case spray time is established, you must then determine how far a spark could travel in this length of time and place your spray assembly this far downstream from the detectors (this is a minimum distance - you may be up to 50% longer).

For example, if we assume the following maximum times:

Detector Reaction:	0.5 ms
Control Panel Reaction:	50 ms
Valve reaction:	200 ms
Spray Establishment:	68 ms
Total Reaction time:	318.5 ms

NOTE: These values are for illustration only. Actual values as provided by the manufacturers must be used to establish worst case times.

In the above case, the worst case Total System Reaction Time is 318.5 milliseconds or 0.3185 seconds.



With a known velocity we simply calculate the distance after the detectors for placement of the spray assembly using the formula:

$$\text{Distance (D}_s\text{)} = \text{Total Reaction Time X Velocity}$$

If your air speed is 20 meters/second, then in 0.3185 seconds it will travel 6.37 meters ($20 \times 0.3185 = 6.37$).

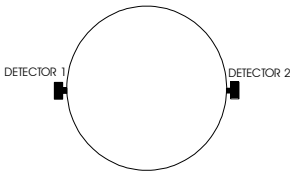
The Hansentek detectors react very quickly to sparks and embers and the water spray command is sent to the nozzle assembly very quickly. The biggest delay of the entire system is the reaction time of the water solenoid valve and the time it takes for the water spray to provide a curtain across the entire duct. The time it takes for the solenoid valve to open introduces the longest delay. There are a number of factors, which affect the solenoid such as water pressure and mechanical variations in the valve itself. Since these factors are variable, we must allow the maximum time in our calculations to ensure the curtain of water is fully developed before the spark arrives.

Detectors should not be located close to branch lines or they will become obscured by dust due to turbulent air flow. Detectors should be placed 2.5 X last branch diameter down stream from that branch (Db).

Note that these are minimum distances and 1.5 times these minimums are preferred if space is available.

DETECTOR MOUNTING

Locate the Detector positions and drill the duct to accept the mounting flange. The detectors must be mounted opposite each other in the same vertical plane in order to perform their sensitivity testing function.

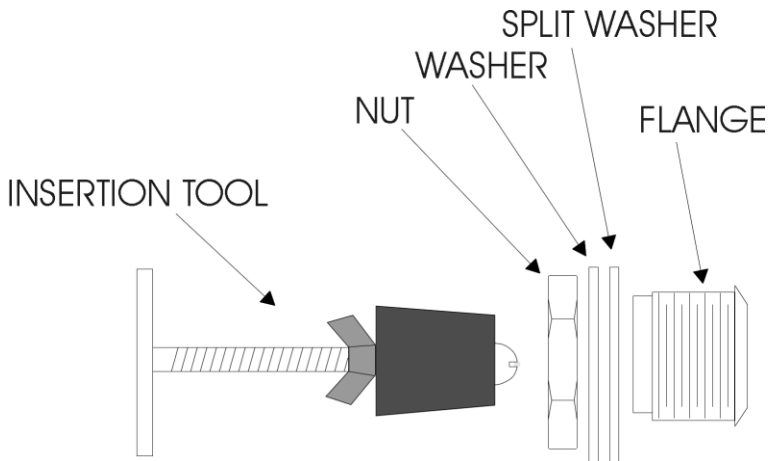


NEVER MOUNT A DETECTOR ON THE BOTTOM OF A DUCT.

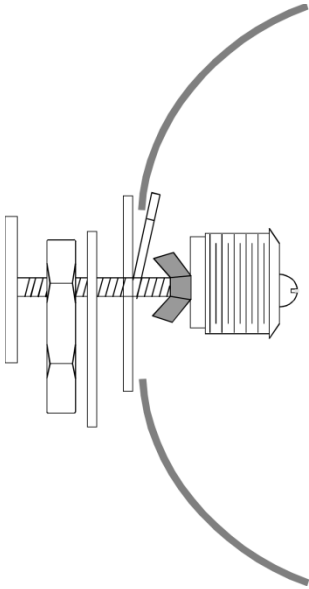
If you have access to the inside of the duct, you can drill a 1.25 inch diameter hole in the duct, push the flange through the hole from the inside and then fasten the washer and nut on the outside of the duct.

If you do not have access to the inside of the duct, you will need to use the supplied insertion tool to mount the detector mounting flange through a blind hole in the duct. The duct hole in this case must be 38 mm diameter as you will need to pass the flange through the hole from the outside. A 38 mm hole saw is provided.

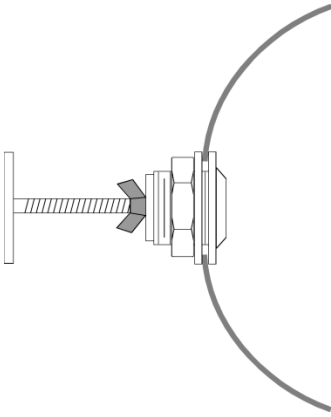
First, slip the nut, washer, split washer and then the flange onto the mounting tool. Turn the wing nut on the insertion tool until the tool fits tightly to the flange. The nut and washers should be loose on the shaft of the tool.



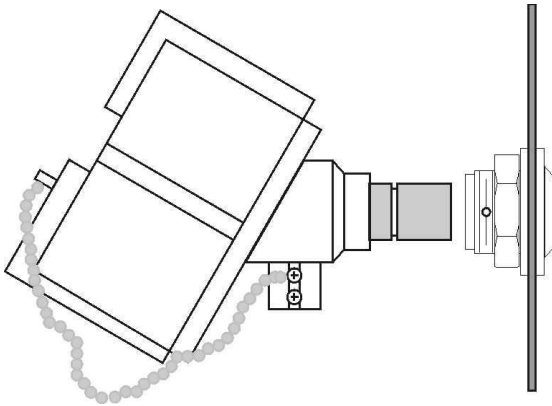
Next, push the mounting flange completely through the hole in the duct and insert the split washer by rotating it into the inside of the duct.



Next, gently pull the flange back through the hole with the insertion tool so it rests against the split washer inside the duct. Make sure the flange is centered in the oversized hole and tighten the washer and nut onto the flange. It is very important that no light can get between the flange and the duct or it will cause false alarms.



Remove the insertion tool by loosening the wing nut and pulling straight back and twisting if required.



The 222-1X Detector lens assembly slides snugly into the flange. A set screw is provided to hold the detector in place

DETECTOR CONNECTIONS

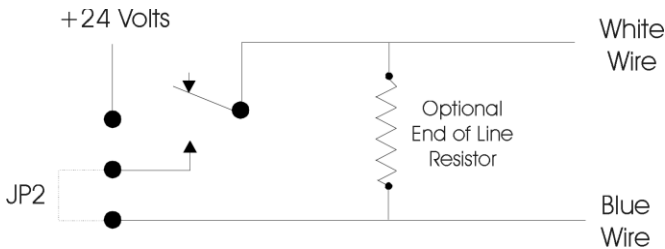
The detector must be wired with a flexible explosion proof rated conduit with sufficient length to allow the detector to be removed, cleaned and replaced without requiring disconnection of the wiring. This cable runs from the detector to a conduit junction box and the wire must be minimum 18AWG. Attempt to keep all cabling 1 meter (36 inches) away from high voltage sources (greater than 400 volts). The cable is connected to a terminal block inside the detector. The detector is opened by unscrewing the large back cover.

Red wire	+24VDC
Black wire	0VDC
White wire	24 Volt SIGNAL or ZONE +
Blue wire	ZONE –
Brown wire	TEST
Green wire	Ground/Earth

SPARK DETECTION SIGNAL

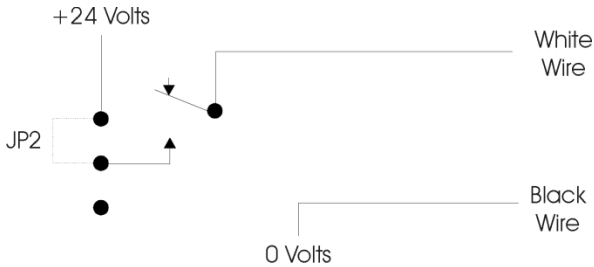
The 222-1X detector can either provide a +24VDC signal on detection of spark or ember or it can provide a dry contact closure. This is selected by a jumper on the printed circuit board. The detector should be ordered to be compatible with the control system to be used as we do not recommend changing these features in the field.

The 222-1X detector can provide a contact closure on alarm. The white wire and the blue wires comprise the zone connections. For standard 4-wire fire alarm control panels, the detector is normally fitted with an End of Line resistor as required by the control unit.



The detection signal is either a momentary one second signal or a latched signal which remains on until the detector is powered off.

The detector may also be optioned to provide a +24VDC output on detection of a spark or ember. The white wire and the black wire comprise the signal connections.

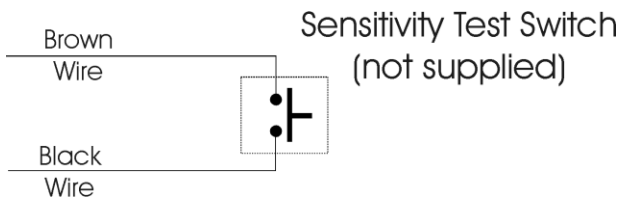


The detection signal is either a momentary one second signal or a latched signal which remains on until the detector is powered off.

DETECTOR SENSITIVITY TESTING

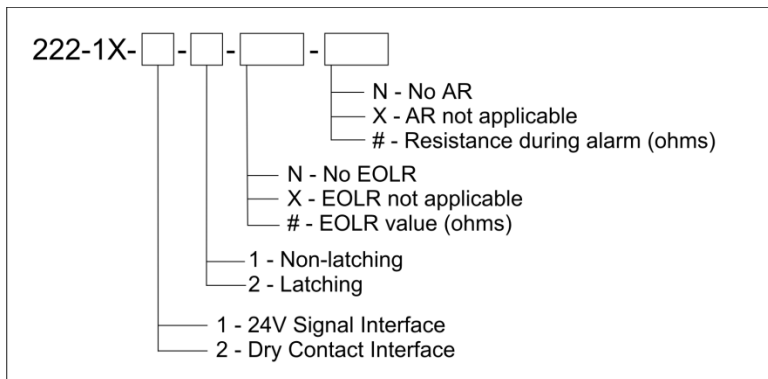
The 222-1X detector is fitted with a test light that can be used to test the detector on the opposite side of the duct, through the lens of both detectors. If the detector on the other side of the duct does not detect this light, there is a problem with the detectors – probably dirty lenses. Clean the lenses and retest. We recommend this test be done when the dust collector is not running.

NOTE: This test will activate the detector, therefore you should disable any adverse responses such as water spraying or system shut down during test. Make sure these responses are enabled again after the test.



MODEL SELECTION

The appropriate configuration arrangement is selected by model number suffix:



For example:

222-1X-2-1-N-470 would designate a 222-1X detector with a dry contact interface, non-latching (pulse) output, fitted with no end-of-line resistor and will give an alarm resistance of 470 ohms.

MAINTENANCE

In order to ensure that your spark detection system is in a fully operational condition at all times it must be properly maintained and inspected on a regular basis.

It is recommended that detector lenses be cleaned on a weekly basis.

WARRANTY

Hansentek warrants that equipment will perform in accordance with Hansentek's specifications and will be free from defects in materials and workmanship under normal use for a period of one (1) year from date of shipment.

Hansentek's warranty is valid only on the following conditions: The equipment is installed in accordance with approved installation drawings and manual and in accordance with all applicable codes, regulations, and safety requirements.

Hansentek's sole obligation and Customer's sole remedy under this warranty is the replacement or repair, at Hansentek's option, of the defective components. Such obligation and remedy are conditional upon the equipment not having been altered, mishandled, misused, repaired or damaged

THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY, MERCHANTABILITY QUALITY, FITNESS FOR A PARTICULAR PURPOSE AND THOSE ARISING BY STATUTE OR OTHERWISE IN LAW OR FROM THE COURSE OF DEALING WITH USAGE OR TRADE. CUSTOMER ACKNOWLEDGES THAT THE SYSTEM DOES NOT PRECLUDE THE POSSIBILITY OF FIRE OR EXPLOSION. INSTEAD, THE PURPOSE OF THE DETECTOR TO DETECT POTENTIAL HAZARDS AT THE SOURCE OF DETECTION. ITS USE IN CONJUNCTION WITH OTHER EXPLOSION SUPPRESSION SYSTEMS, FLAME BARRIERS OR EXPLOSION VENTING MAY REDUCE THE DEGREE OF DAMAGE.

**INSTALLATION and OPERATIONS MANUAL
IMA-2221SY0**