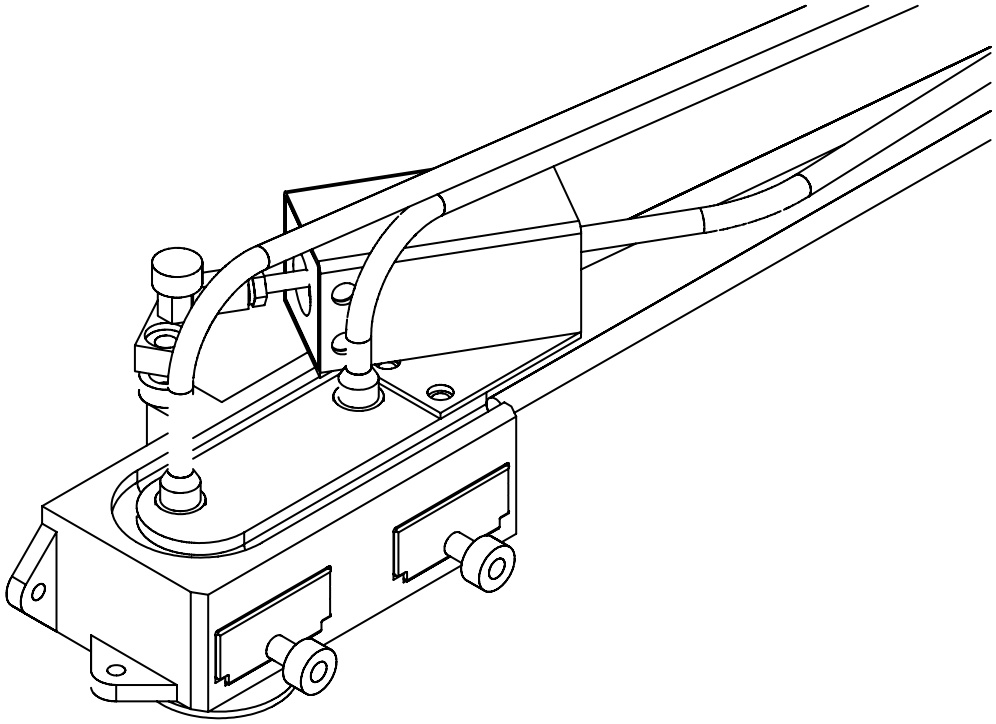
INSTALLATION AND SERVICE MANUAL

BDS-250 Series
DSH5P Series
BSH-150 Series
ASF-140 Series
Plus all Conduit Type Sensor Heads



Sensor Heads

IPN 150826 Rev. C

INFICON

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INFICON Instruments for Intelligent Control®

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First Edition (Rev. A) December 2001
Second Edition (Rev. B) January 2006
Third Edition (Rev. C) November 2007

WARNING

All standard safety procedures associated with the safe handling of pressurized equipment must be observed. Only properly trained personnel should attempt to install or service the sensor heads.

Warranty

INFICON warrants the product to be free of functional defects in material and workmanship and that it will perform in accordance with its published specification for a period of (twelve) 12 months.

The foregoing warranty is subject to the condition that the product be properly operated in accordance with instructions provided by INFICON or has not been subjected to improper installation or abuse, misuse, negligence, accident, corrosion, or damage during shipment.

Purchaser's sole and exclusive remedy under the above warranty is limited to, at INFICON's option, repair or replacement of defective equipment or return to purchaser of the original purchase price. Transportation charges must be prepaid and upon examination by INFICON the equipment must be found not to comply with the above warranty. In the event that INFICON elects to refund the purchase price, the equipment shall be the property of INFICON.

This warranty is in lieu of all other warranties, expressed or implied and constitutes fulfillment of all of INFICON's liabilities to the purchaser. INFICON does not warrant that the product can be used for any particular purpose other than that covered by the applicable specifications. INFICON assumes no liability in any event, for consequential damages, for anticipated or lost profits, incidental damage of loss of time or other losses incurred by the purchaser or third party in connection with products covered by this warranty or otherwise.

Table of Contents

1 IMPORTANT MESSAGE

This instructional manual provides important information regarding the installation and operation of INFICON sensor heads. Please read it in its entirety prior to installation and operation to avoid mistakes that may hinder their usefulness and void the warranty.

2 INSTALLATION

2.1 Mounting Location Consideration

It is very important to maintain the correct sensor head angle when installing a quartz sensor head. The sensor head must be installed so that the face of the crystal is at 90 degrees (normal) to a line from the crystal to the source.

Allowing the sensor head to be tilted at some angle other than normal to the direction of the vapor stream results in two effects which can impact crystal life and increase the probability of mode hopping.

The first effect is that the deposit on the crystal is not even across the surface. Since the edge of the crystal which angled away from the source is further away from the source and receives somewhat less material, the thickness of the deposit is wedge shaped to some degree. This wedge shape in the deposited film tends to reduce the activity of the crystal at its primary resonance.

The second effect is that the area of the deposit shifts from the center of the crystal. This is due to the shadowing effect of the crystal aperture which is located some distance from the surface of the crystal. Any lopsidedness in the crystal enhances the strength of spurious (non-thickness shear) modes of vibration. If the activity of these spurious modes of oscillation get strong enough they cause short-term perturbation of the fundamental frequency and if they get very strong, the oscillator can look onto the spurious mode of oscillation, causing a mode hop.

The combination of both of these effects will have a negative effect on the ultimate crystal life and will increase the probability of mode hops.

To minimize the possibility of these potential problems, it is very important to insure that the surface of the crystal is directed as closely as possible toward the material source. The mounting location must be chosen to avoid any object that may block the direct path between the evaporation source and both of the crystals.

Figure 1 depicts the do and don’t when choosing a location to mount the sensor head.

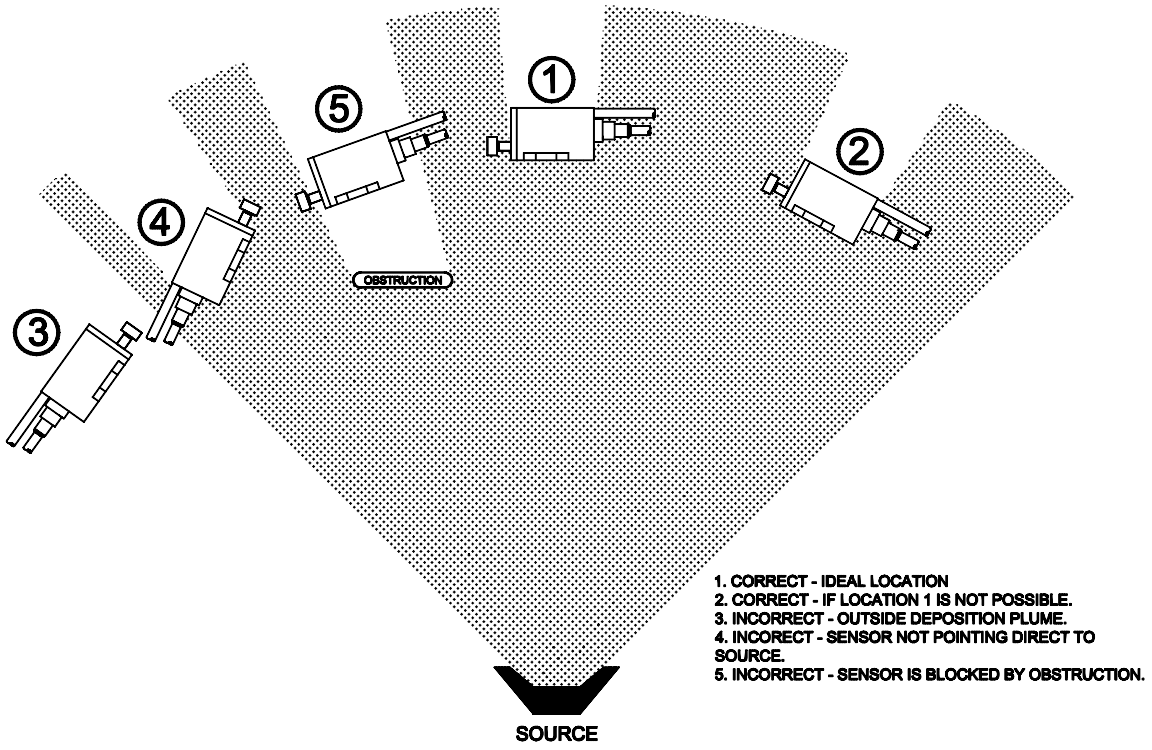


Figure 1 Mounting Location Consideration

2.2 Mounting

Depending on the models, there are either two or four #4-40 tapped holes provided at various locations on the sensor heads for mounting. Refer to your particular sensor head data sheet for the mounting hole locations. Since each vacuum system is different, it is up to the user to provide mounting bracket or fixture to hold the sensor head in place. A rigid and stationary place in the vacuum should be used for mounting to avoid vibration that may cause erratic readings.

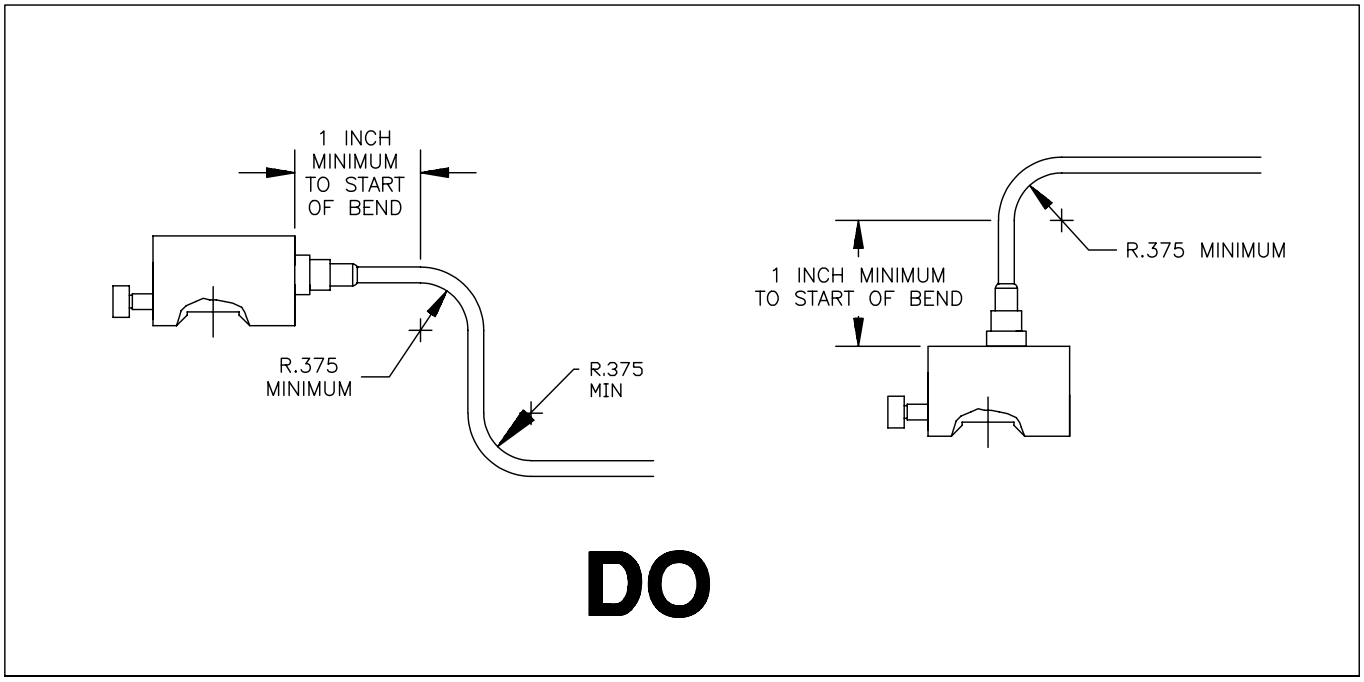
2.3 Tubes Bending

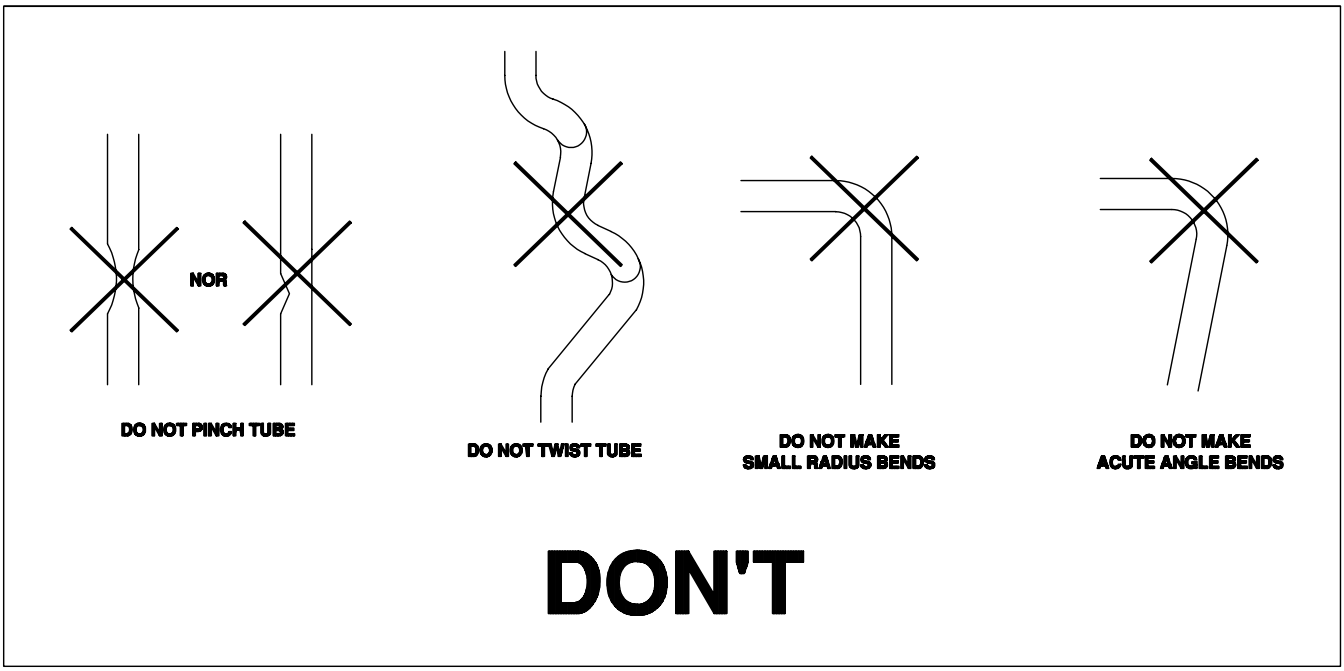
CAUTION: ***Read this section in its entirety before attempting to bend the tubes. Incorrectly bending will damage the tubes beyond repair and void the warranty.***

If it is necessary to bend the tubes to clear obstacles inside the chamber or to bring the head into mounting location, observe the precautions below.

- Support the tubes where the bends will be so the tubes won't collapse or pinched. If the cooling tube is collapsed water flow will be restricted. The head will not have sufficient cooling. If the air tube is collapsed, air pressure maybe restricted and the shutter will not operate correctly. If the electrical tube is collapsed or pinched, that may cause electrical short.
- Do not make sharp bends. Allow a minimum of 3/8 inch bend radius.
- Under no circumstances that bends should be made closer than 1 inch from the braze joint at the electrical connector. Doing so will PERMANENTLY SHORT out the electrical connection and **void** the **warranty**.

The 1/8 inch tubes used on the head are flexible enough to bend for a couple of times, but they are not designed for repeat bending. Plan your bends wisely and verify it before committing to the actual bending to avoid readjusting. If in doubt, contact INFICON support for help.





2.4 Hook-up

2.4.1 Water Supply

Use one of the two 1/8" OD water tubes as an inlet and the other as an outlet. If INFICON feedthrough is used, connections to a water feedthrough should be made using Swagelok® fittings or brazing. Water flow should be set at 0.2 gpm and water supply temperature should be at room temperature (20 to 25 C).

2.4.2 Air Supply

Connect the air supply to the air tube on the sensor head. A normally closed two-way pneumatic valve (such as INFICON 147202) must be installed on the atmosphere side between the air supply and the air tube leading to the bellows assembly. Air supply pressure must be regulated at 60 PSI.

2.4.3 Electrical connections

A Female BNC connector (2 provided for the dual sensor head types) is provided for connection to the oscillator(s). For dual sensor heads, make sure the correct crystal BNC connector go to the correct port on your monitor/controller.

2.5 SHUTTER OPERATION

2.6 Dual Sensor Head Shutter

INFICON dual sensor heads are designed to provide automatic crystal failure back-up or to provide separate crystals for use with two different materials. The two crystals are located side-by-side in a water-cooled housing. Only one crystal is exposed to the evaporation source. The other crystal is covered by the shutter. The normally exposed crystal is the primary (or crystal #1) and the covered crystal is the backup crystal (or crystal #2). The shutter is switched by pneumatically actuating the bellows assembly. When the pneumatic valve is open (on), the bellows is actuated and move the crystal shutter covering up crystal #1 and expose crystal #2.

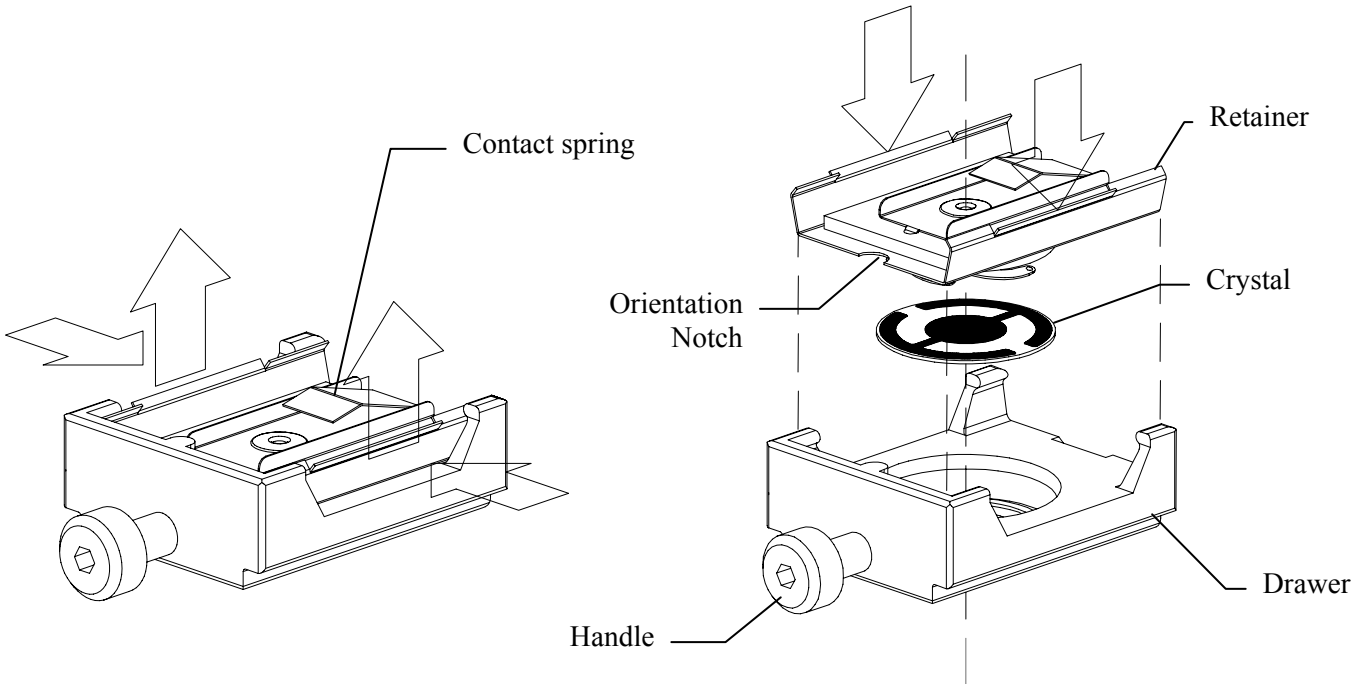
2.7 Single Sensor Head Shutter

For the single sensor head type, the shutter covers the crystal. Note that the single shutter does not fully cover the crystal at atmosphere, but once under vacuum, due to the differential pressure, the shutter rests over the crystal. When the pneumatic valve is open (on), the air actuates the bellows, move the shutter and expose the crystal.

2.8 CRYSTAL REPLACEMENT

CAUTION: ***To reserve cleanliness and to maximize performance all work should be performed in a clean room environment.***

1. Using your thump and index fingers, gently squeeze the sides of the retainer at mid section then lift it up, away from the drawer, as shown in Figure 1.
2. Holding the drawer by the handle and turn it up side down to remove the spent crystal.
3. Install a new crystal in the drawer. Observe its orientation. The pattern electrode should be up as shown in Figure 2.
4. Hold the retainer by its sides. Align its orientation notch with the drawer then gently and evenly push the retainer down until it snaps firmly into the drawer. See Figure 2. Never push down (or pull up) on the contact spring, doing so may permanently damage it.
5. Inspect the whole assembly. The retainer should lay evenly and engage the drawer at all of the four corners.


Contact spring
Retainer
Orientation Notch
Crystal
Drawer
Handle