OPERATION AND SERVICE MANUAL

RSH-600 / RSH-601

Rotary Sensor Head

153800 Rev. D

INFICON

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IPN 153800 Rev. D

INFICON Instruments for Intelligent Control®

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REV B - September 2002
REV C - September 2004
REV D - October 2007

WARNING

All standard safety procedures associated with the safe handling of electrical equipment must be observed. Always disconnect power when working inside the controller. Only properly trained personnel should attempt to service the instrument.

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.

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1. Features

1.1 Crystal Failure Back-up:

Switching the crystal without venting the system makes it possible to run automatic and continuous deposition. The fixed position of the crystal being measured makes it unnecessary to change the Tooling Factor.

1.2 Material Dedicated Crystals:

The Rotary Sensor Heads RSH 600/601 can be used to deposit a different material on each of six crystals providing greater measurement accuracy. Upon completion of deposition of one material, the deposition controller may be programmed to switch crystals for the next material.

The Rotary Sensor Head may also be actuated manually.

1.3 Crystal Number Feedback:

A 7-pin, six-position connector provides a switch closure indicating the number of the active crystal. This may be used to interface with a thin film controller such as the MDC-360 for automatic crystal switching operation.

1.4 Flexible Mountings:

The RSH-600 is adjustable from 2" to 6.6" (51mm to 168mm) from the vacuum side of the mounting flange to the crystal surface whereas the RSH-601 is adjustable from 2" to 12.5" (51mm to 318mm). An O-ring sealed flange is required to mount the RSH's. This mounting flange can be ordered and manufactured to customer's specifications. The customer must supply specifications as to mounting holes, exterior diameter of flange and system mating flange.

The exposed crystal electrode is fully grounded to effectively eliminate problems due to free electrons and RF interference.

2. Specifications

Number of Crystals:	6
Crystal Size:	0.550” diameter
Installation Aperture:	2.0" diameter
Overall Length:	RSH-600 - 16.7" (424mm)
	RSH-601 - 22.6" (574mm)
Adjustable Length in Vacuum:	RSH-600 - from 2" to 6.6" (51 to 168mm)
	RSH-601 - from 2" to 12.5" (51 to 318mm)
Power Requirement:	115VAC/50 mA or 24VDC/20 mA
Crystal Switching Method:	Air Actuated @ 55psi (4kg/cm^2) regulated
Cooling Method:	Water-cooled @ 5L/m at 2kg/cm^2 (28psi)
Air and Water Connections:	(3) ¼” quick connects
Operating Temperature:	300°C max with water cooling and Standard Head Cover
	400°C max with water cooling and Copper Head Cover
Weight:	RSH-600 - 8.5 lb. (3.8kg)
	RSH-601 - 9.9 lb. (4.5kg)

3. Unpacking and Inspection

Carefully inspect your Rotary Sensor Head and its shipping container for evidence of possible shipping damage or loss. If such evidence is present, a report should be filed with the carrier as soon as possible. Keep the shipping container as evidence if shipping damage is present or for possible future return of the unit. Check the material against the packing list to be certain that all material is accounted for. The following items should have been included with your Rotary Sensor Head:

1 Rotary Sensor Head RSH 600 or RSH 601	
1 User's Manual	P/N 153800
1 Oscillator Assembly and Cables	P/N 124201-4
11 Crystals (6 installed)	P/N 103701
and if ordered	
1 Flange (from customer's specification)	
1 O-Ring	P/N 803188

Prior to using the RSH, remove the head cover to insure that each crystal is seated and not broken. Replace the head cover.

4. Bench Checkout

The RSH is equipped to operate on a 115 VAC, 60 Hz line or a 24 VDC supply depending on the model number. You can verify the required voltage on the body of the pneumatic valve mounted on the side of the RSH. The RSH may be bench checked using the following procedure:

1. Connect air pressure (55 psi) via ¼" plastic tubing to the air inlet fitting at the base of the solenoid valve marked "P".
2. Connect RSH as show in the diagram below or any convenient method of applying and removing the control voltage. The RSH will advance when the voltage is applied and latch into position when it's removed. The electrical pulse duration should be at least one second.

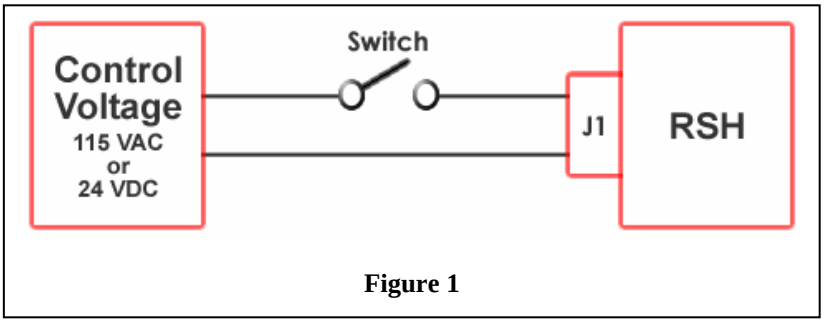


Figure 1

5. Installation

CAUTION

During installation, special care must be taken to protect the barrel surface from being damaged. Scratches or gouges may prevent the RSH to form a good vacuum seal to the O-ring.

5.1 Mounting

***Important**: The head cover must be removed from the RSH prior to installation.*

To remove the standard stainless steel cover: Loosen the retainer ringnut; push the head cover inward while turning it counterclockwise until it stops (1/16 of a turn); pull the head cover outward.

To remove the optional copper cover: Loosen the Allen head screws that clamp the head to the RSH then gently pull the head off of the RSH barrel.

The vacuum system has to be equipped with a 2.0" diameter aperture port. This port must have an o-ring to provide vacuum seal to the fixed flange on the RSH. If the head cover has been removed, simply slide the RSH through the 2.0" port. Secure the RSH to the port using four ¼"-24 bolts minimum. Reinstall the head cover.

5.2 Adjustable Flange Installation:

Adjust the flange to desired position on the head, and then tighten. Again, slide the RSH through the 2.0" port. Secure the adjustable flange to the port using four ¼"-24 bolts minimum. Reinstall the head cover.

5.3 Copper Head Installation:

The optional copper head must be installed after the RSH has been mounted on the vacuum system. The copper head has two main pieces namely the clamping ring and the head cover. Loosen the Allen head screw on the clamping ring and on the clamp portion of the head cover. Attach the clamping ring to the head cover. Next, remove the crystal retainer and you will see two gold springs. One spring makes contact with the backside of the retainer. The other spring makes contact with one of the individual crystal contacts. You have to align the hole in the head cover so that the crystal that this spring contacts will be exposed. Note the position of this spring and replace the crystal retainer. Then carefully slide the cover over the barrel of the RSH until it touches the crystal retainer then rotate the cover so that the crystal in contact with the spring is centered in the hole in the cover. Finally, tighten the Allen screws on the clamping ring. Please note that the clamping ring should be left attached to the head during crystal changing. Only the head cover should be removed so the alignment process will not have to be repeated unless the head is removed from the chamber

If no flange was ordered and you plan on making your own adjustable flange, the factory can provide essential dimensions and "O" rings.

5.4 Cooling System:

The direction of the water flow is not important. Use 1/4" plastic tubing to connect one port to a water supply. The water flow rate should be 5 L/m (1.3 g/m) at 2kg/cm^2 (28 psi). Water temperature should be less than 30°C. Connect the other port to a drain or water recycle system.

5.5 Air Supply:

Use 1/4" plastic tubing to connect the air inlet port to an air supply. Make sure the plastic tube is rated higher than 55 PSI. The air pressure should be regulated to 4kg/cm^2 (55psi).

5.6 Crystal Number Feedback Connections:

The Crystal Number Feedback Connector has 7 pins. Pin number 1 through 6 corresponds to the six crystals and pin number 7 is the common pin. A short between pin 7 and one of the pins 1 through 6 indicates the active crystal. For example, if pin 7 is shorted to pin 1, then crystal 1 is the active crystal.

Use this connector to interface with your controller for automatic crystal selection. Refer to your controller user manual for programming instruction. If your controller is a INFICON MDC-360, see instructions in section titled *Example Using INFICON's RSH-600 Six Crystal Sensor Head.*

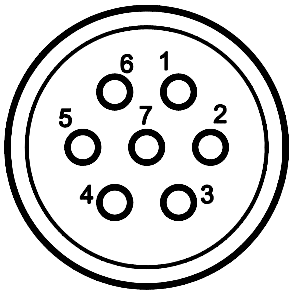


Figure 2 Crystal Number Feedback Connector

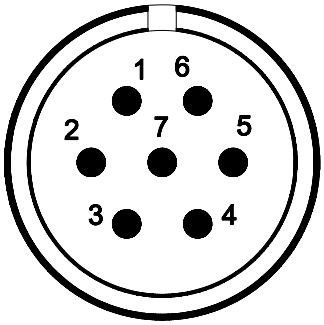


Figure 3 Mating Connector (Male) - Crystal Number Feedback

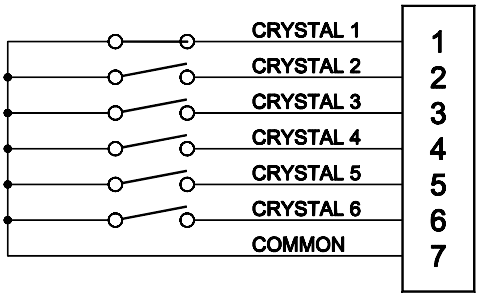


Figure 4 Crystal Number Position Feedback Diagram

5.7 Protection from Evaporant:

It is advisable to cover the head cover and barrel of the RSH with aluminum foil to protect the unit from evaporants.

6. Sensor Crystal Replacement

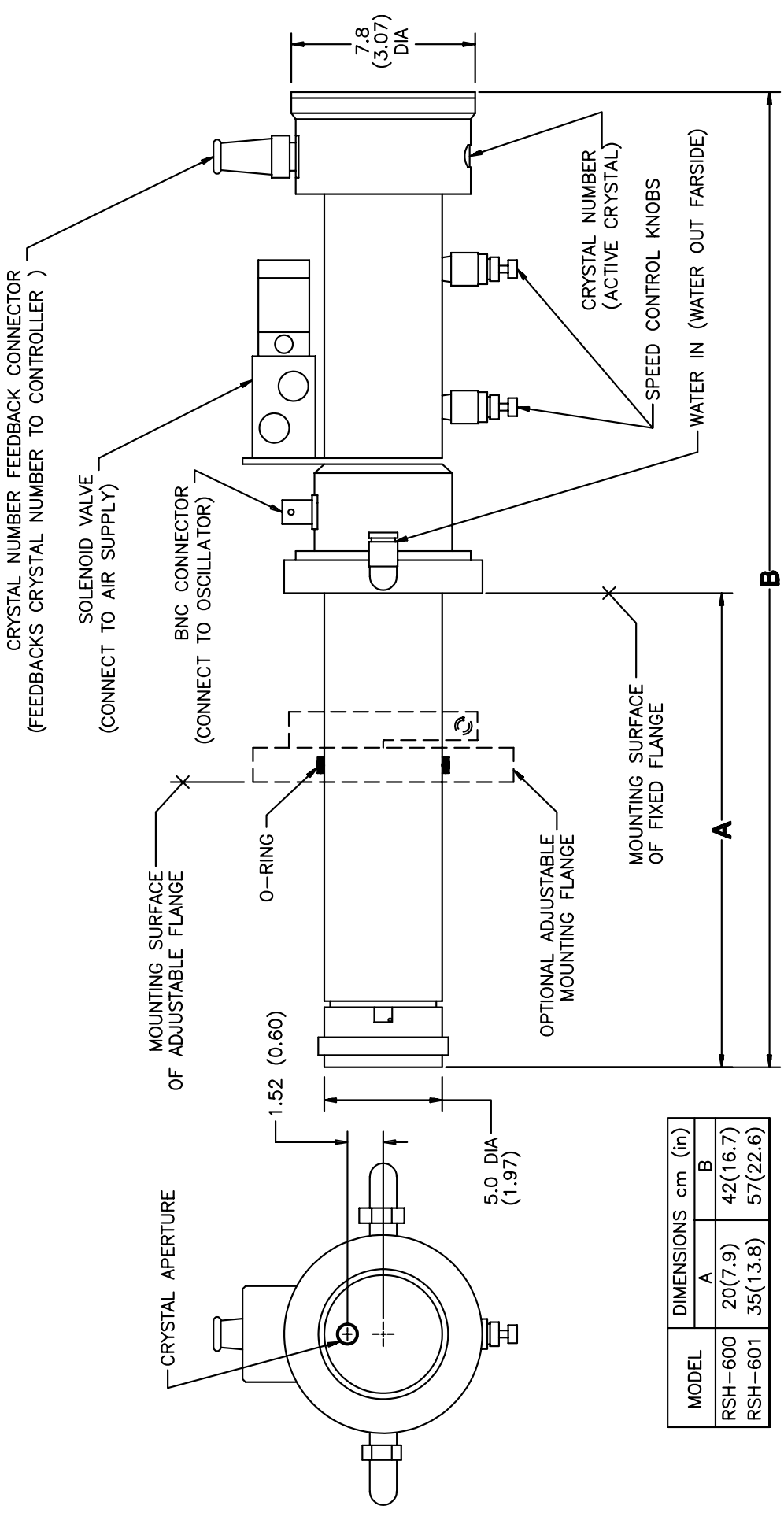
1. Remove aluminum foil (If installed)
2. Remove the standard stainless steel head cover:
    a. Loosen the retainer ringnut.
    b. Push the head cover inward while turning it counterclockwise until it stops (1/16 of a turn)
    c. Pull the head cover outward and remove head cover from the head barrel.
3. Remove the optional copper head cover:
    a. Loosen the three Allen head screws that attach the head cover to the copper clamping ring. (Leave this clamping ring attached)
    b. Carefully slide the head off of the barrel of the RSH.
4. Loosen center screw of the head to release crystal retainer.
5. Remove the remaining three screws (on the backside of the retainer) to separate the head from the spring retainer.
6. Remove the used crystals and replace new ones into the crystal holder. Make sure to place the crystal so that the solid electrode is facing out of the head.
7. Put the spring retainer and crystal housing back together and tighten the three screws being careful not to deform the crystal springs or break the crystals.
8. Place the complete crystal retainer assembly back on the head barrel, observe and line it up with the indexed pin. Tighten the screw.
9. Replace the head cover.

** Note ** - Crystal replacement time can be reduced by using a spare crystal holder.

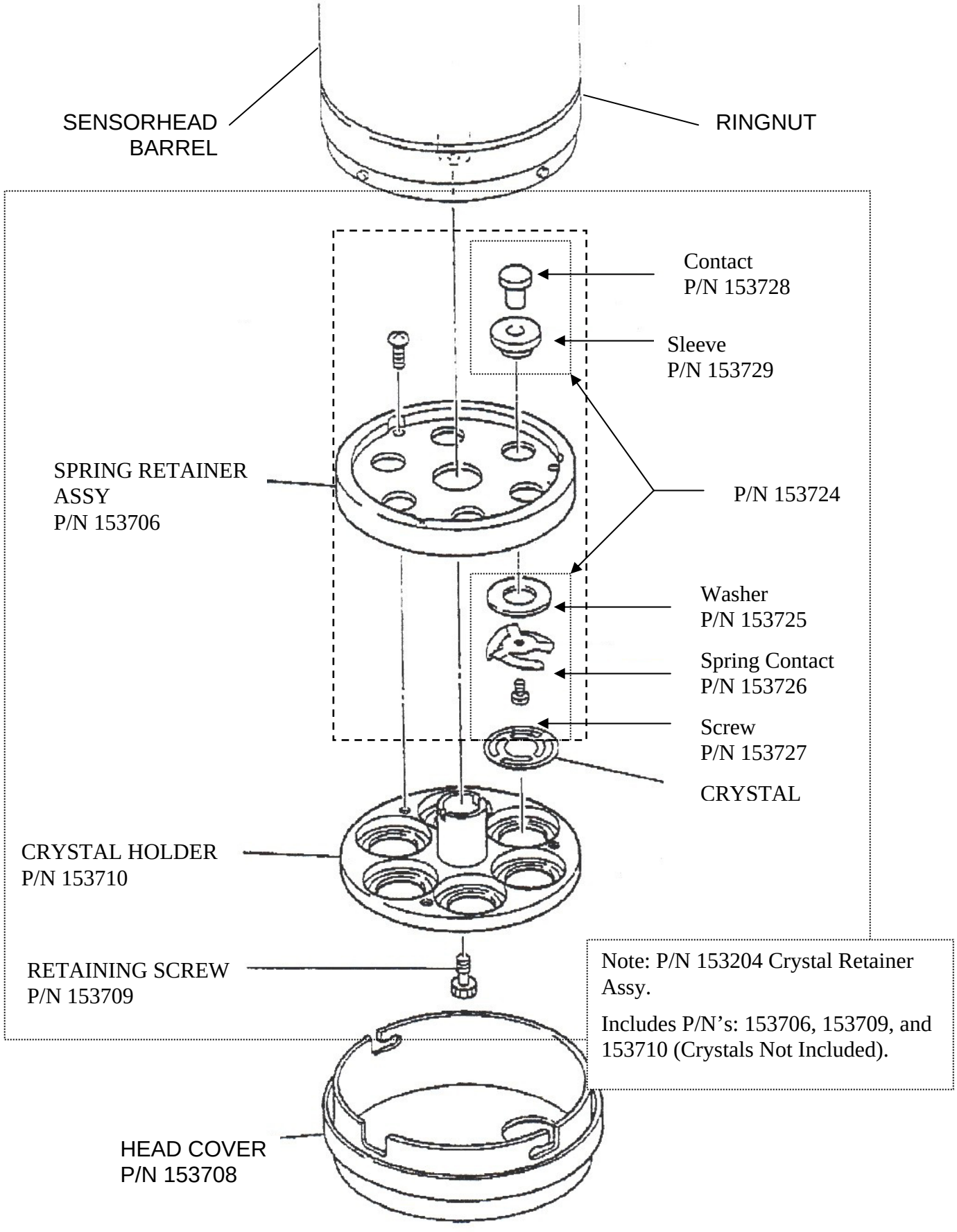
7. Spare Parts

Description		Part Number
Standard Stainless Steel Head Cover		153708
Angled Stainless Steel Head Cover		153713
Copper Head Cover		153723
Angled Copper Head Cover		153723-2
Crystal Holder		
Flat Type	Spring Retainer	153706
	Crystal Holder	153710
Angle Type	Spring Retainer	153714
	Crystal Holder	153716
Crystal Holder Retaining Screw (Flat Type)		153709
Crystal Holder Retaining Screw (Angle Type)		153715
Crystals		
	Gold	103220
	Silver	103221

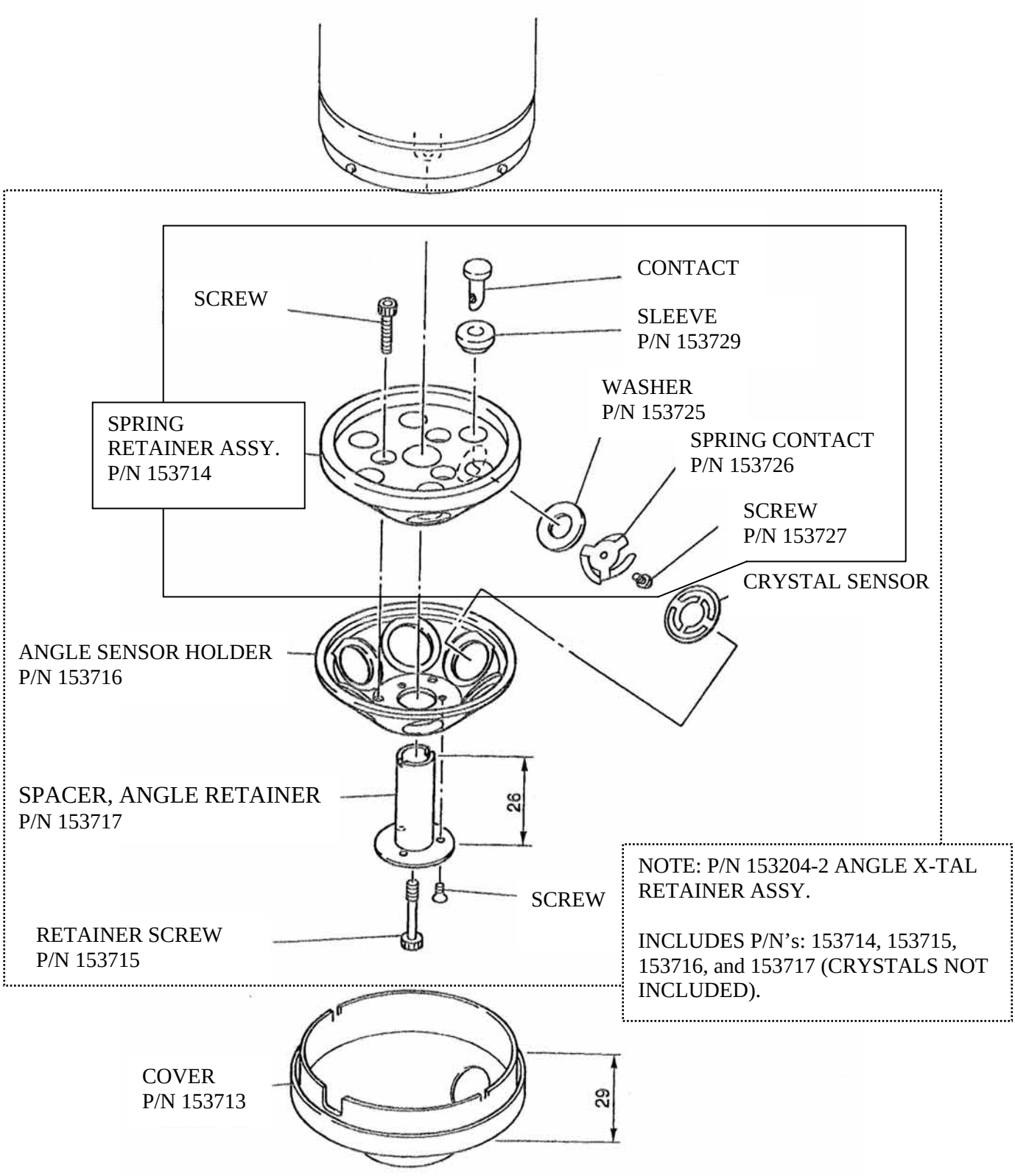
Note - Other crystals are available.



MODEL	DIMENSIONS cm (in)	
	A	B
RSH-600	20(7.9)	42(16.7)
RSH-601	35(13.8)	57(22.6)



ROTARY SENSOR HEAD FLAT TYPE



Rotary Sensor Head Angle Type