WAVE QSK Crystal Head
WAVE QSK Crystal Head Controller

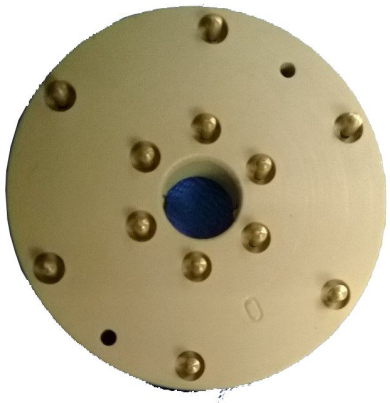
The new Wordentec high accuracy six position crystal head is the film measurement device used in the latest WAVE controlled deposition systems where accuracy and repeatability are of paramount importance.

This latest version features

- Improved Temperature Stability
- Accurate Micrometer Style Adjustment
- Revised Contact Mechanism
- Re-designed Crystal Cassette

The outer dimensions of this unit are identical to the now obsolete Balzers QSK 610a crystal head. This makes it a straight swap upgrade to address the known problems associated with using the older type units.

This model can also be used to replace the first generation QSK610 crystal heads with the addition of the WAVE QSK Crystal Head Controller to replace the QCC101 rack mounted crystal controller.



Technical Data

WAVE QSK Crystal Head

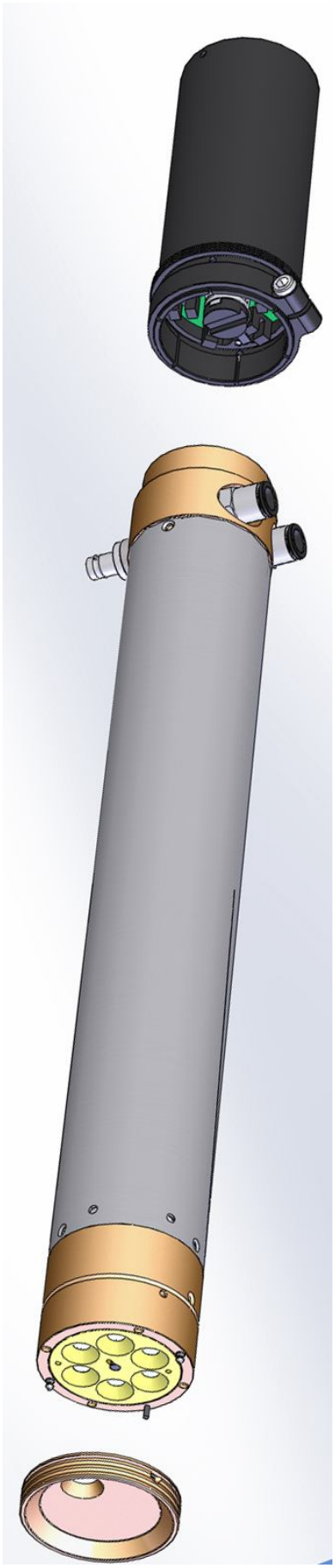
Overall Length	590mm
Tube Diameter	60mm
Weight	3.5kg
Cooling Connection	10mm push in
Position Connection	15way D type
Oscillator Connection	Standard BNC

WAVE QSK Crystal Head Controller

Length	210mm
Width	133mm
Height	100mm
Weight	0.6kg
Power Connection	24vdc (AC Adapter)
Crystal Head Connection	15w D type
Remote Input Connection	7 pin screw on plug

Accessories

- Oscillator for SQM
- Oscillator for IC5
- BD104 QSK Adaptor
- O Ring
- Crystal Lead
- Quartz Crystals
- High Accuracy Crystal Chiller



The crystal head must be fitted into the coating system in such a way that from the point of view of the evaporation process it is subjected to the same conditions as the object which is to be coated.
When using one crystal head, a central position between sources is normally favored with the crystal head front face at the same height as the center of the substrate dome.
If upgrading from the QSK610 or the QSK610a it is important that the new crystal head is positioned in exactly the same place as the old unit. We suggest taking some accurate measurements of the crystal head position before starting.
The crystal height is fully adjustable along the length of the outer body. The vacuum seal is achieved by clamping the o ring into a tapered flange onto the long center portion of the crystal head.
The minimum insertion depth into the chamber is 80mm the maximum is 380mm so the seal can be achieved anywhere in the 300mm height range.
When the height is correct and the bolted flange is leak tight the clamp should be positioned to prevent the crystal head being drawn into the chamber. This will also provide a height gauge when refitting the crystal head in the future.

Cooling Water

The cooling water connections are 3/8bsp parallel thread. These are normally fitted with 10mm push fit connectors. These can be changed for hose barbs or any connection with an o-ring face seal. We recommend a flow rate of 5 l/m with a cooling water temperature of 25 °C.
To improve the accuracy of the crystal head we recommend that the water temperature is closely controlled, if this is not possible with the existing set up a dedicated crystal chiller can be supplied to provide cooling at +/- 1/10th °C

Oscillator Connection

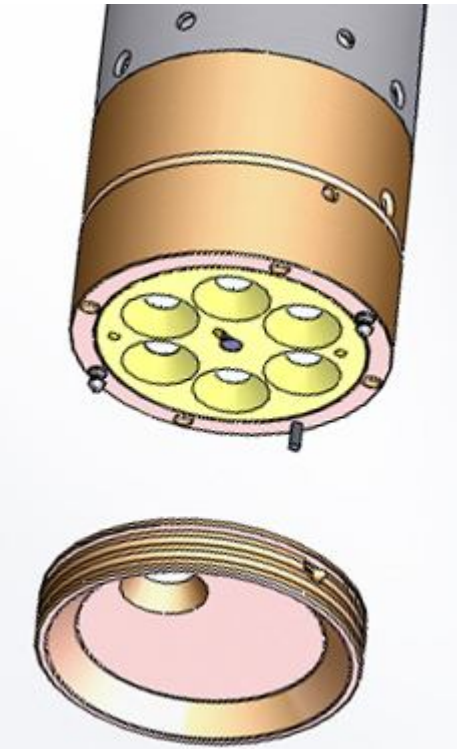
Connect the oscillator as close as possible to the BNC connection just under the drive assembly. To reduce the possibility of induced electrical noise in the circuit a short lead is far better than a long one, connect the other end of the oscillator to your PC card or crystal readout.

Position Connection

Connect the 15 way ‘D’ connector to the system. If upgrading from the Balzers QSK610A the control connection is the same however it may be necessary to change the connector hood from the clip type to the more modern bolted type.
If upgrading from the older QSK610 with the circular connector it will be necessary to fit the WAVE QSK Crystal Head Controller to provide the correct automatic and manual signals.
The new crystal head can also be integrated into a modern control system by providing the correct inputs and outputs.

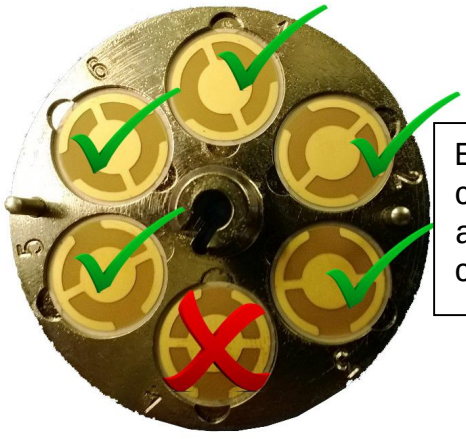
Operation

With the crystal head bolted in position pull down the front cover to expose the crystal cassette.
Gently pull the crystal cassette downward to release it from the crystal head body.



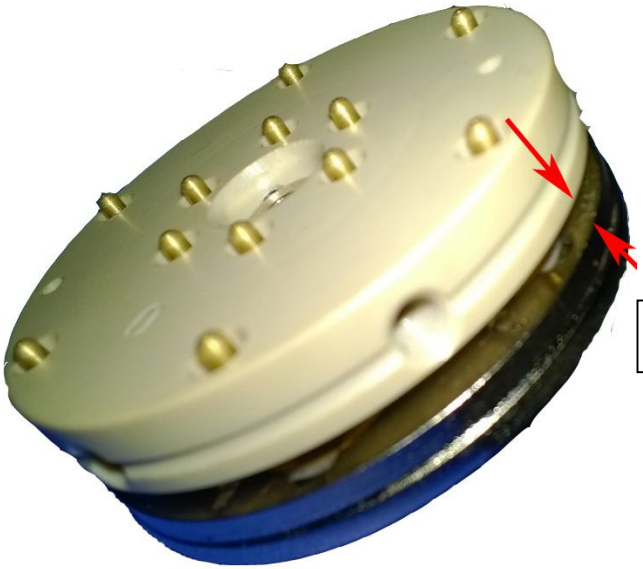
The cover and crystal cassette is pulled gently downward and released from the body

Working on the bench separate the two halves of the crystal cassette taking note that the [0] stamped on the top portion of the cassette is visible
Remove the old crystals and fit 6 new crystals of your choice taking care that they are positioned correctly.



Ensure the gap in the crystal connector is not adjacent to the connector pin position

With the new crystals fitted gently snap the two halves of the crystal cassette together taking care not to break the delicate crystals. The cassette top will only fit one way on the offset pins and the stamped [0] must be on the outside of the assembly. Once the crystal cassette has been assembled we suggest it is kept horizontal to ensure the crystals do not move away from their supports.



Gently snap the two halves together

Insert the cassette into the body and fit the front cover.

Rotate the crystal head using the controller to check that each crystal is fitted correctly and has a good frequency. A new, correctly fitted 6MHZ crystal will have a frequency of approximately 5.99 MHz.

Service

This device is set up at the factory with the correct crystal alignment and also the correct tension of the snap springs located within the crystal cassette and drive body.

To re-adjust the crystal position:

Set the crystal controller to position 1
Mark the crystal fitted into the crystal cassette at position 1
Loosen the clamp screw around the drive mechanism
Rotate the drive until the crystal is exactly in the center of the aperture then tighten the clamp screw.
Setting the position of crystal 1 aligns the other 5 crystals correctly.

Cleaning

To ensure reliable operation the crystal cassette must be kept clean of coating debris. **Do not sand blast the crystal cassette** use some IPA and some cloth to clean the cassette face and connection pins.
When blasting the front cover please mask the inner face and ensure that all of the blast media is removed before re-assembly.

Troubleshooting Guide

Problem	Probable Cause	Remedy
Crystal head does not rotate	Controller not working	Check the controller fuse
All of the crystals have no frequency	Oscillator not connected correctly	Check / Replace the oscillator
One of the crystals has a low frequency	The crystal is contaminated	Change the crystal or crystals
The front cover falls off	The spring adjustment is wrong	Adjust the spring tension correctly
The alignment of the crystal is wrong	The drive section has been rotated	Set the crystal 1 position
The measurement is inconsistent	The cooling water is not stable	Check and adjust the water flow
The vacuum changes whenever its rotated	The main shaft seal has failed	Replace the main shaft seal
The crystal head does not stop rotating	Failure of the drive electronics	Contact Wordentec
The crystal head is noisy in operation	The contacts have become bent	Replace the contacts

Spare Parts

Part	Part Number	Quantity
Crystal Front Cover	WCS-0234	1
Crystal Cassette	WCS-0084	1
Water Connection	182-4841	2
BD104 QSK Adapter	WCS-0235	1
Seal Kit	WCS-0236	1
Contact Strip Kit	WCS-0076	1
Oscillator for SQM	WCS-0074	1
Oscillator for IC/5	757-302-G1	1

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