

BS-04 Series Rotary Sensor

6 or 12 quartz crystals sensor head for a thin film deposition controller/monitor which control/monitor the deposition rate and the film thickness in a vacuum deposition process.

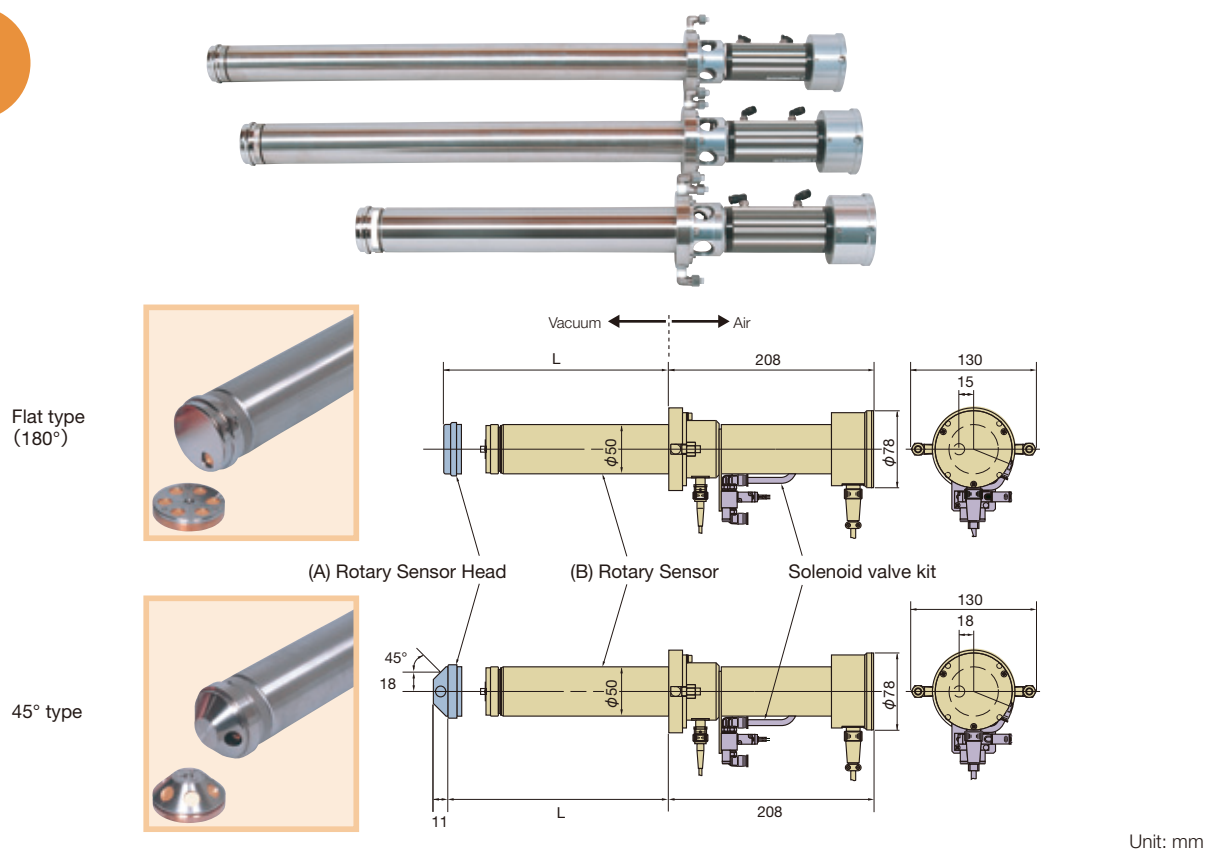


Rotary Sensor 6 12

These are multi-point sensor heads that are designed to be connected to crystal oscillator film-thickness controllers or monitors in order to control/monitor the film thickness and deposition rate during vacuum deposition. Six crystal and 12-crystal models are available. When a crystal reaches the end of the service life (crystal failure), it is possible to continue using these sensor heads by simply switching to the next crystal, making these suitable for depositing thick films and multi-layer films. Since the detection aperture is in a fixed position, there is no need to change the Tooling Factor each time a crystal is switched. There are 2 types of sensor heads, a flat type and a 45° type, so you can select which one to use according to the mounting position.

6-point Rotary Sensor

6



Unit: mm

Configuration

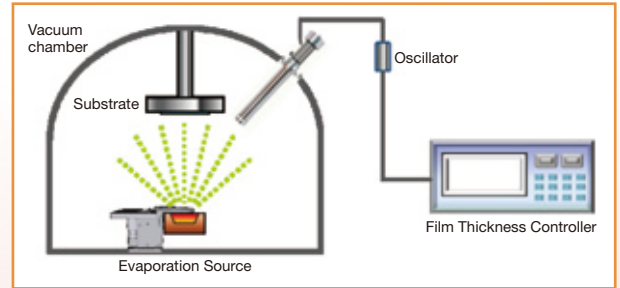
(A) Rotary Sensor Head		(B) Rotary Sensor			
Type	Model	L (vacuum side length)*	Model	L (vacuum side length)*	Model
Flat type (180°)	BS-04120SSH	200 mm	BS-04010SSR	480 mm	BS-04060SSR
		300 mm	BS-04020SSR	500 mm	BS-04070SSR
		350 mm	BS-04030SSR	540 mm	BS-04080SSR
45° type	BS-04130SSH	400 mm	BS-04040SSR	580 mm	BS-04100SSR
		450 mm	BS-04050SSR	650 mm	BS-04110SSR
Solenoid Valve Kit (option)		Cu cap (option)			
24 V type	BS-04170KIT	Flat type	BS-04140CAP	45° type	BS-04150CAP

For the configuration, select /A + B (+ options).

* When the 45° head is mounted, 11 mm is added to the total length.

Features

- The electrical contacts on the back of the quartz crystals are multi-point electrodes that are nearly surface contacts, making it possible to perform high accuracy film thickness measurements due to the stable crystal oscillation. In addition, the replacement of consumables/parts is simple, and the structure makes it unlikely that poor contact between the electrodes will occur, delivering stable operation even when the crystals are replaced.
- Crystal switching is performed with an air drive and stopper mechanism, enabling highly-precise alignment.
- The sensor body length inside the vacuum chamber can be selected, and there are 2 types of head angles offered, making these suitable for installation in almost any location, from small to large chambers.
- Positioning is easy due to the simple structure of a flange mounting to the chamber opening. The detection position can be aligned exactly as designed.
- The sensor head is fastened by the tube from the insertion flange, so the attachment is secure, unlike the sensors fixed at the head-section only. Since there is no shifting of the sensor head position (detection position) during crystal replacement or maintenance it is possible to achieve reproducibility (data reliability) between batches and over long periods of use.
- Attaching an optional Cu cap to the sensor head enables stable deposition rate monitoring, even in high-temperature processing environments of 270 °C or higher.

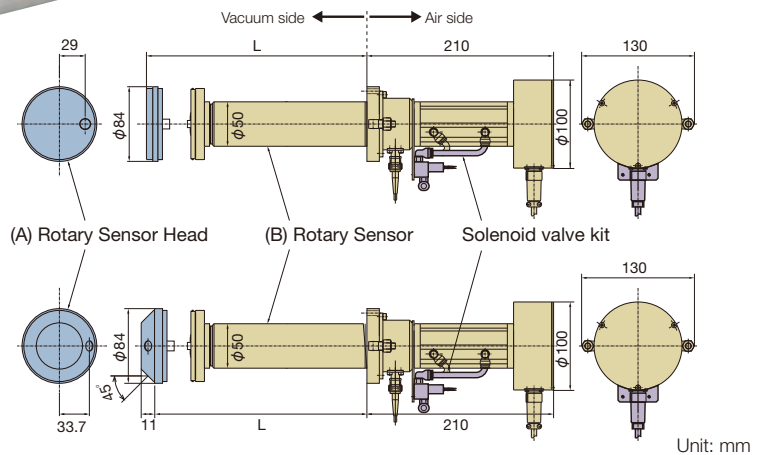


Can be connected to both 6 MHz and 5 MHz crystal oscillator film-thickness controllers/monitors.

* Please inquire for details about compatible makers and devices.

12-point Rotary Sensor

12



Configuration

(A) Rotary Sensor Head		(B) Rotary Sensor			
Type	Model	L (vacuum side length)*	Model	L (vacuum side length)*	Model
Flat type (180°)	BS-04430TRH	200 mm	BS-04300TRS	500 mm	BS-04360TRS
		300 mm	BS-04310TRS	540 mm	BS-04370TRS
		350 mm	BS-04320TRS	580 mm	BS-04390TRS
45° type	BS-04440TRH	400 mm	BS-04330TRS	650 mm	BS-04400TRS
		450 mm	BS-04340TRS	700 mm	BS-04410TRS
		480 mm	BS-04350TRS	750 mm	BS-04420TRS
Solenoid Valve Kit (option)		Cu cap (option)			
24 V type	BS-04170KIT	Flat type	BS-04460CAP180	45° type	BS-04470CAP45

For the configuration, select /A + B (+ options).

* When the 45° head is mounted, 11 mm is added to the total length.

Specification	6-point type	12-point type
Crystal oscillator	6 pcs (6 MHz) / 12 pcs (6 MHz)	12 (6 MHz*1)
Crystal oscillator operating temperature	100 °C or lower	
Drive method	Air (0.4 to 0.7 MPa)	
Air connection port bore size	6 mm × 4 mm in diameter	
Cooling method	Water-cooling jacket	
Cooling water	Flow rate 2 to 3 L/min, Maximum inlet pressure 0.5 MPa, Differential pressure 0.2 MPa to 0.35 MPa, Water temperature 10 to 30 °C or lower	
Cooling water connection port bore size	6 mm × 4 mm in diameter	
Main body outer diameter	50 mm in diameter	
Mounting chamber opening diameter	2 inch in diameter	
Dimensions (Length) ²	BS-04010SSR + BS-04120SSH 408 mm (Air side 208 mm + Vacuum side 200 mm)	BS-04300TRS + BS-04430TRH 410 mm (Air side 210 mm + Vacuum side 200 mm)
	BS-04030SSR + BS-04120SSH 558 mm (Air side 308 mm + Vacuum side 350 mm)	BS-04320TRS + BS-04430TRH 560 mm (Air side 210 mm + Vacuum side 350 mm)
Mass	BS-04010SSR + BS-04120SSH 3.0 kg	BS-04300TRS + BS-04430TRH 3.6 kg
	BS-04030SSR + BS-04120SSH 4.0 kg	BS-04320TRS + BS-04430TRH 4.5 kg

*1 5 MHz crystal oscillators can also be used.

*2 When the 45° head is mounted, 11 mm is added to the total length. When the Cu cap is attached, the total length is increased by 7 mm.

Temperature Conditions

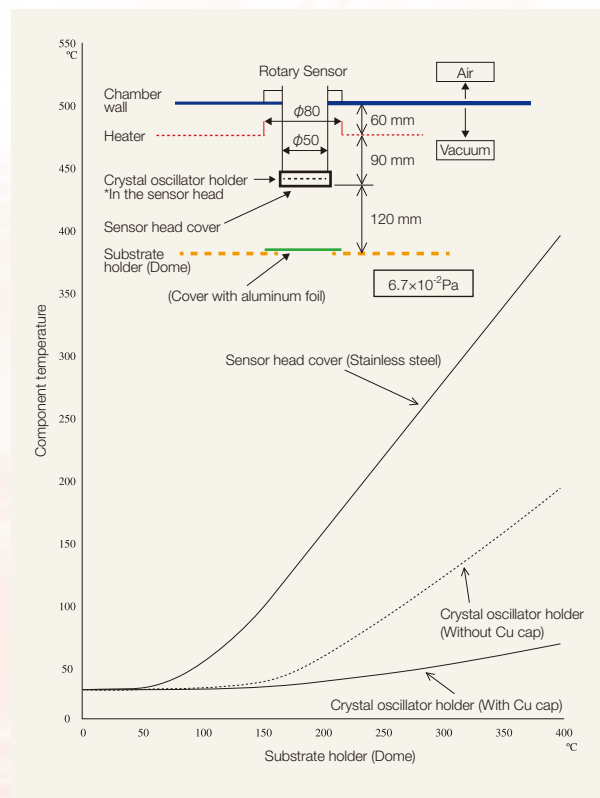
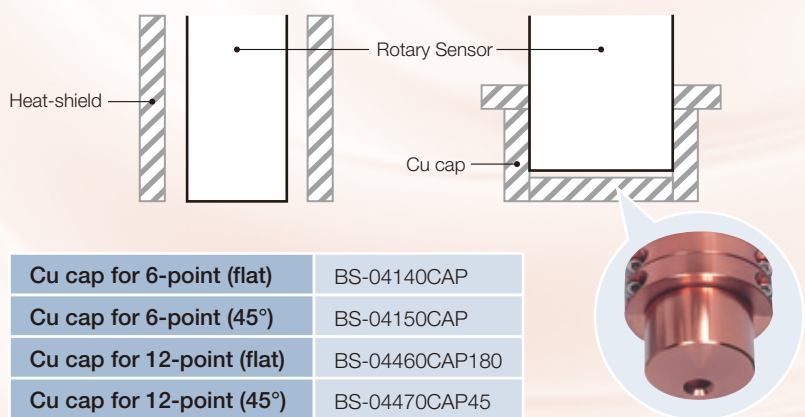
The figure on the right shows comparison data for the sensor head temperature and the substrate dome temperature.

Since there are large differences depending on factors like the mounting positions of the sensor head and heater, and vapor injection, the data shown is only an example for reference.

The crystal oscillator temperature should be within the specified temperature (100 °C or less) during use.

If the temperature of the crystal oscillator holder is expected to exceed 100 °C, take countermeasures like the following:

- Mount a heat shielding cover (a water-cooled type is best) around the Rotary Sensor
- Mount the optional Cu cap



* Specifications subject to change without notice.

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