



Ordering Information

5683 Ultrastable Quartz SPRT,
–200°C to 450°C

See page 15 for calibration prices.

Technical Tip

All Platinum Is Not the Same

Platinum resistance thermometers (PRTs) are made from a variety of platinum sensor wire. The differences in the wire affect the thermometers' performance. The two most important variations are purity and thickness.

According to IPTS-68 requirements, platinum purity was measured by its "alpha," or average change of resistance per degree. Alpha 0.00385 was common for industrial thermometers, and alpha 0.003925 was common for SPRTs. ITS-90, in contrast, measures platinum quality with ratios of their resistance at certain fixed points (gallium, mercury, and/or silver) to their resistance at the triple point of water (R_{TPW}). Those meeting the ITS-90-specified ratios are considered SPRT quality.

The thickness of the platinum wire affects its resistance and is indicated by a nominal resistance value at the triple point of water. The thicker the wire, the lower its nominal resistance. 100 ohms at R_{TPW} is common for industrial sensors, and 25 ohms at R_{TPW} is typical for SPRTs.

Which is best for your application? All things equal, lower resistance PRTs are generally more stable because of their thicker sensor wire. However, low-resistance PRTs require higher resolution readout devices to handle the small changes in resistance per degree. The advantages gained by using low-resistance PRTs are not significant in most applications. If they're needed, however, be sure you have the right device to read them.

Ultrastable SPRT

Model 5683

Superior drift rate: 0.0005°C typical

Range from –200°C to 450°C

Calibration options available by fixed point or by comparison

When you select an SPRT to be your lab standard, there is no other selection criterion more important than stability. You won't find a more stable reference thermometer than Hart's new Model 5683 Ultrastable SPRT.

While SPRTs traditionally cover temperatures to the aluminum point (660°C), most measurements occur between –100°C and 420°C. The Model 5683 SPRT covers this range and more, from –200°C to 450°C, and does so with long-term stabilities that extended range SPRTs can't match. Typical drift is less than 0.5 mK after 100 hours at 480°C.

Like other SPRTs that are made by Hart and that have become lab standards in primary temperature laboratories throughout the world, the 5683 is made from the best sensor and sheathing materials available.

The integrity of the seal between the quartz glass sheath and the platinum sensor wire is maintained (even throughout constant temperature changes of the SPRT) by a meticulously crafted graduating seal that matches the different expansion rate of the quartz glass to the platinum. The proprietary gas mixture inside the sheath remains

uncompromised, thereby maintaining the low drift of the 5683.

Each Hart SPRT is carefully manufactured and tested to meet the difficult acceptance criteria of our primary standards design team. We're so confident in these instruments, we'll take any of them back if they don't make you happy with their performance. Our primary standards team has been designing and building SPRTs longer than anyone else in the industry. Don't trust the construction of your lab standard to anyone else.

Specifications

Temp. Range	–200°C to 450°C
Nominal R_{TPW}	25.5Ω
Current	1 mA
Resistance Ratios	W(302.9146K) > 1.11807 and W(234.3156K) < 0.844235
Drift Rate	< 0.001°C/100 hours at 480°C (0.0005°C typical)
Short-Term Repeatability	0.2 mK
Protecting Sheath	Quartz glass Diameter: 0.28" (7 mm) Length: 20.5" (520 mm)



Read about our accredited calibration services on page 156.