Going digital on three axes

Changing to the new SCL3300 inclinometer can mean more work, but it has major advantages to its analogue predecessors. Murata will provide support in the transition.

In inclinometer applications, the SCA100T and SCA61T to be discontinued can be replaced by the new SCL3300, a digital 3-axis inclinometer. Even though the change will require some redesign in the system and rethinking of the application, the benefits of the digital sensor are evident.

Lower System Costs

The older sensors were analogue, but the SCL3300 is digital, meaning there is no more need for a A/D converter, which makes it easier to design the system, but even more importantly, reduces the total system costs.

Murata has made sure that the sensor's internal A/D converter is of such high quality that its performance is as good as any external converter.

SCL3300 measures on three axes, and it can output inclination data directly, instead of acceleration data used as the basis for inclination calculation. With former 1- or 2-axis sensors, achieving 3-axis measurement has required more than one sensor and a vertical PCB. This way, again, the SCL3300 helps cut system costs.

Moreover, the SCL3300's current consumption in normal use is only 1–2 mA, compared to the 4 mA for SCA100T and SCA61T. Where even lower current consumption is essential, the SCL3300 can be switched to a power down mode, which lowers the consumption to 10 µA. This way, the sensor can be, for example, battery-operated in structural health monitoring applications.

The new sensor is also much smaller in size compared to the previous generations. This makes it possible to decrease the size of the packaging, which again leads to lower costs.

More choice

With SCL3300, the user can choose from three different dynamic ranges, going for a large measurement range with lower sensitivity or a small range with higher sensitivity.

This allows the adjustment of accuracy and vibration resistance for each application and makes it possible to use the same sensor in different applications, when earlier different sensors had to be selected for different ranges.

The SCL3300 has a much lower cross-axis sensitivity than is predecessors (±1% vs. ±4%), so it is less prone to possible mounting errors.

Even though SCL3300 is a 3-axis sensor, it can just as well be used in 1 or 2-axis measurements. In case of larger tilting angles (>30 degrees) or full rotations, it is always beneficial to utilize two measurement axes to measure in one direction of tilt. Should the need to measure the third axis arise, it is ready to be used, whenever necessary.

The SCL3300 also represents a new kind of platform thinking at Murata. The sensor is fully compatible with the SCA3300 accelerometer, and the development of new sensors in the same family will make it possible to upgrade your solution quickly and easily.

Support in Transition

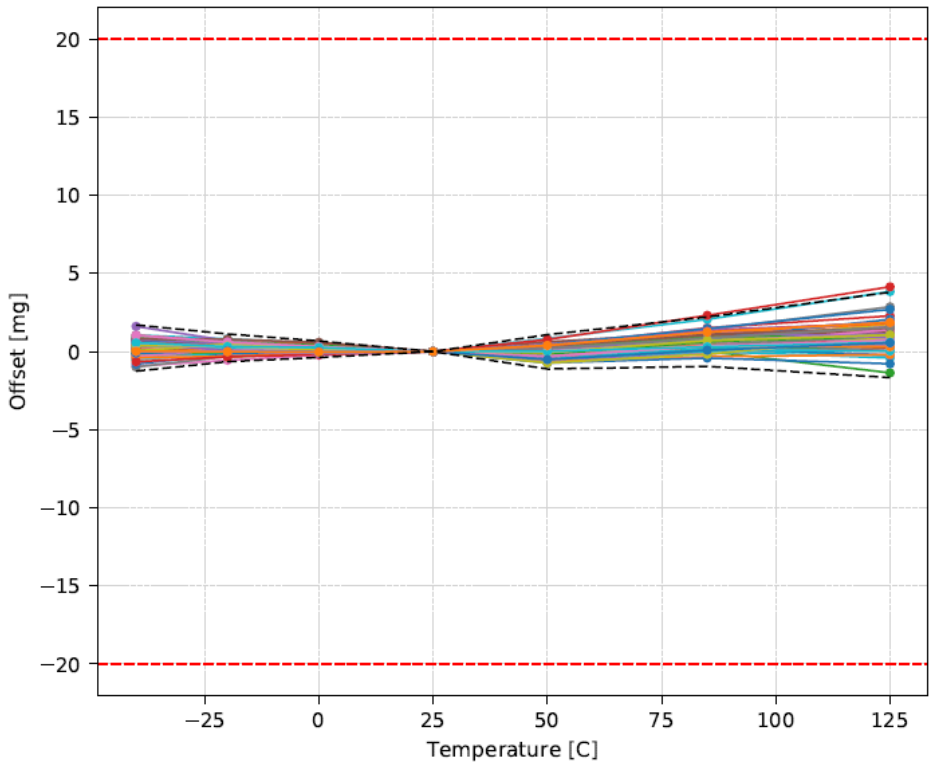
So, moving on to SCL3300 is in many ways advantageous, and the digital sensor's performance is at least on a par with the older analogue ones in terms of offset temperature drift, long term drift, and noise density, for example.

Even so, the change requires some effort, and Murata is ready to help its clients in the transition. To get to a good start, we offer a demo evaluation kit to find out how the SCL3300 would work for you.

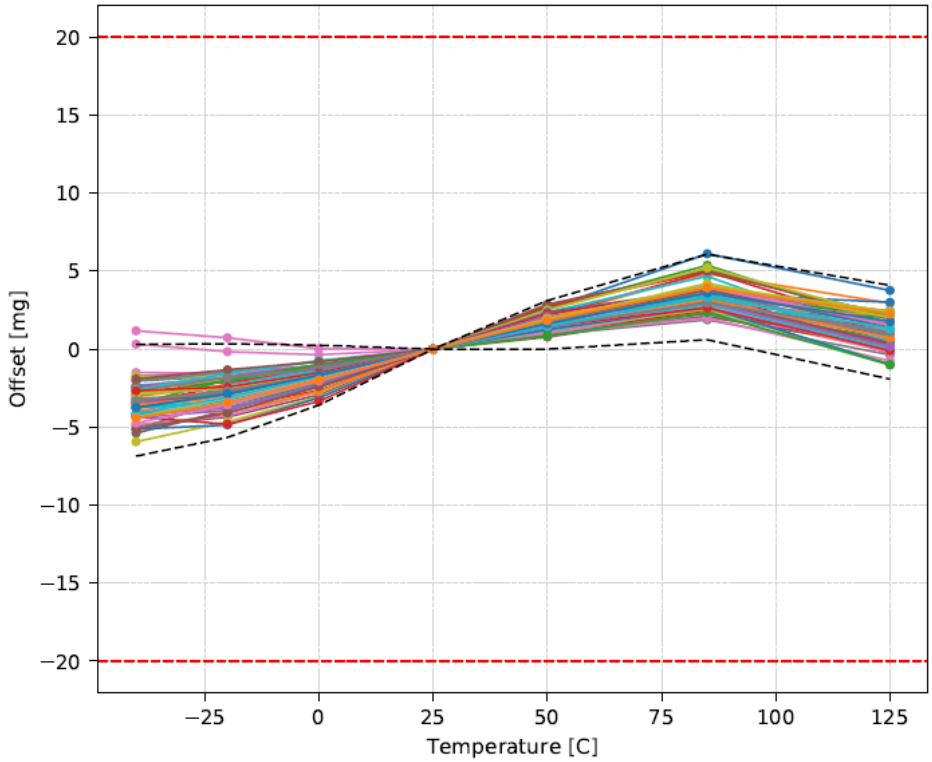
We can also support you in choosing the right sensor for your application and provide technical support in application development.

As indicated in the product obsolescence notification of the 10th of December 2018, the last orders for SCA100T and SCA61T need to be made by the 15th of June 2019 and product deliveries will end in June 2021. We hope all out clients contact us as soon as possible, so together we can find the best solution going forward.

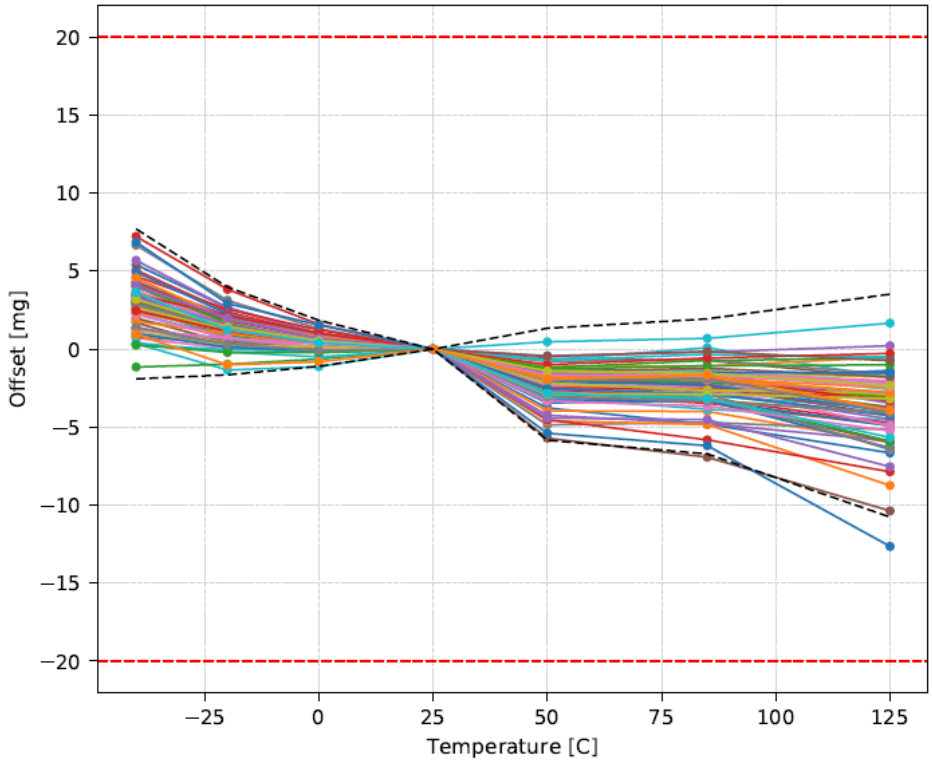
SCL3300 Offset Temperature Dependency



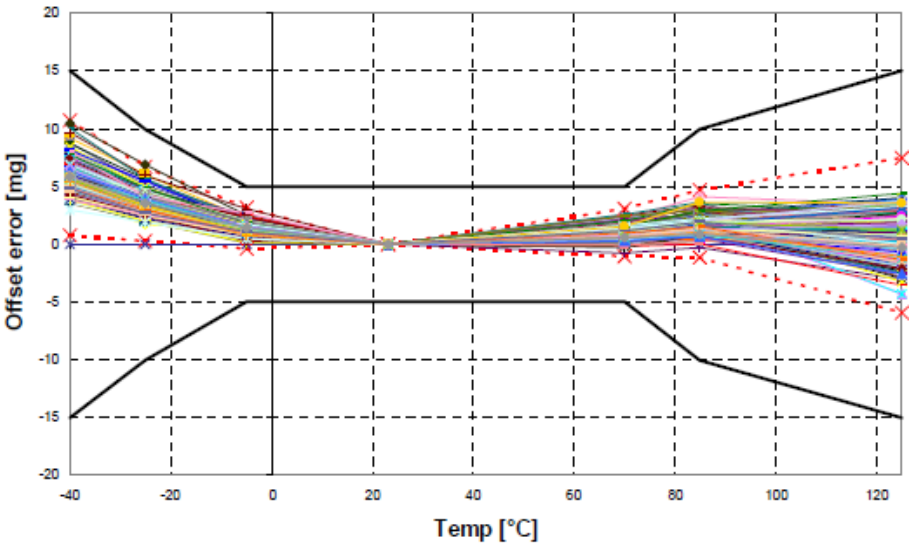
SCL3300-D01 offset temperature dependency, X-axis



SCL3300-D01 offset temperature dependency, Y-axis



SCL3300-D01 offset temperature dependency, Z-axis



SCA61T/SCA100T offset temperature dependency for comparison

SCL3300 specifications in comparison to SCA100T and SCA61T

Parameter	SCL3300-D01	Notes	SCA100T		SCA61T	
			D01	D02	FAHH1G	FA1H1G
Measurement axes	XYZ		XY		X	
Size, mm (w x l x h)	7.6 x 8.6 x 3.3		11.31 x 15.58 x 5.08		11.31 x 10.48 x 5.08	
Operating voltage, V	3.0–3.6		4.75–5.25		4.75–5.25	
Current consumption, mA	1.2 / 2.1*	** Mode 4*	4		2.5	
Measurement range (°)	Selectable ±90° / ±5°		±30°	±90°	±90°	±30°
Offset temperature dependency (°)	±0.57° / ±0.86°*	** Y-channel*	±0.86°		±0.86°	
Sensitivity (LSB/°) (mV/°) - Acceleration output	209, 105, 52	*Calculated from acceleration* *Only valid between 0...±1°*	70	35	70	35
- True inclination output	182		-		-	
Sensitivity temperature dependency (%)	±0.3		-2.5...1		-2.5...1	
Noise density (°/√Hz)	0.0012	*X, Z-ch, Mode 4*	0.0008		0.0008	
	0.0008	*Y-ch, Mode 4*				
Cross-axis sensitivity (%)	±1		±4		±4	
Amplitude response (Hz)	Selectable* 70, 40, 10	** Tied to measurement range*	8–28		8–28	
Output	Digital 16-bit		Analog		Analog	

SCL3300 Inclinometer in Short

- 3-axis accelerometer
- Direct angle output
- Angle resolution of direct angle output 0.0055°/LSB
- Typical noise density for small angles 0.0013°/√Hz
- Excellent bias stability over component lifetime typically less than 10 mg
- Typical output temperature dependency only 15 mg
- Wide operating temperature range -40...+125 °C
- Low current consumption at the 1 mA level
- Digital 16-bit output
- Small size: 7.6 x 8.6 x 3.3 mm