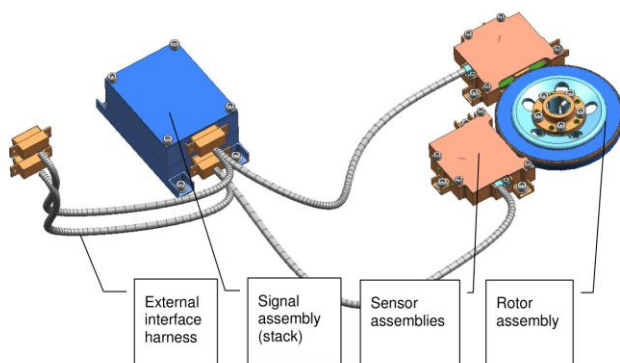
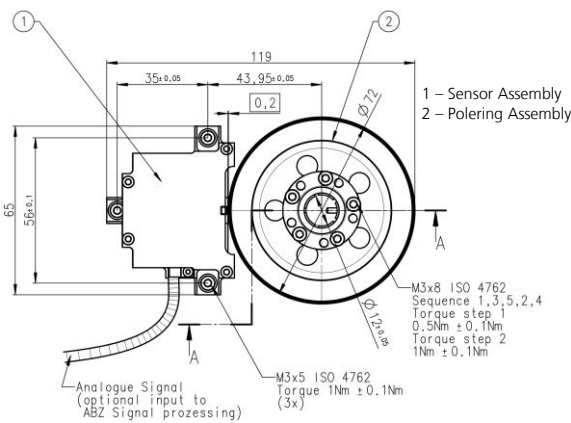
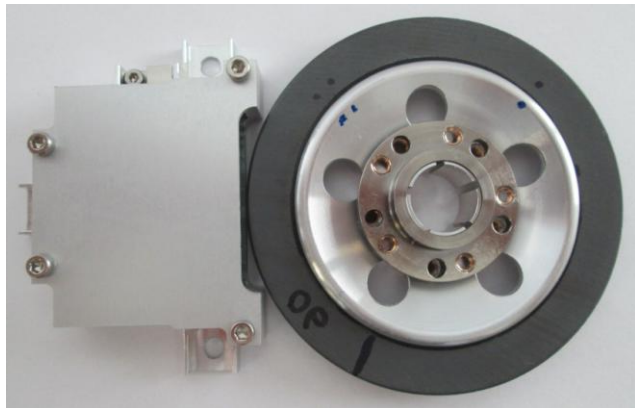


RUAG MRS

Magneto Resistive Sensor

RUAG's Magneto-Resistive Angular Sensor for Space Applications (MRS) utilizes an ITAR free contactless angular sensing based on the magneto resistive effect. Its compact and robust design features high accuracy, a large airgap, no wear and is radiation hard.

Since 2013 RUAG Space Germany and Sensitec GmbH have teamed up to develop and qualify a standardized yet flexible to use magneto-resistive angular sensor for space mechanisms. To improve reliability, performance and to keep the costs at low level compared with a common potentiometer or to enable closed-loop motor control for improved mechanism performance and reduced micro vibrations.



MR-based sensors possess the unique advantage that in order to comply with low or medium performance demands (i.e., up to 11 bit resolution), basically no front end signal conditioning is required to provide the user with a reasonable angular signal due to the intrinsic sine-cosine output signal. In order to achieve discrete (hence TTL compatible) sensor output signal, only a reduced signal processing is required. This concept is an ideal candidate for 360° incremental encoders with reference pulse that can replace potentiometers. Such medium performance encoder could be used for instance for: Antenna pointing mechanisms, Shutter mechanisms, Calibration mechanisms, Reaction wheels (e.g., as wheel speed sensors) and Robotic exploration.

Performance

Mechanical Properties

Mass Ring 0,03 kg

Mass Sensor Module 0,12 kg

Mass Signal Module 0,15 kg

Designload (QSL) >31 g

Shock loads	Frequency	SRS (Q=25, D=2%)
	100 HZ	50 g
	1000 HZ	1500 g
	10000 HZ	1500 g

Electrical Properties

Configuration Analogue output ABZ Signal
Sine/cosine 1Vpp TTL

Measurement type Quasi-absolute(Incremental w/reference pulse)

Angular range >360° without dead zone

Resolution +/- 0.07 degree > 10.8 bit

Linearity error ± 0.07° ± 0.1°

Repeatability ± 0.0035° ± 0.05°

Non op. [-60°C; +110°C]

Operating [-50°C; +100°C]

Radiation Level 300 krad 100 krad

power consumption 95 mW 150 mW