HIGH RESOLUTION STANDARD PROXIMITY SENSOR (HRSPS)

TECHNICAL DESCRIPTION of the achieved HRSPS

The HRSPS has received the Vibro-Meter definition of Displacement Measuring System DMS 111, consisting of one or two Eddy current displacement sensors TQ 461 and a conditioner IQS 114. The purpose of the DMS 111 is to measure displacement in either single mode (with one TQ 461) or in a differential mode (with two sensors TQ 461). The system provides high resolution, repeatablility and excellent accuracy. Two other sensors with wider measuring ranges are available TQ 462 (2 mm. or ± 1 mm.) and TQ 463 (6 mm. or ± 3 mm.).

DMS 111

Measuring range with TQ 461	- Translation 1 mm in single sensor mode - Translation 1 mm i.e. ± 0.5 mm wrt. Centre position in differential arrangement
Output transfer function / voltage	10 V/mm. Output voltage ± 5 VDC
Linearity in the differential arrangement	Diff. ≤ 0.5 % FSD, single ≤ 1 % FSD
Long term stability	5×10^{-4} FSD/month (non cumulative), 3% FSD over 15 years operating lifetime
Zero temperature stability	< 100 PPM/°K of FSD, design goal 50 PPM
Sensitivity temperature stability	< 100 PPM/°K of FSD, design goal 50 PPM
Frequency response	DC to 16.5 KHz (-3dB)
Phase lag	≤ 5° from 0 to 1 KHz
Equivalent RMS I/P noise in the band 100 Hz to 20 kHz in differential arrang.	≤ 1 x 10^{-7} FSD /√Hz (mechanical resolution 0.1 nm / √Hz)
Effective resolution in the differential arrangement	Less than 1 nm with a 100 Hz bandwidth at 1 kHz
Accuracy diff. Arr. D temperature 40°C	≤ 1% FSD (domain –55°C to +70°C)
Input voltage	± 15 VDC with a tolerance of -5% +25% or 28 ± 5 VDC with DC/DC converter
Power consumption	< 1.5 W with a power supply voltage of ± 15 VDC, < 2 W under +28 VDC.

TQ 461 Sensor

Temperature range	-55°C to +70°C (- 140°C to + 125°C)
Mass	≤ 30 gr with 2m. cable
Diameter	Tip ≤ 5 mm.
Length	Sensor 20 mm., integral cable max. 2 m.
Power dissipation	< 15 mW is expected in the sensor head i.e. 1 % of total DMS 134 power consumption.

IQS 114 Electronic conditioner

Temperature range	- 55°C to + 70°C
Mass	≤ 500 gr
Size (with one conditioner frame)	≤ 120 × 101 × 48 mm

DSS-1829 (3) 28.11.01 (except frequency response 16.5 kHz)

HIGH RESOLUTION STANDARD PROXIMITY SENSOR

CONFIGURATION, VERSIONS AND MEASURING RANGES

DMS 111 is an Engineering Model used for ground and testbench. The reliability of the DMS 111 with 2 sensors is over 584'000 hours for ground benign environment. The detailed specification of the DMS 111 is the DSS-1829 (3). Possibility to increase the measuring range by max. 50%.

DMS 111	**Transfer/ differential**	**Measuring**	**range**
	V/mm	Single	Differential
TQ 461/IQS 114	10	1 mm	± 0.5 mm
TQ 462/IQS 114	5	2 mm	± 1 mm
TQ 463/IQS 114	1.66	6 mm	± 3 mm

DMS 124 is a Flight Model qualified for microgravity and ISS applications. The reliability of the DMS 124 with 2 sensors is over 1'690'000 hours for a space environment. The detailed specification of the DMS 124 is the DSS-1894 (1). Possibility to increase the measuring range by max. 50%.

DMS 124 (883B)	**Transfer/ differential**	**Measuring**	**range**
	V/mm	Single	Differential
TQ 471/IQS 124	10	1 mm	± 0.5 mm
TQ 472/IQS 124	5	2 mm	± 1 mm
TQ 473/IQS 124	1.66	6 mm	± 3 mm

DMS 134 is a Flight Model qualified for high reliability satellite applications.The reliability of the DMS 134 with 2 sensors is over 2'520'000 hours in a space environment. The detailed specification of the DMS 134 is the DSS-1895 (1). Possibility to increase the measuring range by max 50%.

DMS 134 (Hi-Rel)	**Transfer/ differential**	**Measuring**	**range**
	V/mm	Single	Differential
TQ 471/IQS 134	10	1 mm	± 0.5 mm
TQ 472/IQS 134	5	2 mm	± 1 mm
TQ 473/IQS 134	1.66	6 mm	± 3 mm

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