



Solid State Fatigue Meter

DESCRIPTION

Advances in solid state electronics and sensor design enabled AMETEK Aerospace to introduce a system that performs the same functions as an electromechanical fatigue meter or counting accelerometer, more reliably. Fatigue meters and counting accelerometers were designed to monitor acceleration of structural life consumed during flight. The fatigue meter is an integrated set of sensors, data acquisition equipment and software. It includes an external data port for ground personnel to upload configuration information and download event and usage information, and it can store information for over 300 flights. Additionally, when the memory is 95% full the pilot is warned that a download must be performed soon so not to overwrite data.

The fatigue meter stores the G level counts for each individual flight and for the total flights. A selectable flight mission input allows the pilot to record the mission scheduled for each flight. The unit contains an internal clock/calendar set by the Ground Support Equipment, and includes a low battery alert.

The fatigue meter design features a solid state micro-machined accelerometer that provides reliable and accurate information to the system. Output from the sensor goes to an analog circuit containing an amplifier and filter designed to provide the desired range of frequency response, typically 7 Hz. The signal is fed into a digital signal conditioning circuit containing A/D converter and a micro-controller programmed for zero and span temperature correction. The micro-controller also contains the threshold level settings, temperature compensation software, and communication protocol.

Under normal operation the power regulator powers the unit from aircraft power. When ground personnel access the fatigue meter to download data, an internal switch activates the battery mode. A nonvolatile data memory stores the accelerometer information and prevents loss of data. An independent, battery powered clock is operator set through Ground Support Equipment.

AMETEK Aerospace has built a reputation for supplying innovative products for the aviation industry. The fatigue meter system provides rugged reliability and intelligent design that takes advantage of the latest developments in electronics. Its advanced design offers years of reliable service monitoring the structural life of the aircraft.



FEATURES

- ✓ *Reliable, solid state electronics and sensor in one box*
- ✓ *Replaces counting accelerometer transducer and indicator*
- ✓ *Records data for up to 32 different load-factor levels*
- ✓ *Weighs less than 1 kilogram*

Solid State Fatigue Meter

SPECIFICATIONS

PHYSICAL CHARACTERISTICS

Weight: Less than 35 oz. (1 kg)

Main Connector: MS3112E10-6P

RS232 Connector: MS3112E10-6S

Cooling:

No air vents, blowers, or similar devices are required

External Finishing: Anodized aluminum

ELECTRICAL CHARACTERISTICS

Input Power: 28 VDC

Power Consumption:

Less than 2 W at 28 VDC (total system)

ACCELEROMETERS CHARACTERISTICS

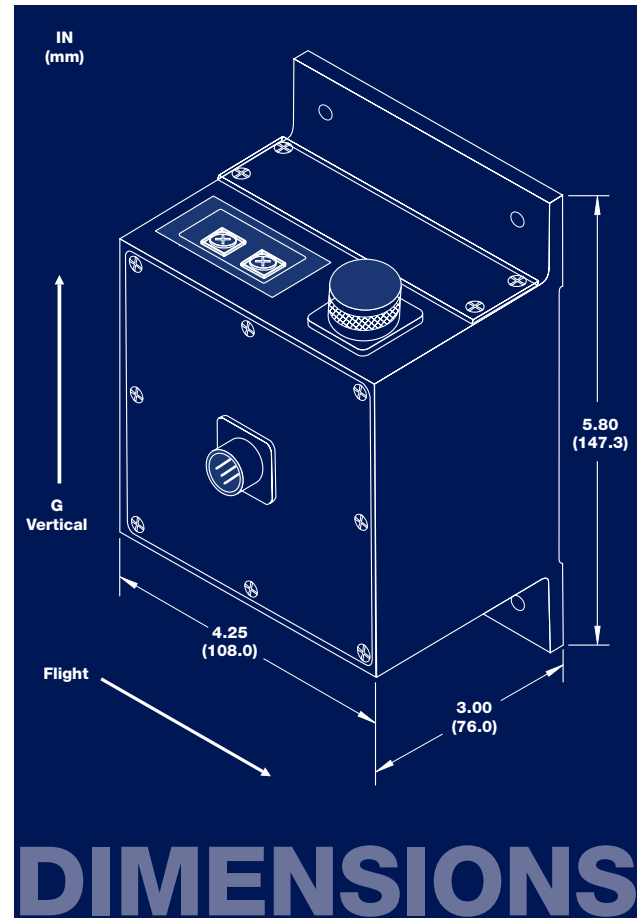
Range: $\pm 10G$

Accuracy: $\pm 1.5\%$ FSO

Resolution: 0.001 g

Operating Temperature Range: -40 to 185°F (-40 to 85°C)

Storage Temperature Range: -65 to 185°F (-54 to 85°C)



QUALIFICATIONS TO DO-160D REQUIREMENTS

Section 4.0	Temperature and Altitude	CAT C2
Section 5.0	Temperature Variation	CAT B
Section 6.0	Humidity	CAT B
Section 7.0	Operational Shocks	CAT B
Section 8.0	Vibration	CAT S
Section 13.0	Fungus Resistance	CAT F
Section 16.0	Power Input	CAT Z
Section 15.0	Magnetic Effect	CAT A
Section 17.0	Voltage Spike	CAT A
Section 19.0	Induced Signal Susceptibility	CAT A
Section 20.0	Radio Frequency Susceptibility (Radiated and Conducted)	CAT U
Section 21.0	Emission if Radio Frequency Energy	CAT B
Section 22.0	Lighting Induced Transient Susceptibility, shield cable bundle test only	CAT XXE3

Software was developed in accordance with the requirements of DO178 Level E

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