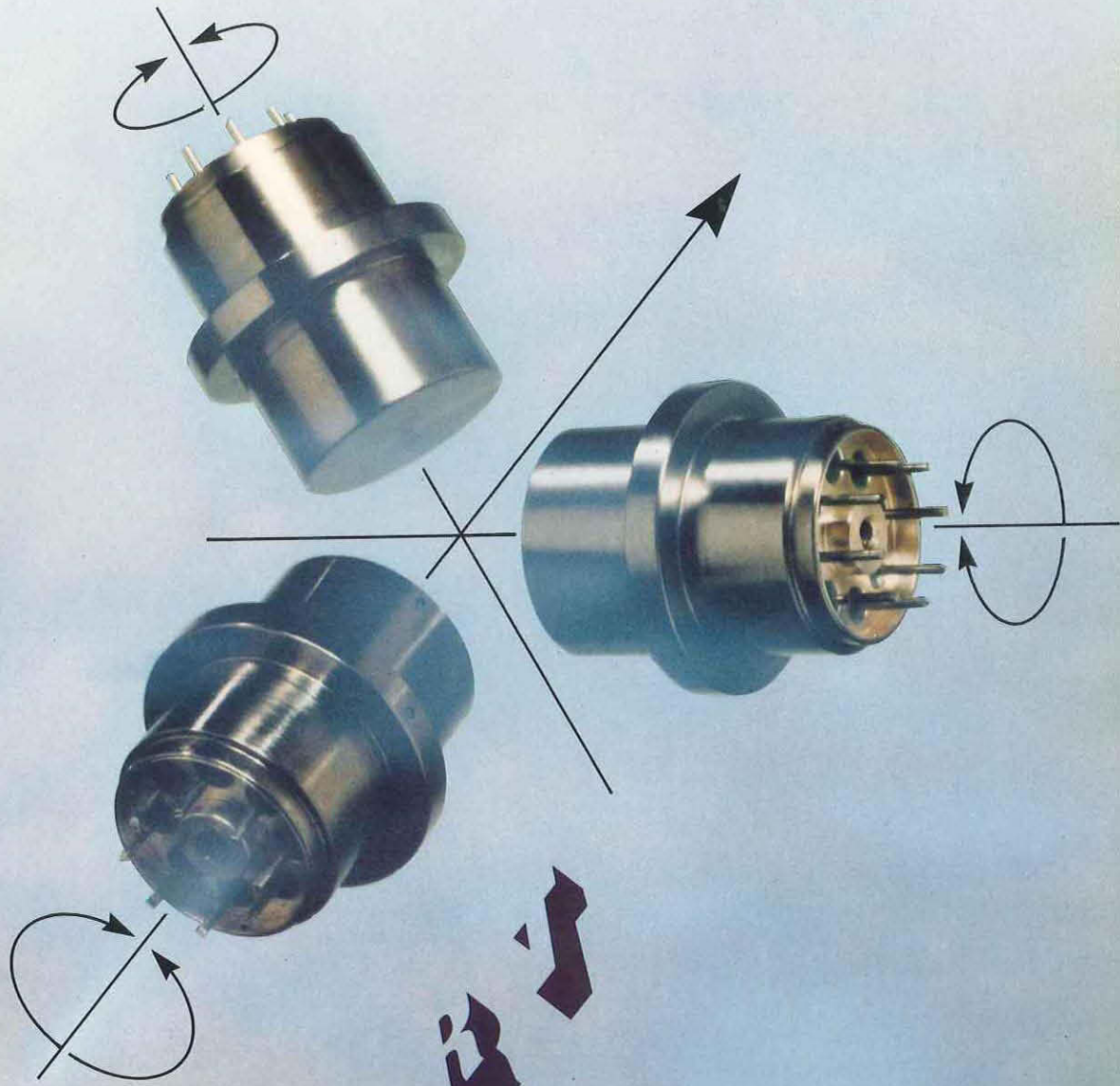
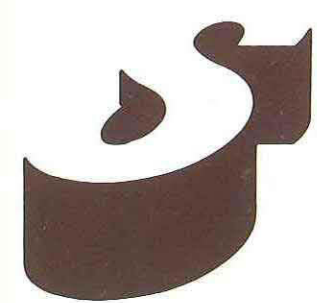


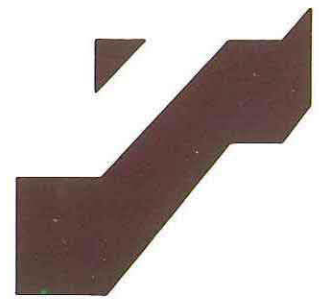
GEC AVIONICS



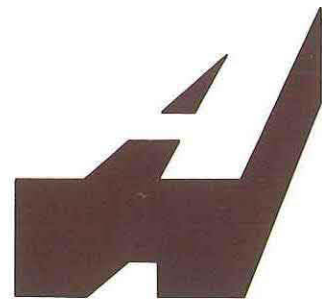
31441



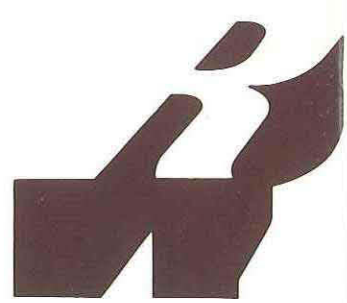
SOLID



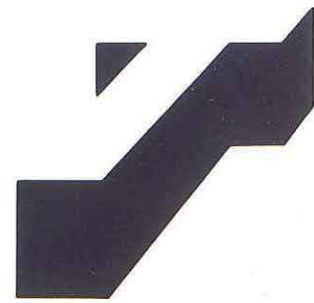
STATE



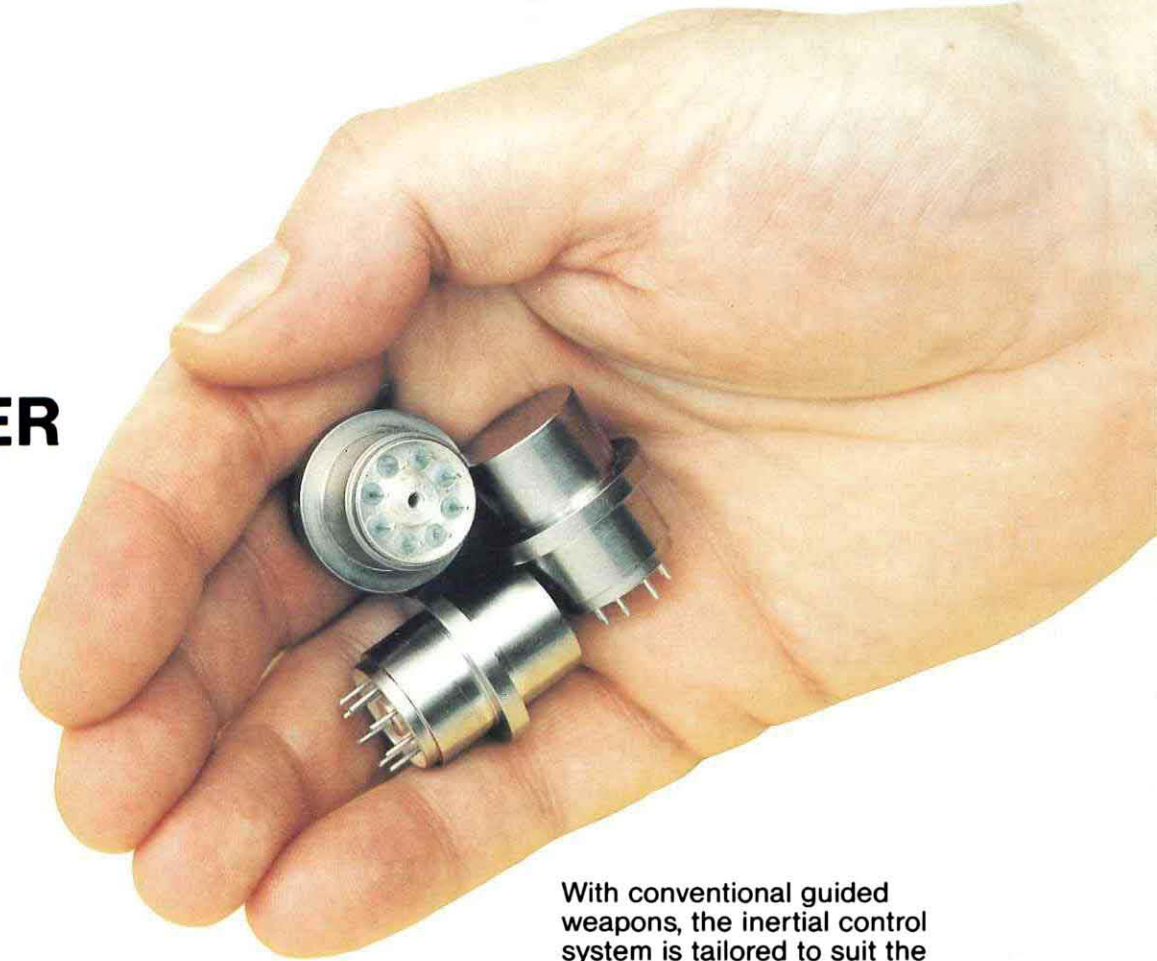
ANGULAR



RATE



TRANSDUCER



With conventional guided weapons, the inertial control system is tailored to suit the flight profile accuracy and environment, but for guided ballistic rounds, such as artillery shells, there is an additional need for the gyro system to survive a very severe launch shock.

START has been subjected to cannon launch shock tests of up to 25000g on a 155mm artillery shell trials range to prove its ability to withstand this environment. Firing trials of a 3-axis START rate measurement system from a 155mm gun have also demonstrated an operational flight capability.

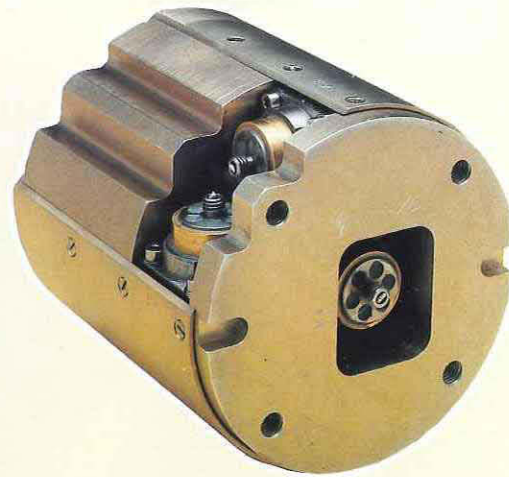


Control and Detection Circuit

Guidance and Control in the High Shock Environment

3-Axis Rate Sensor Unit

Input measurement range $\pm 200^\circ/\text{sec}$ roll, pitch and yaw
Output voltage $\pm 10\text{V DC FS}$ each axis
Excitation $\pm 15\text{V DC}$
Power consumption 3 Watts (constant)
Size 83 dia x 90mm
Weight 1.03kg



Roll Control Unit

Input measurement range $\pm 200^\circ/\text{sec}$
Output voltage $\pm 10\text{V DC FS}$
Excitation $\pm 15\text{V DC}$
Power consumption 1 Watt (constant)
Size 95 x 59 x 61 mm
Weight 500gms



Throughout the development of this solid state gyro the emphasis has been on simplicity, in order to achieve a low unit price, with a manufacturing design that is ideally suited to inexpensive mass production techniques. Alone, or in a 3-axis configuration, START competes successfully against more conventional technologies. Typical applications are:-

- Precision guided munitions
- Vehicle active suspension
- Terminally guided sub-munitions
- Light anti-armour weapons
- Hypervelocity missiles

In addition to its robustness and low cost, START offers other significant advantages:-

- Small size
- Light weight
- Instantaneous start
- Constant low power
- Very long life

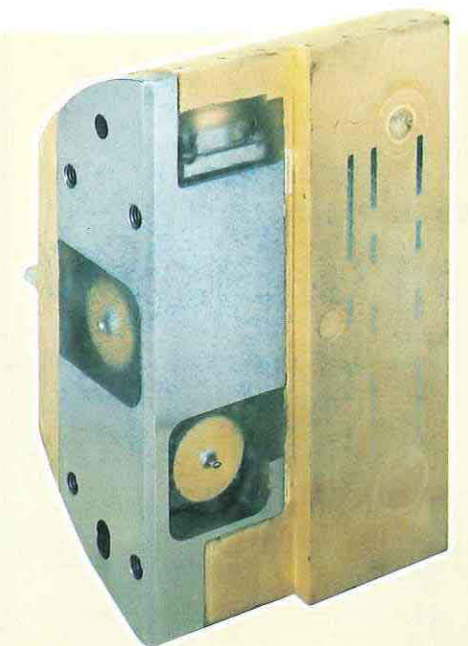
Yaw Rate Sensor Unit

Input measurement range $\pm 200^\circ/\text{sec}$
Output voltage $\pm 10\text{V DC FS}$ (Single sided output optional)
Excitation $\pm 15\text{V DC}$ (Single sided input optional)
Power consumption 1 Watt (constant)
Size 80 x 58 x 60mm
Weight 350gms



3-Axis Rate Measurement Unit

Input measurement range Pitch and yaw $\pm 150^\circ/\text{sec}$
Roll $\pm 300^\circ/\text{sec}$
Output voltage $\pm 5\text{V DC FS}$ each axis
Excitation $\pm 15\text{V DC}$
Power consumption 3 Watts (constant)
Size 121 x 77 x 58mm
Weight 675gms



Outline Specification

Typical Performance

Range (Rm)	adjustable up to 3000°/sec
Over-range characteristic	25000°/sec minimum
Saturation characteristic	Constant output
Weight	40gms (incl of hybrid cct)
Excitation	±15V DC
Power	1 Watt
Full Scale Output	±10V DC
Null	±1°/sec -40 to +80°C
Switch on to switch on repeatability	±0.25°/sec
Scale factor	$\frac{10^4}{R_m}$ mV/°/sec
Scale factor variation with temperature	±2% -40 to +80°C
Linearity	<0.25%FS, 0 to FS
Hysteresis	<0.05°/sec
Resolution	0.03°/sec
Threshold	0.03°/sec
Start up time	100msecs approx
Settling time from switch on (to within 0.2°/sec)	250msecs approx
Bandwidth	90Hz
Noise	<10mV rms. (Total noise in the frequency band 0 to 100Hz)

Environmental

Shock Survival	>25,000g 5msecs
Vibration	1.5mm DA 10Hz to 57Hz 10g peak 57Hz to 9kHz
Storage	>10 years
N.B. Environmental values do not represent maximum capability.	

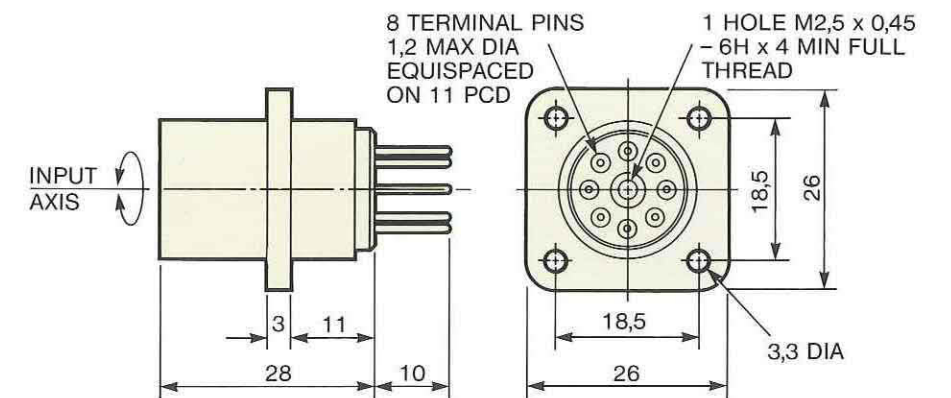
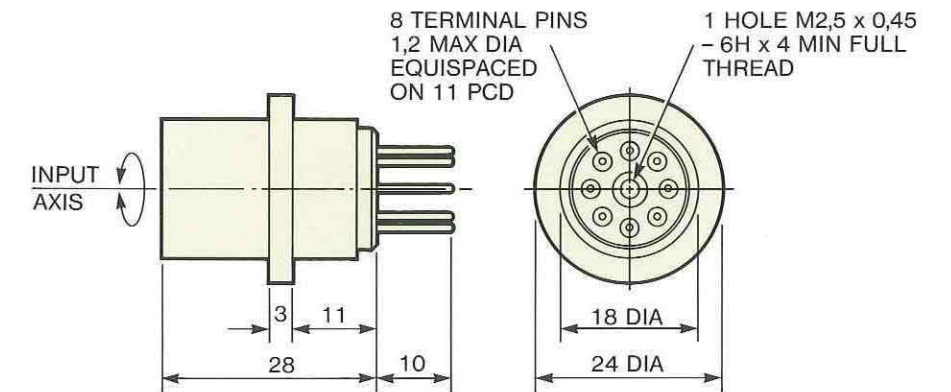
Principle of Operation

The rotation sensor in START is a steadily pulsating cylinder. Angular rate about the cylinder axis causes the pulsating pattern to shift and this is detected electrically to form the basis of the gyro output.

Rate Sensitive Element

Notes:

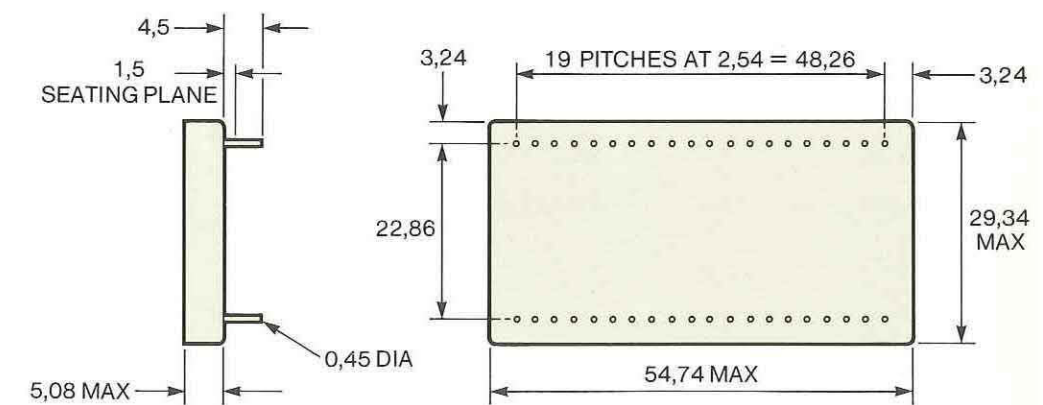
1. Actual size shown
2. Dimensions in mm.
3. Clamp ring and mounting flange optional.



Control and Detection Circuit

Notes:

1. Actual size shown
2. Dimensions in mm.



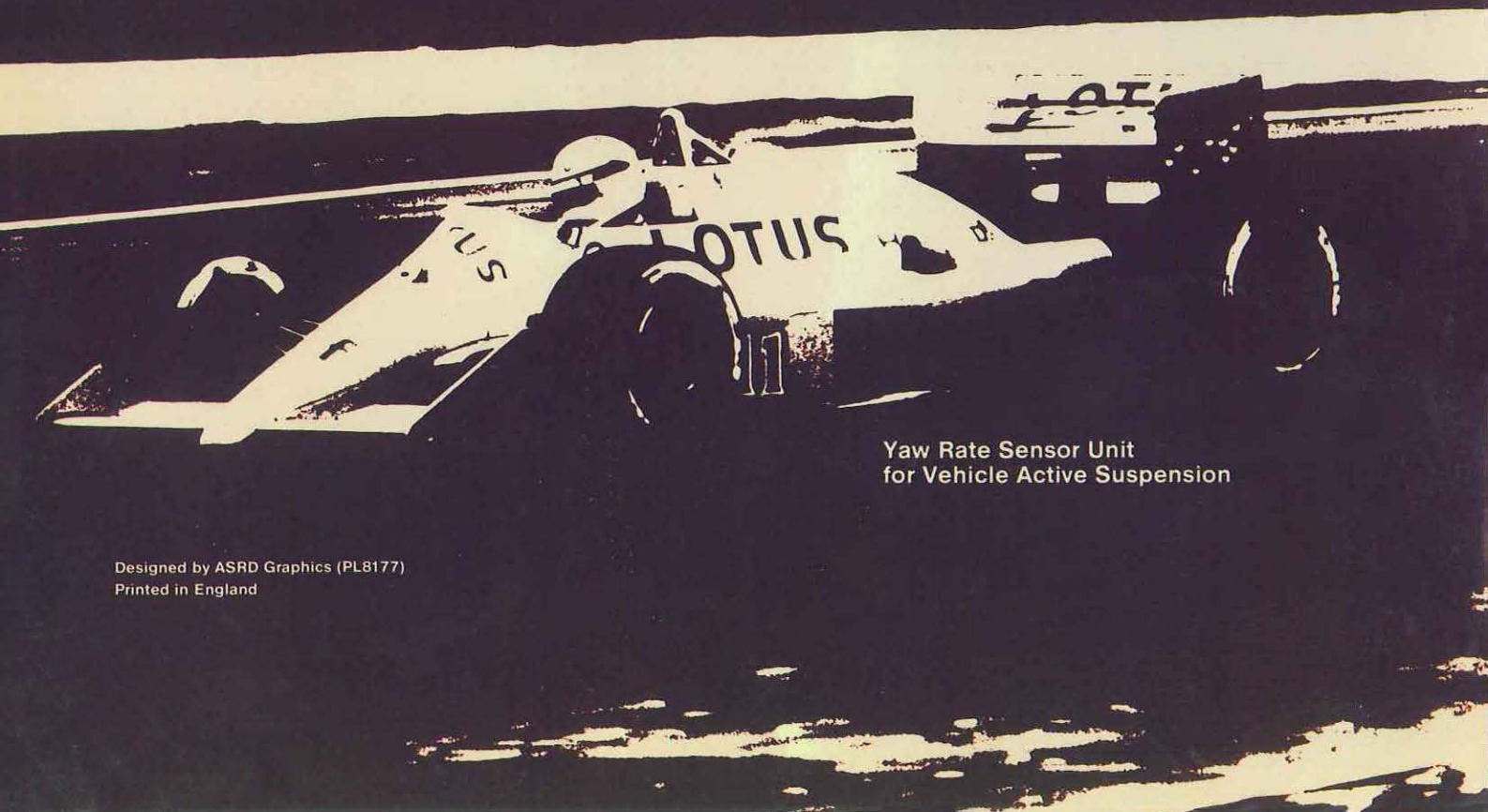
GEC AVIONICS



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Yaw Rate Sensor Unit
for Vehicle Active Suspension

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