

## μFORS-3U / -3UC / -6U / -6UC High Performance Fiber Optic Rate Gyros

*Approved for many years in*

- Stabilisation (Turret, Gun, Optics, Radar, Antenna)
- Navigation (INS/GPS/AGV)
- Guidance (Missile)



Northrop Grumman LITEF's Fiber Optic Rate Sensor μFORS is designed to meet the requirements of a wide range of air, land and sea applications.

Using the latest technology, it provides compensated angle or angular rate outputs via its digital interface, which can be set to either asynchronous or synchronous operation mode.

With small volume, low weight and small power consumption, the μFORS can be integrated easily. Its configurable measurement range makes it an ideal candidate to standardize system design, thereby reducing system complexity and cost.

Free from effects of gravity induced errors, and with no moving parts, Northrop Grumman LITEF's μFORS is insensitive to shock and vibration. It offers high reliability without the need for periodic maintenance.

### Features

- High Dynamic Range (Closed Loop Sensor)
- High Scale Factor Linearity

- High Performance under High Vibration Levels
- High Performance under Extended Temperature Range
- Temperature Compensated Data Output
- Robust One-Box Solution
- Standard Digital Interface
- Flexible, configurable Interface with multiple Range, Resolution and Measurement Mode options
- Tools available for Flexible Interface Configuration

### Advantages

- Improves System Performance
- Operates in Harsh Environments
- Reduces Integration Complexity
- Reduces Logistic Complexity
- Reduces Weight, Volume, Power, Costs
- Northrop Grumman LITEF Support during Integration
- Reduces Export Authorization Formalism
- Reduces Risk

# μFORS-3U / -3UC / -6U / -6UC

## High Performance Fiber Optic Rate Gyros

### TECHNICAL DATA

(Standard parameters, other performance on request)

	μFORS-3U / -3UC	μFORS-6U / -6UC
<b>Performance</b>		
• Range	±1000 °/s / ±499 °/s	
• Scale Factor Error		
- Repeatability (day to day)	≤ 0.2 % (1σ)	
- Linearity (full range, at 25 °C)	≤ 0.02 % (1σ)	
• Bias		
- Repeatability (day to day)		
- full temperature range	≤ 3.0 °/h (1σ)	≤ 6.0 °/h (1σ)
- at const. temperature	≤ 1.5 °/h (1σ)	≤ 3.0 °/h (1σ)
- Offset at 25 °C <sup>1)</sup>	≤ 1.0 °/h (1σ)	
- Stability (at const. temperature) <sup>2)</sup>	≤ 0.05 °/h (1σ)	
• Noise (Random Walk) <sup>2) 3)</sup>		
- at const. temperature <sup>1)</sup>	≤ 0.08 °/√h	≤ 0.15 °/√h ≤ 0.047 °/√h
• Magnetic Sensitivity	≤ 30 °/h/mT (3 °/h/Gauss)	
• Initialization time	≤ 120 ms	
• Misalignment	±5 mrad max	
• Bandwidth (3 dB)	3200 Hz	
• Update Rate		
- asynchronous	5 .. 1000 Hz	
- synchronous	5 .. 8000 Hz	
• Latency <sup>4)</sup>		
- asynchronous	down to 0.7 ms	
- synchronous	down to 0.2 ms	
MTBF (ground mobile)	≥ 50,000 h	
<b>Electrical Characteristics</b>		
• Power Supply	+ 5 VDC	
• Power Consumption	1.1 W <sup>1)</sup> , 2.3 W max	
• Connector	26 Pin Header, 2.54 mm pitch, double row	
• Digital Serial Data Interface		
- asynchronous (RS-422)	9,600 Bd .. 375,000 Bd	
- synchronous (IBIS, based on CCITT 1431T1/E19)	up to 2.048 MHz	
• Configurability	Range & Resolution, Mode (Angular Increments, Rate, Accumulated Angle) asynchronous interface only: Baudrate, Trigger Mode (HW, SW, Auto), Update rate	
<b>Physical Characteristics</b>		
• Size (H x W x L)	21 mm x 65 mm x 88 mm	
• Weight	≤150 g	
• Housing	ruggedized	
<b>Environmental Conditions</b>		
• Temperature		
- operating	-40 °C ... +65 °C	
- non-operating	-55 °C ... +85 °C	
• Vibration	11.73 g <sub>RMS</sub> , 10 Hz ... 2 kHz max. 0.1 g <sup>2</sup> /Hz, 500 Hz ... 1 kHz	
• Shock operating	800 g; 0.5 ms / 250 g; 4 ms / 100 g; 11 ms	

For more information,  
please contact:  
**Northrop Grumman LITEF GmbH**  
Loerracher Str. 18  
79115 Freiburg, Germany  
Phone: +49 761 4901-0  
Fax: +49 761 4901-480  
info@ng-litef.de  
www.northropgrumman.litef.com

1) typical values: measured at final production acceptance tests  
3) independent of update rate, i.e. white noise behavior

2) by Allan Variance  
4) depending on interface configuration