

## Strain Gage Module

The GMSG plug-in modules expand the functionality of our Graphite series HMI operator interface panels with PID control of load cells, pressure and torque transducers.

Expanding Graphite HMI functionality to include strain gage inputs is easy with GMSG plug-in modules. GMSG modules include full-featured single loop PID controllers designed to accept low level signals from a wide variety of bridge-type transducers. Optional second strain gage inputs are available to provide math capabilities between input channels for customized programs. Available with a user-selectable analog output and solid state or relay outputs, the GMSG module can perform virtually any combination of time-proportioning or linear output control operations.



### Applications

- Factory automation
- Manufacturing
- Plastic extrusion
- Food processing

### Product Highlights

- Full PID control functionality
- Load cell, pressure and torque bridge inputs
- Extended operating temperature
- Multiple output options
- Digital rate, batch totalizer and peak/valley recording

### Features & Benefits

- Dual Strain Gage Inputs (Model Dependent)
  - Monitor and control load cells, pressure and torque transducers
- Three Solid-State or Three Relay Outputs
  - Easily control processes that include weight, pressure and tensioning
- Up to Seven Soft Alarms Can Trigger Discrete Outputs
  - Trigger outputs for precision operation
- User Selectable Analog Output
  - Software defined (0-10 VDC, 0-20 mA, or 4-20 mA)
- -40° to 70°C T<sub>AMB</sub> Operating Temperature
  - Reliably works in harsh environmental conditions
- Control Modes Include:
  - On/off, P, PI, or PID control

# Graphite Strain Gage Module Ordering Guide and Specifications

## Ordering Guide

Part Number	Description
GMSG10R0	Graphite Module, Single Loop, One Strain Gage Input, Relay Outputs, and Analog Output
GMSG10S0	Graphite Module, Single Loop, One Strain Gage Input, Solid State Outputs, and Analog Output
GMSG11R0	Graphite Module, Single Loop, Two Strain Gage Inputs, Relay Outputs, and Analog Output
GMSG11S0	Graphite Module, Single Loop, Two Strain Gage Inputs, Solid State Outputs, and Analog Output

## Module Specifications

### Power

Power will be supplied by the Graphite host device. Some modules, depending on usage may consume high levels of power. This may limit the total number of modules that can be installed on a single Graphite host. Check the Graphite module and Graphite host data sheets for specific usage and power requirements.

**GMSG1 Max Power: 5.6 W**

### LEDs\*

STS - Status LED shows module condition.

OP1, OP2, OP3 - Indicate status of outputs 1, 2, and 3

ALM - Alarm LED is lit during any internal alarm condition.

\* Default configuration.

### Memory

Non-volatile memory retains all programmable parameters.

### Inputs

Selectable Input Range	Accuracy * 18 To 28 °C 10 To 75% RH	Accuracy * 0 To 50 °C 0 To 85% RH	Accuracy * -40 To 70 °C 0 To 85% RH
±20.000 mVDC	0.02% of reading +3 µV	0.07% of reading +4 µV	0.09% of reading +5 µV
±33.000 mVDC	0.02% of reading +5 µV	0.07% of reading +7 µV	0.09% of reading +9 µV
±200.00 mVDC	0.02% of reading +30 µV	0.07% of reading +40 µV	0.09% of reading +50 µV

\* After 20 minute warm-up. Accuracy includes the temperature coefficient.

Connection Type:

4-wire bridge (differential)

2-wire (single-ended)

Sample Time: 50 msec (20 readings per second)

Common Mode Range (with respect to input common): 0 to +5 VDC

Common Mode Rejection: > 100 dB, DC to 120 Hz

Temperature Coefficient (ratio metric): 20 ppm/°C max.

Step Response Time: 200 msec max. to within 99% of final process value

Input Impedance: 100 MΩ

Max Continuous Overload: 30 V

PV Range: -30,000 to 30,000

Effective Resolution: 16-bit

### Bridge Excitations

Software selectable:

5 VDC, ±2%, 65 mA max.

10 VDC, ±2%, 125 mA max. combined (excitation 1 plus excitation 2).

Temperature coefficient (ratio metric): 20 ppm/°C max.

Max. four 350Ω bridges per module.

### Isolation Level

500 Vrms @ 50/60 Hz for 1 minute between the following:

OP1 \* OP2 \* OP3 \*

Linear Output

Signal Inputs (the 2 input channels are not isolated from each other)

Power Supply Input

\* Outputs OP1, OP2 and OP3 of SSR model are not isolated from each other

### Communications

Provided by the Graphite host device.

### Discrete Outputs

Available as (3) Solid State NFET, or (3) Form A relay.

Solid State Output:

Type: Switched DC, N Channel open drain MOSFET

Current Rating: 1 A max

VDS ON: 0.3 V @ 1 A

VDS MAX: 30 VDC

Offstate Leakage Current: 0.5 mA max

Form A Relay Output:

Type: N.O.

Current Rating: 3 Amps @ 125 VAC

1/10 HP @ 125 VAC

Life Expectancy: 200,000 cycles at maximum load rating.

(Decreasing load, increasing cycle time, and use of surge suppression such as RC snubbers increases life expectancy.)

# Graphite Strain Gage Module Specifications Cont.

## Control Modes

Control: On/Off, P, PI, or PID  
Output: Time proportioning or linear  
Cycle Time: Programmable from 0.0 to 60.0 sec  
Auto-Tune: When selected, sets proportional band, integral time, derivative time values, and output dampening time  
Input Fault Response: Upscale

## Alarms

Modes: Manual  
Absolute High Acting      Absolute Low Acting  
Deviation High Acting      Deviation Low Acting  
Inside Band Acting      Outside Band Acting  
Reset Action: Programmable; automatic or latched  
Standby Mode: Programmable; enable or disable  
Hysteresis: Programmable  
Input Fault Response: Upscale

## Analog DC Output

Software programmable for 0-10 VDC, 0-20 mA, or 4-20 mA  
Resolution:  
Voltage: 500  $\mu$ V  
Current: 1  $\mu$ A  
Accuracy:  
0.1% of full scale (18 to 28°C)  
0.2% of full scale (-40 to 70°C)  
Update Time: 0.0 to 60.0 sec  
Compliance (for current output only): 500  $\Omega$  max.  
Minimum load (voltage output only): 10 K $\Omega$  min.  
Output is software selectable for either 10 V or 20 mA. The output range may be field calibrated to yield approximate 10% overrange and a small underrange (negative) signal.

## Environmental Conditions

Operating Temperature Range:  
GMSG10R0 and GMSG11R0: -40 to 70 °C  $T_{AMB}$   
GMSG10S0 and GMSG11S0: -40 to 75 °C  $T_{AMB}$   
Operating temperature is limited to lowest range among equipment used in your Graphite system. Consult the user manual or [www.redlion.net/OpTemp](http://www.redlion.net/OpTemp) for further details.  
Storage Temperature Range: -40 to +85°C  $T_{AMB}$   
Shock to IEC 68-2-27: Operational 40 g (10 g, relay).  
Operating and Storage Humidity: 85% max relative humidity, non-condensing.  
Altitude: Up to 2000 meters

## Certifications and Compliances

**CE Approved**  
EN 61326-1 Immunity to Industrial Locations  
IEC/EN 61010-1  
RoHS Compliant  
**ATEX/UKEX Approved** (GMSG10S0 and GMSG11S0 only)  
Ⓜ II 3 G Ex nA IIC T4 Gc  
DEMKO 14 ATEX 1387X  
EN 60079-0, -11, -15, -31  
UL23UKEX2879X  
**IECEx Approved** (GMSG10S0 and GMSG11S0 only)  
Ex nA IIC T4 Gc  
IECEx UL 15.0035X  
IEC 60079-0, -11, -15, -31  
**India PESO Approved:**  
A/P/HQ/MH/104/7441 (P549599)  
**UL Listed:** File #E302106  
**UL Hazardous:** File #E317425 (GMSG10S0 and GMSG11S0 only)  
**ABS Type Approval for Shipboard Applications**

## Construction

Case body is all metal construction.

## Connections

Removable wire clamp screw terminal blocks.  
Wire Gage: 28-16 AWG (0.32 mm - 1.29 mm) terminal gage wire.  
Torque: 1.95-2.21 inch-lbs (0.22 - 0.25 N-m)

## Mounting

Screws to host.

## Weight

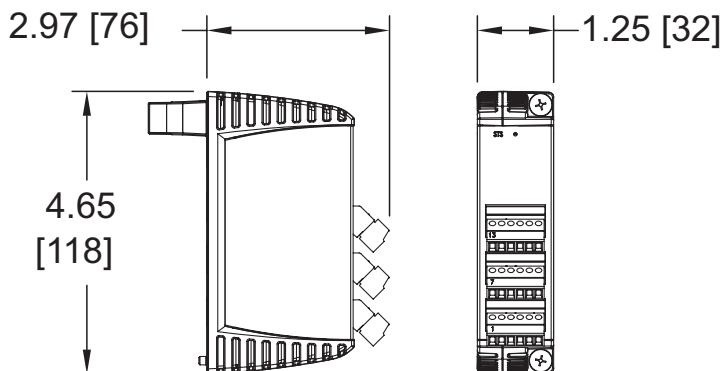
8 oz (224 g)

## Warranty

2 years on design and manufacturing defects.  
Specifications are subject to change.  
Visit [www.redlion.net](http://www.redlion.net) for more information.

# Graphite Strain Gage Module Dimensions

## Dimensions In inches [mm]



[www.redlion.net](http://www.redlion.net)  
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