

GS series of wireless industrial sensors

Features:

- Input: strain gauge Wheatstone bridge: 300ohms to 10kohms. Typical: 1000 ohms.
- Standard input range: up to 2mV/V full scale signal
- Intrinsically safe, Class 1 division 1 & ATEX zone 0 available in option
- Ruggedized water proof enclosure IP66
- 1 to 2 years battery life for typical applications
- Outside radio range of 4000 ft, in plant 500ft to 1000ft
- Adjustable threshold for radio transmissions
- Adjustable heartbeat transmissions
- Adjustable wake-up cycles
- Could be remotely calibrated to transmit digitally calibrated values.
- Operates from one 'D' cell battery
- Input power supply: 1.0 to 3.8 volts, 0.1 to 100mA. 'D' cell battery lithium or alkaline.
- Dimension: 6.5" x 3.0" x 2.5"
- 900Mhz license free band with wavelength optimized for radio communication in industrial environment.
- Industrial (-40°C to 85°C) tested industrial temperature ratings. Humidity 0 to 100%RH.
- Temperature compensated
- IP66 water resistant.
- Selectable radio power, up to 30mW, +15dBm
- Ruggedized antenna and stainless steel enclosure
- Potted electronics for increase water proof protection

Applications:

- Strain gauge Wheatstone bridge signal transmitter
- Oil and gas pressure / weight sensor
- SCADA systems
- Remote weight measurement
- Pipe pressure sensor remote monitoring
- Remote tension or compression forces
- Water and waste water
- Any other application where a Wheatstone bridge of strain gauge is used.



General Description:

The radio operates license free at 900MHz in North America or 869MHz in Europe. Radio output power is 30mW, which requires a low 0.09 ampere of current, thus allowing battery operation.

Every piece of equipment is industrially hardened and rigorously tested to withstand harsh environment, shocks and thermal extremes.

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Ordering information

Model	Description
GS001-02	standard 915MHz frequency band
GS001-02-ce	868MHz frequency band
GS001-02-CSA	915MHz frequency band with class 1 division 1 certification
GS001-02-ATEX	868MHz frequency band with ATEX zone 0, 1 & 2 certification
LB506	Pigtail cable SS4MF 20in (50cm). Connects to GS001 connector and provide 4 wires to connect the strain gauge bridge to.
Related part number GS001	Strain gauge transmitter with fixed low and high level alarm thresholds. This model is recommended for LSI load pins and load cells only. All other strain gauge systems should use the GS001-02

GS001-02

Specifications

Parameter	Test Condition	Min	Typ	Max	Unit
Sensor input					
Measurement range		0	2	3	mV/V
Bridge Impedance		350	1000	10000	Ohms
Non linearity	Percentage of full scale		0.5		%
Sensitivity parameter adjustment					
	Sensitivity=50%		16		μV/V
	Sensitivity=100%		8		μV/V
	Sensitivity=150%		4		μV/V
Power Supply					
	Sensor in sleep mode		0.1		mA
	Sensor in operation		30		mA
	Sensor transmitting		100		mA

Absolute maximum ratings

Parameter	Test Condition	Min	Typ	Max	Unit
Input voltage		0.9	3.6	5	V
Strain gauge bridge impedance		100	300		ohms
Temperature range	Operating	-40		+60	°C
Temperature range	Storage	-50		+70	°C

Certifications

FCC/IC//CE certification

Class 1 division 1

ATEX zone 0

ETSI 300-220-1, 300-220-3, EN 301 489-3

EN61000-3-2, EN61000-3-3, EN61000-4-3, EN61000-4-6

CSA C22.2 No.0.4.M2004, No.0-M1991, No.0142,M1987, No0.157-M1992, No.213-M1987

UL508, UL913, UL1604

EN61000-4, EN60079-0, EN60079-11, EN60079-26

Applications details

The transmitter will read the strain gauge Wheatstone bridge every 250mSec. The internal scale factor and offset will then be used to convert the ADC reading into the final system units. The resulting value is then compared to the requirement for a radio transmission. If the requirement is met, the value is sent on the radio network. The sensitivity is at 100% by default, which represent a 16 bits difference in reading. The transmitter will thus transmit immediately if a new reading has a difference of at least 16 bits compared to the previously sent reading. The table on the right illustrates that 16 bits over 8192 bits represent around 0.195%. A change of reading equal or higher to 0.2% will thus force an immediate radio transmission. Sensitivity could be adjusted to increase or decrease sensitivity based on the table here.

An updated reading is transmitted in two occasions: every heart beat period, and every time a new reading changes by a large enough number of bits.

List of adjustable parameters in the sensor:

Parameter	Default
Scale factor	1
Offset factor	0
Heartbeat	60 seconds
Sensitivity for Radio Transmission	100%

Transmitted value = (ADC reading * ScaleFactor) – Offset
 ADC reading: 0 to 8192

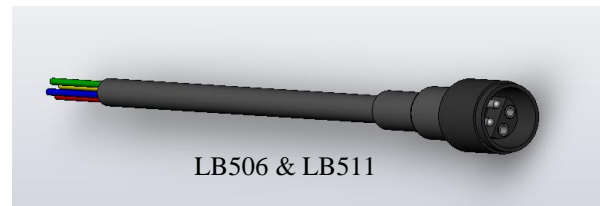
Wiring



The transmitter has a cable with a connector. Mating cables with bare wires are available to connect to the transmitter connector. The part numbers are LB506 & LB511.

LB506 (6 ft) or LB511 (6 inches) SS4F cable wiring

Wire color	Pin number	Description
Blue	1	Excitation -
Yellow	2	Signal -
Green	3	Signal +
Red	4	Excitation +

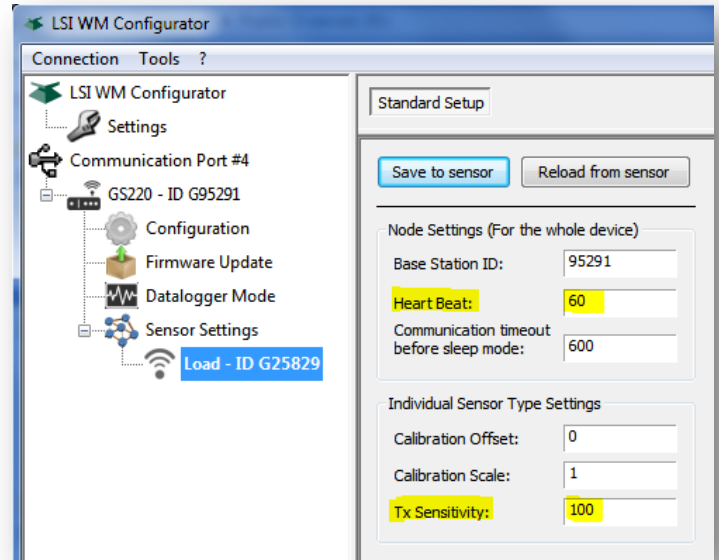


Sensitivity (%)	Threshold in % of full scale	Threshold (bits)
0	0.391%	32
5	0.381%	31
10	0.371%	30
20	0.352%	29
25	0.342%	28
30	0.332%	27
40	0.313%	26
45	0.303%	25
50	0.293%	24
55	0.283%	23
60	0.273%	22
70	0.254%	21
75	0.244%	20
80	0.234%	19
90	0.215%	18
95	0.205%	17
100	0.195%	16
105	0.186%	15
110	0.176%	14
120	0.156%	13
125	0.146%	12
130	0.137%	11
135	0.127%	10
145	0.107%	9
150	0.098%	8
155	0.088%	7
160	0.078%	6
170	0.059%	5
175	0.049%	4
180	0.039%	3
185	0.029%	2
190	0.020%	2
195	0.010%	1
200	0.000%	0

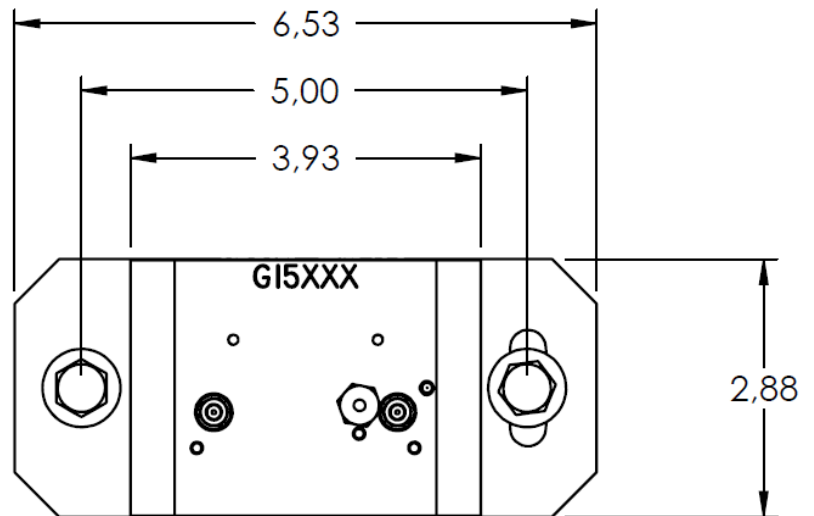
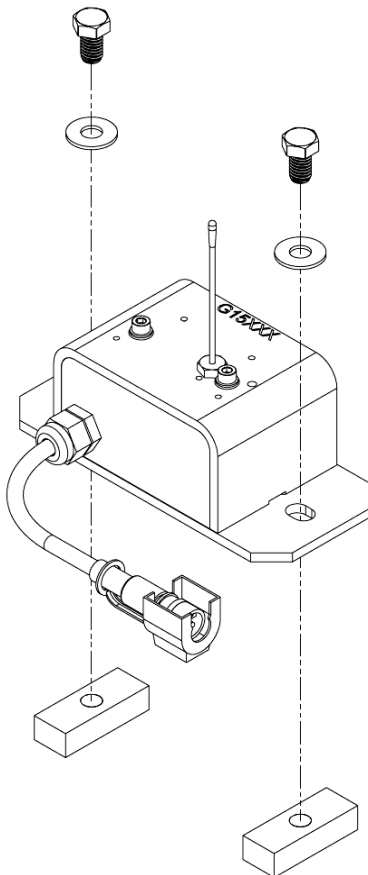
How to change internal settings

The GS001 internal settings could be adjusted in two ways. With a display unit, access the manual calibration page 4B2. With a gateway, connect the gateway to a PC USB port. Use the WM Configurator software to connect to the gateway. In the example on the right, the GS001 ID#25829 has an HeartBeat of 60 seconds and a Transmission Sensitivity of 100%.

Note: WM Configurator is available at this address: www.loadsystems.com/wmconfigurator

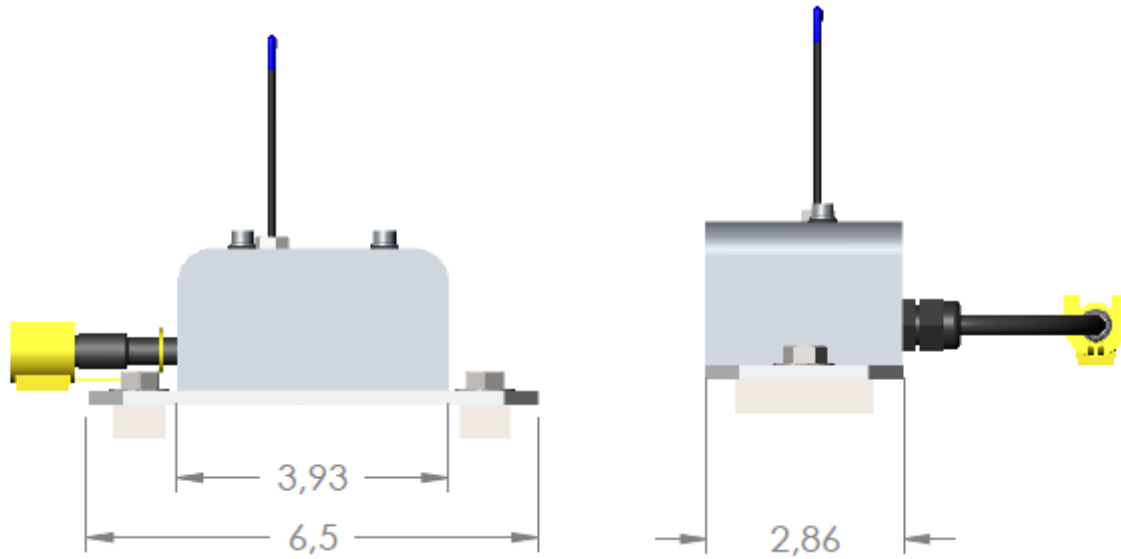


Installation



The transmitter is supplied with two solder tabs and a set of screws. Weld the solder tabs, tap holes or use nuts to fix and hold the transmitter in place.

Dimensions



Revision History

Rev 0.1	Preliminary version
Rev. 0.99	Update to list of applications, and application details section
Rev. 1.0	Update to Ordering information
Rev. 1.0.2	Update to wake threshold table

GS series of wireless industrial sensors

Features:

- Input: two wires to detect contact closure or opening
- Fast 40 mSec typical delay for alarm reception on remote receiver unit.
- 2 years battery life for typical applications
- Outside radio range of 4000 ft, in plant 500ft to 1000ft
- Adjustable heartbeat transmissions
- Could be remotely calibrated to transmit digitally calibrated values.
- Operates from one 'D' cell battery
- Dimension: 6.5" x 3.0" x 2.5"
- Input power supply: 1.0 to 3.8 volts, 0.1 to 100mA. 'D' cell battery lithium or alkaline.
- 900Mhz license free band with wavelength optimized for radio communication in industrial environment.
- Direct Sequence Spread Spectrum modulation for robust radio links
- Intrinsically safe, Class 1 division 1 & ATEX zone 0 available in option
- Industrial (-40°C to 85°C) tested industrial temperature ratings. Humidity 0 to 100%RH.
- Temperature compensated for battery level measurement
- IP66 water resistant.
- Selectable radio power, up to 30mW, +15dBm
- Ruggedized antenna and stainless steel enclosure
- Potted electronics for increase water proof protection

Applications:

- Alarm signal transmission
- On/off status of a switch transmitter
- Limit switch activation transmitter



General Description:

The sensor is optimized to detect a closed circuit as a normal condition between its two wires input. The opening of the closed circuit is transmitted and received within 40mSec. Closing of the circuit is sent with lower priority, with a typical delay of 200mSec.

The radio operates license free at 900MHz in North America or 869MHz in Europe. Radio output power is 30mW, which requires a low 0.09 ampere of current, thus allowing battery operation.

Every piece of equipment is industrially hardened and rigorously tested to withstand harsh environment, shocks and thermal extremes.

Information furnished by LSI is believed to be accurate and reliable.

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Ordering information

Model	Description
GS005	standard 915MHz frequency band
GS005-ce	868MHz frequency band
GS005-CSA	915MHz frequency band with class 1 division 1 certification
GS005-ATEX	868MHz frequency band with ATEX zone 0, 1 & 2 certification
LB505	Recommended Pigtail cable SS2F 10ft. Connects to GS005 connector and provide 2 wires to connect switch contacts.

GS005

Specifications

Parameter	Test Condition	Min	Typ	Max	Unit
Sensor input					
Detecting opening of the closed circuit			10	20	μA
Data transmission delay on loop opening	Short to opened circuit		40	50	mSec
Data transmission delay on loop closing	Opened circuit to short		200	300	mSec
Sensitivity parameter adjustment					
	None				
Power Supply					
	Sensor in sleep mode		0.1		mA
	Sensor in operation		30		mA
	Sensor transmitting		100		mA

Absolute maximum ratings

Parameter	Test Condition	Min	Typ	Max	Unit
Input voltage		0.9	3.6	5	V
Strain gauge bridge impedance		100	300		ohms
Temperature range	Operating	-40		+60	°C
Temperature range	Storage	-50		+70	°C

Certifications

FCC/IC//CE certification
 ETSI 300-220-1, 300-220-3, EN 301 489-3
 EN61000-3-2, EN61000-3-3, EN61000-4-3, EN61000-4-6
 CSA C22.2 No.0.4.M2004, No.0-M1991, No.0142,M1987, No0.157-M1992, No.213-M1987
 UL508, UL913, UL1604
 EN61000-4, EN60079-0, EN60079-11, EN60079-26

Applications details

The two wires coming out of the transmitter could be connected to a mechanical switch to detect and transmit its status. If the two wires are shorted and the circuit is then opened, an interrupt is generated and a radio transmission is started immediately. This polarity should be used to transmit time critical alarms.

The other polarity, going from an opened circuit to a short circuit, is detected by the 250mSec polling loop. Data transmission begins as soon as the change is detected. The detection delay is an average of 125mSec and a worst case delay of 250mSec. Data transmission is usually completed in 30 to 40mSec.

Advanced:

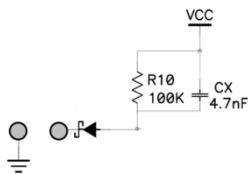
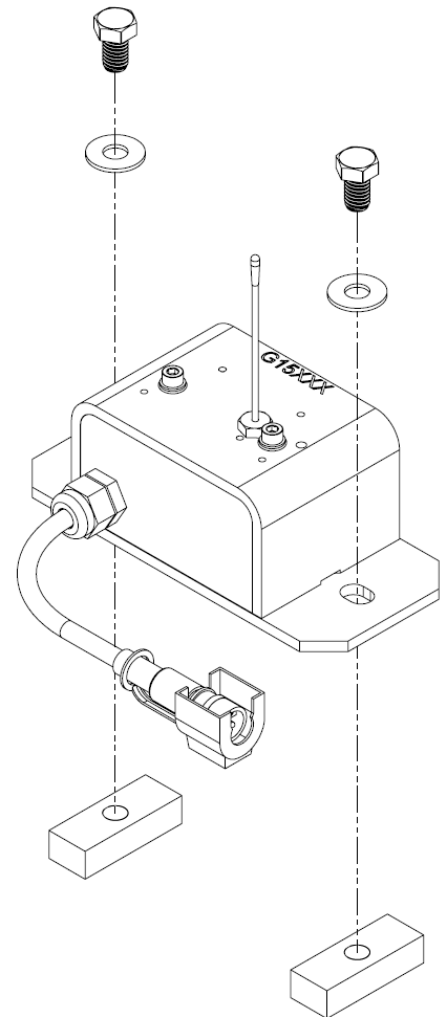


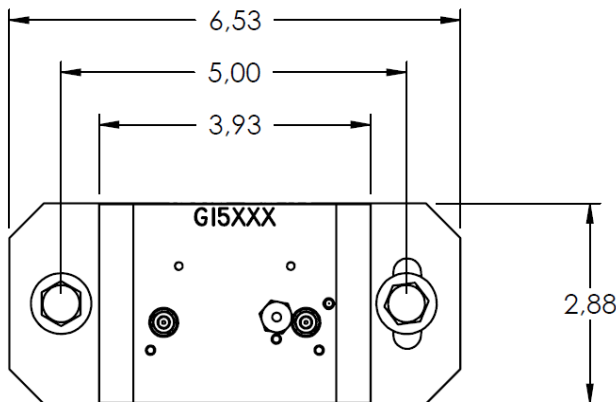
Figure: electrical schematic of the two wires contacts. Vcc = 2.8V.

Installation

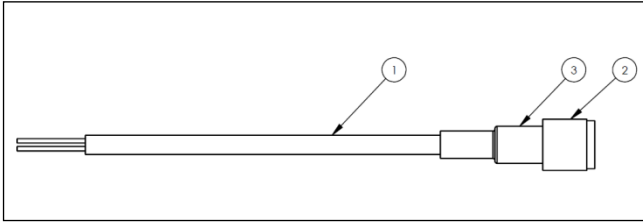
The transmitter is supplied with two solder tabs and a set of screws. Weld the solder tabs, tap holes or use nuts to fix and hold the transmitter in place.



GS005fixation hole pattern



To use the GS005, a cable assembly LB505 is recommended:



LB505: 2 wires cable 10 feet long with connector on one end and bare wires on the other end.

Wire color	Pin number	Description
Blue	1	Connector-socket
Red	2	Connector-Pin

Dimensions

