

GS220, GS221, GS222 series - LSI gateways

Features:

- Receive all LSI standard radio communications
- Configurable to be the master of up to 30 sensors, or to listen to unlimited number of devices.
- Input power supply: 9 to 30V, or USB port, or other depending on model number, current requirement of 200mA maximum.
- Could output data on CAN bus, J1939 networks, RS232 or USB.
- Industrial (-40°C to 85°C) tested industrial temperature ratings. Humidity 0 to 100% RH.
- IP65 water resistant aluminum enclosure.
- Potted electronics for increase water proof protection

Applications:

- Remote sensor reading
- Replacing wired sensors by wireless sensors with easy integration in current system.
- Datalogger / recorder : to record wireless sensor readings on file
- Live alarm monitoring
- Forward wireless sensor readings to a PLC via RS232 port
- Forward wireless sensor readings to an embedded computer

General Description:

The LSI Gateway receives readings from any LSI wireless sensors. The readings could be forwarded to other devices the Gateway is connected to, such as a CAN bus, J1939 network, RS232 PLC or computer, USB ports of computers, etc...



This photo is an illustration of the gateway, the actual connectors and cables will depend on the part number.

The radio operates license free at 900MHz in North America or 869MHz in Europe. 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.

Table of contents

Features:	1
Applications:	1
General Description:	1
Table of contents	2
Specifications	3
Absolute maximum ratings	3
Certifications	3
Ordering information	3
Applications details.....	4
GS220 – Gateway with USB port – works with a PC software.....	4
GS221 – Gateway with CAN bus interface	6
GS221 – Gateway with CAN bus and J1939.....	6
GS222 – Gateway with RS232 output	8
Dimensions.....	9
Revision History	9

GS220, GS221, GS222 series - LSI gateways

Specifications

Parameter	Test Condition	Min	Typ	Max	Unit
Number of sensors					
Maximum number of sensors in master mode		1		32	
Maximum number of sensors in listening mode		1		1000	
Power Supply					
	GS220 (from USB port)		60	200	mA
	GS221 & GS222 on 9V to 30Vdc power source		60	200	mA

Absolute maximum ratings

Parameter	Test Condition	Min	Typ	Max	Unit
Input voltage GS221-GS222		9	12 or 24	30	V
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
 EN61000-4, EN60079-0, EN60079-11, EN60079-26

Ordering information

Model	Description
GS22x-nn	915MHz frequency band for North America
GS22x-nn-ce	868MHz frequency band for Europe

x represents the signal output option: GS220=USB only, GS221=CAN Bus+USB, GS222=RS232+USB, etc...
 nn represents other options: such as wires instead of connectors, wall plug transformers instead of bare wires, etc..

P/N	Description	Connectors and cables
GS220-01	Datalogger to PC or laptop, listener, 100+ sensors	USB connector only
GS220-04	Datalogger & Repeater with 35 ft power cable	USB connector & power cable for Repeater
GS221-01	CAN bus receiver	1 cable for both: power & CAN bus.
GS221-04	CAN bus with J1939 protocol	Std connector for J1939
GS221-05	CAN bus & power supply on a right-angle M12 connector	M12 connector with 31" of cable
GS221-07	CAN bus & power supply on a straight M12 connector	M12 connector with 31" of cable
GS222-01	RS232 Datalogger to PC or laptop, listener, 100+ sensors, wall power supply.	RS232 DB9-F connector, wall plug transformer for 120/220Vac
GS222-05	RS232 with two cables	Two bare wires cables, one for power (9 to 36V) and one for PLC.

GS220, GS221, GS222 series - LSI gateways

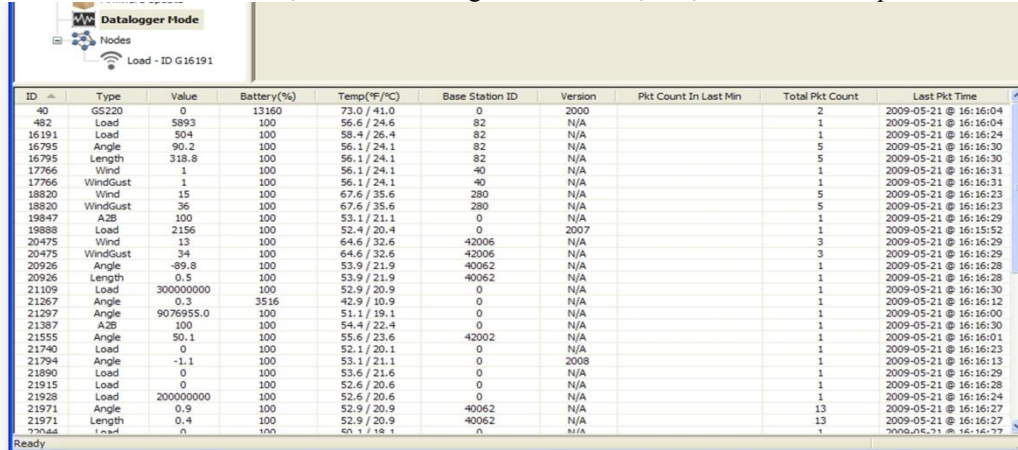
Applications details

GS220 – Gateway with USB port – works with a PC software

Two operating modes exist: **Datalogger mode** and **Master mode**

Datalogger mode:

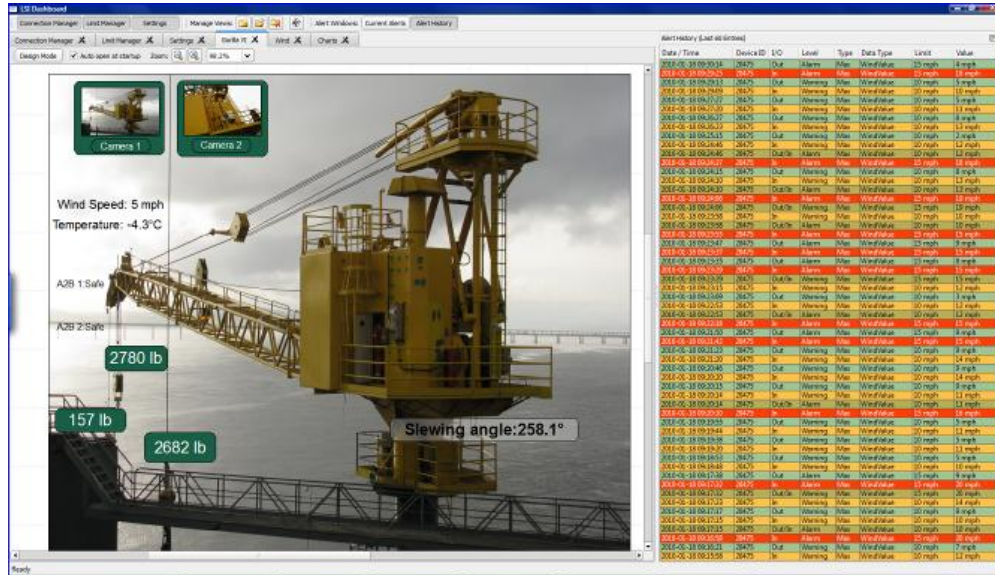
A Gateway in datalogger mode listens to everything around without a need to setup specific IDs. The PC software will show sensors as they are detected. On the screen, the values change in ‘real time’, live, as shown in the picture below.



ID	Type	Value	Battery(%)	Temp(°F/°C)	Base Station ID	Version	Pkt Count In Last Min	Total Pkt Count	Last Pkt Time
40	GS220	0	13160	73.0 / 41.0	0	2000		2	2009-05-21 @ 16:16:04
482	Load	5893	100	56.6 / 24.6	82	N/A		1	2009-05-21 @ 16:16:04
16191	Load	504	100	58.4 / 26.4	82	N/A		1	2009-05-21 @ 16:16:24
16795	Angle	90.2	100	56.1 / 24.1	82	N/A		5	2009-05-21 @ 16:16:30
16795	Length	318.8	100	56.1 / 24.1	82	N/A		5	2009-05-21 @ 16:16:30
17766	Wind	1	100	56.1 / 24.1	40	N/A		1	2009-05-21 @ 16:16:31
17766	WindGust	1	100	56.1 / 24.1	40	N/A		1	2009-05-21 @ 16:16:31
18820	Wind	15	100	67.6 / 35.6	280	N/A		5	2009-05-21 @ 16:16:23
18820	WindGust	36	100	67.6 / 35.6	280	N/A		5	2009-05-21 @ 16:16:23
19847	AzB	100	100	53.1 / 21.1	0	N/A		1	2009-05-21 @ 16:16:29
19888	Load	2156	100	52.4 / 20.4	0	2007		1	2009-05-21 @ 16:16:52
20475	Wind	13	100	64.6 / 32.6	42006	N/A		3	2009-05-21 @ 16:16:29
20475	WindGust	34	100	64.6 / 32.6	42006	N/A		3	2009-05-21 @ 16:16:29
20926	Angle	-89.8	100	53.9 / 21.9	40062	N/A		1	2009-05-21 @ 16:16:28
20926	Length	0.5	100	53.9 / 21.9	40062	N/A		1	2009-05-21 @ 16:16:28
21109	Load	300000000	100	52.9 / 20.9	0	N/A		1	2009-05-21 @ 16:16:30
21267	Angle	0.3	3516	42.9 / 10.9	0	N/A		1	2009-05-21 @ 16:16:12
21297	Angle	9076955.0	100	51.1 / 19.1	0	N/A		1	2009-05-21 @ 16:16:00
21387	AzB	100	100	54.4 / 22.4	0	N/A		1	2009-05-21 @ 16:16:30
21555	Angle	50.1	100	55.6 / 23.6	42002	N/A		1	2009-05-21 @ 16:16:01
21740	Load	0	100	52.1 / 20.1	0	N/A		1	2009-05-21 @ 16:16:23
21794	Angle	-1.1	100	53.1 / 21.1	0	2008		1	2009-05-21 @ 16:16:13
21890	Load	0	100	53.6 / 21.6	0	N/A		1	2009-05-21 @ 16:16:29
21915	Load	0	100	52.6 / 20.6	0	N/A		1	2009-05-21 @ 16:16:28
21928	Load	200000000	100	52.6 / 20.6	0	N/A		1	2009-05-21 @ 16:16:24
21971	Angle	0.9	100	52.9 / 20.9	40062	N/A		13	2009-05-21 @ 16:16:27
21971	Length	0.4	100	52.9 / 20.9	40062	N/A		13	2009-05-21 @ 16:16:27
22048	Load	0	100	60.1 / 18.1	0	N/A		1	2009-05-21 @ 16:16:77

Alternatively, a graphical user interface

Example of application with the Dashboard software to monitor crane sensors:



When a Gateway is in listen mode, the sensors must be in their normal ‘wake-up’ condition, not in sleep mode. Two ways of keeping sensors awake when needed exist:

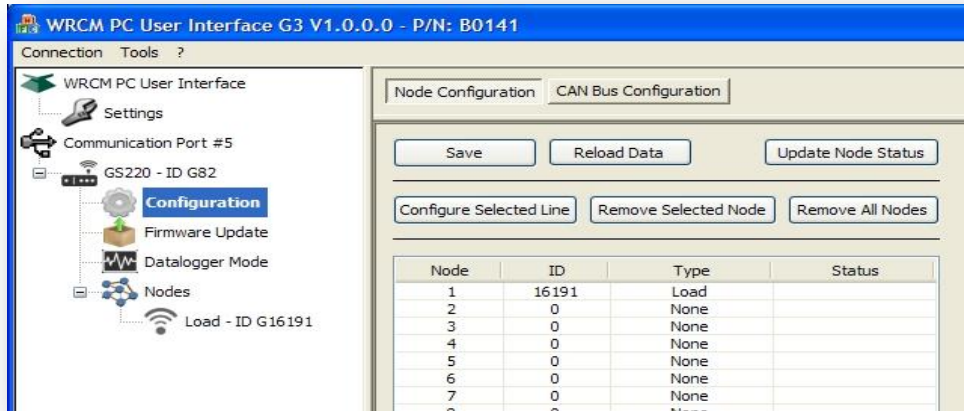
- All sensors could have a master unit, waking them up when required
- Sensors could be in the “dual mode”, an operating mode without a master where the sensor broadcast to everything around. This de-activate their sleep condition.

GS220, GS221, GS222 series - LSI gateways

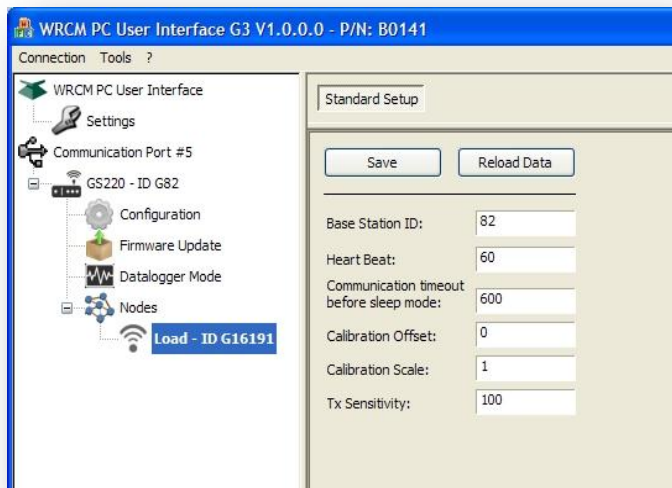
Master mode:

Sensors, or nodes, could be configured, adjusted, calibrated. The picture below illustrates a Gateway prepared to listen to a load sensor ID # 16191. Because the Gateway is the master of this sensor, the sensor will enter low power sleep mode when the Gateway is off. On power-up, the Gateway wakes-up the sensor.

In master mode, the Gateway is limited to about 32 sensors.



The configurator software allows a Gateway to setup internal parameters internal to the sensors:



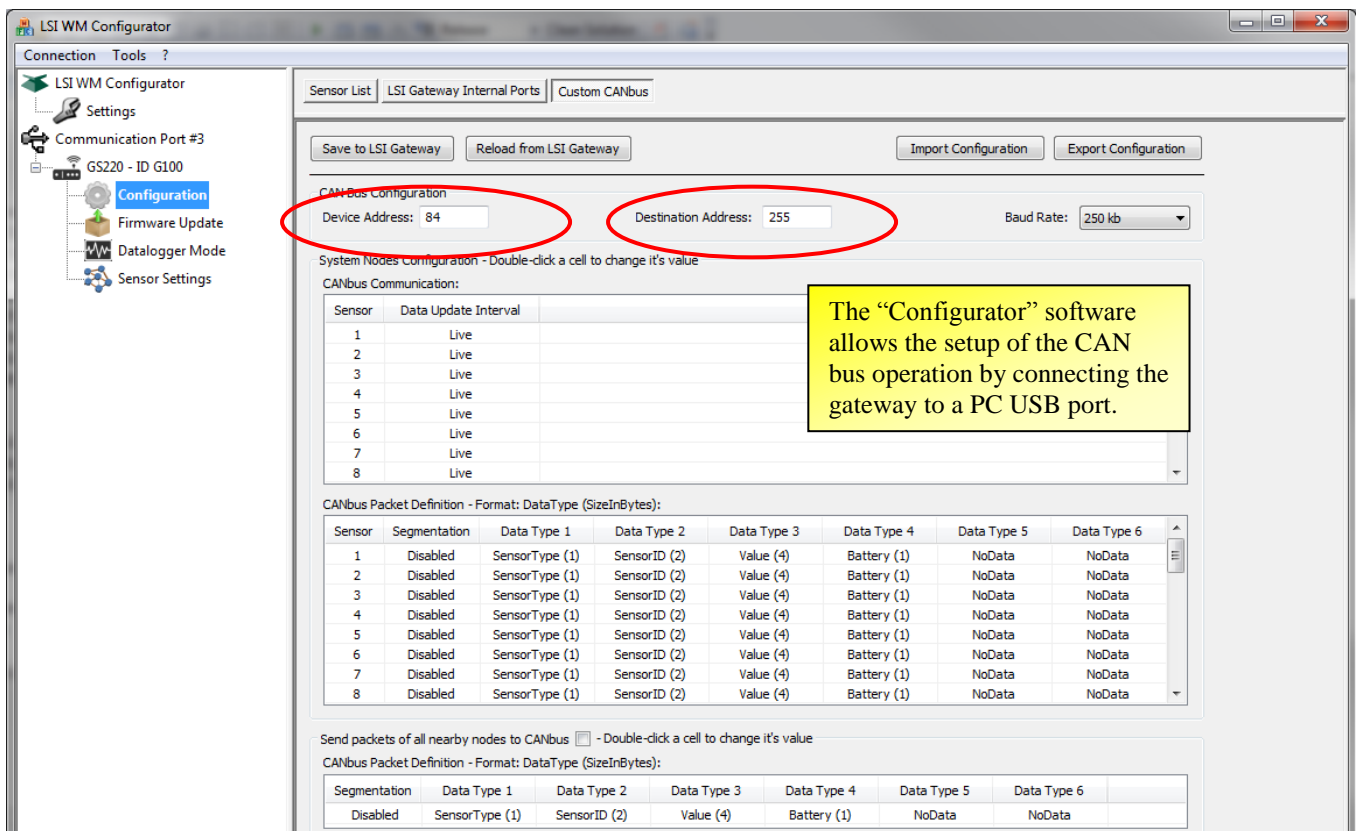
GS220, GS221, GS222 series - LSI gateways

GS221 – Gateway with CAN bus interface

CAN bus (Controller Area Network) is a bus standard designed to allow microcontrollers and devices to communicate with each other. It has been designed specifically for automotive applications but is now used in industrial and medical applications.

The LSI Gateway will communicate with other devices on a CAN bus network. It could forward the information coming wirelessly from other radio sensors such as load cells, inclinometers, etc... With the free LSI configurator software, it is possible to change how the data will be output on a CAN bus. Sensors readings could be sent based on a timer or based on events, such as a change of load. The default is 'live', which means that every update received from a sensor will be forwarded on CAN bus.

CAN bus source and destination address number could be set manually.



GS221 – Gateway with CAN bus and J1939

J1939 uses the CAN bus as the communication link. It is built over CAN bus. J1939 is the vehicle bus standard used for communication and diagnostics among vehicle components, originally by the car and heavy duty truck industry in the United States. J1939 is used in the commercial vehicle area for communication throughout the vehicle. SAE, the Society of Automotive Engineers administers the J1939 standard.

The J1939 Gateway uses PGN numbers for the communication on the network.

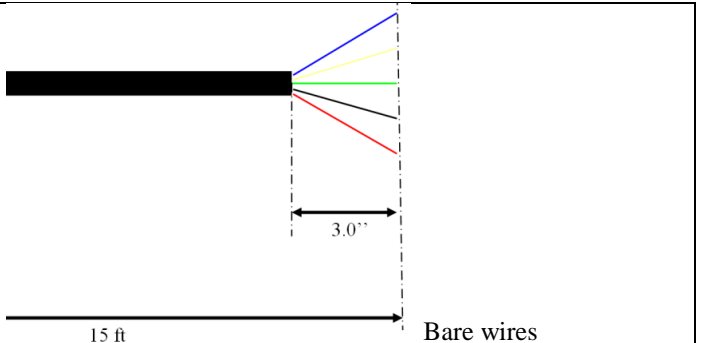
Consult these documents for details:

- Gateway J1939 specifications.pdf
- Gateway CANbus specifications.pdf
- J1939 Receiver Information Sheet.pdf

GS220, GS221, GS222 series - LSI gateways

Wiring GS221-01: one cable for power and the CAN bus network wires

Wire color	Description
Black	Ground
Red	Power supply, 9 to 36 volts
Blue	CAN bus ground
Green	CAN-H
White	CAN-L



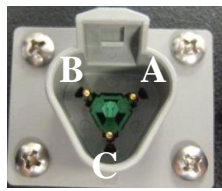
15 ft

3.0"

Bare wires

Wiring GS221-04: standard 3-pin Deutsch J1939 connector


Pin	Signal
A	CANL
B	CANH
C	GND



J1939 connector

15 ft power cable:

Signal	Wire color
Ground	Blue
Power (9-30V)	Red



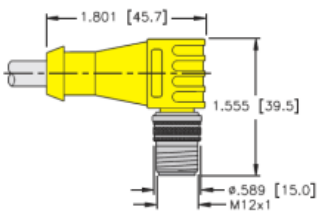
Power

USB

J1939

Wiring GS221-05: one M12 connector for power and the CAN bus network signals

Wire	Description
1	Shield
2	Power
3	Gnd
4	CAN_H
5	CAN_L




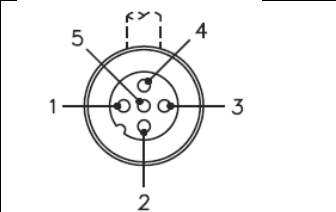
1.801 [45.7]

1.555 [39.5]

0.589 [15.0]

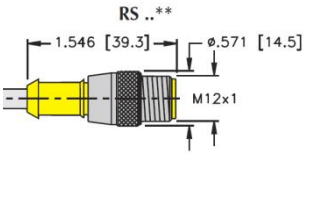
M12x1

Cable length: 31"

Wiring GS221-07: one M12 connector for power and the CAN bus network signals

Wire	Description
1	Shield
2	Power
3	Gnd
4	CAN_H
5	CAN_L




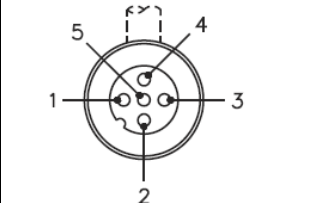
RS..**

1.546 [39.3]

0.571 [14.5]

M12x1

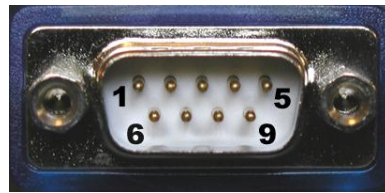
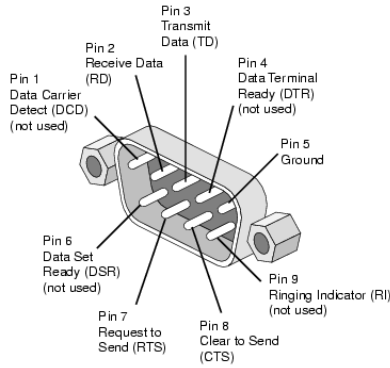
Cable length: 31"

GS220, GS221, GS222 series - LSI gateways

GS222 – Gateway with RS232 output

RS232 was a serial communication port present in most PC computers before 2005. It is still widely used on PLC or other electronic controllers. As for the CAN bus interface, the ‘Configurator’ software provides a way to define the data format on the RS232.




The GS222-01 has a female connector mating the one shown above.

Applications: this output is often wanted to interface with existing computer, consoles or PLC (Programmable Logic Controller)

Wiring GS222-01: this part number has a DB9 connector at the end of a cable


Cable	Description
1	12 ft long cable with wall plug transformer
2	6 ft long cable with DB9-F female connector



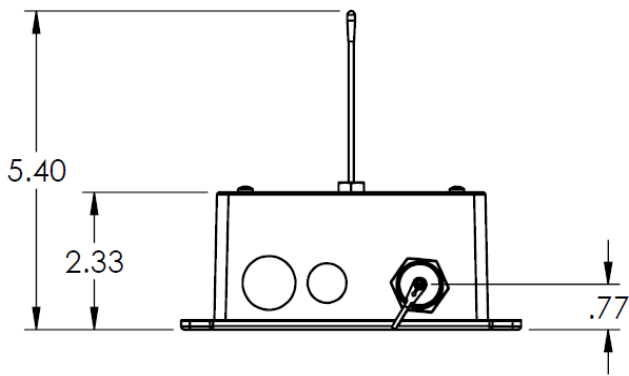
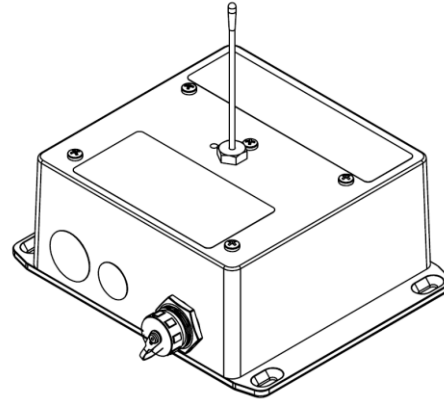
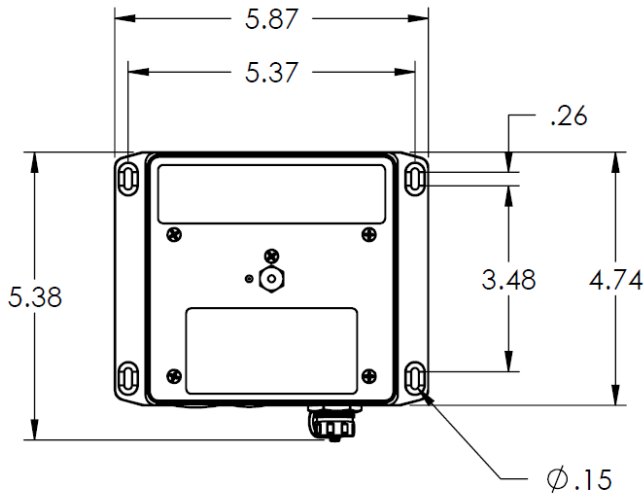
Wiring GS222-05: this part number has bare wires instead of the DB9 connector

Cable	Wire Color	Wire Color (CSA only)	Description
Cable 1 15 ft long 2 wires	Red	White	Power supply 9 to 30V
	Blue	Black	Ground
Cable 2 15 ft long 4 wires	Red	White	RS232 gateway TX* signal
	Green	Green	RS232 gateway RX signal
	Blue	Black	RS232 ground
	Yellow	Yellow	Not used

*Note the gateway TX signal means ‘transmit’ and must connect to the ‘receive’ wire of the PC or PLC.



Dimensions



The picture is an illustration of the gateway, the actual connectors and cables will depend on the part number.

Revision History

Rev 1.0	Release
Rev 1.5	Addition GS221-07
Rev 1.6,1.7	Typos
Rev 1.8	Wiring update on CSA version
Rev 1.9	Update to part numbers