Ocean Sensor Systems, Inc.
Wave Gauge, OSSI-010-003C
A Self Logging/Self Powered Pressure Sensor

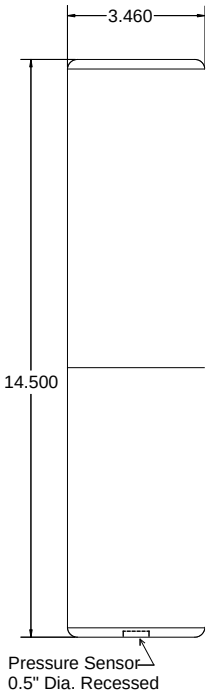
General Description

The OSSI-010-003C Wave Gauge combines a highly stable Pressure Sensor, a Compact Flash Card Data Logger, a rugged waterproof package and 12 or 28 C size Alkaline Batteries. A Low Power Microprocessor records up to 2 Gigabytes of data on a Compact Flash Card in an ASCII or Binary format with time and date. Then the Card is easily removed and can be read on any PC with a standard Compact Flash Card Reader. The Logger will collect months of continuous data or years of burst data. A serial port is provided as a user interface to configure and monitor the Wave Gauge. Standard pressure ranges are 0 to 1 Bar, 0 to 3 Bars and 0 to 10 Bars.

Features

- **Standard Compact Flash Card Data Storage**
- **Data storage up to 2 Gigabytes**
- **Standard Card Reader Compatible**
- **Power with 12 or 28 C Size Alkaline Batteries**
- **Flush Hastelloy Diaphragm**
- **ABS Plastic Housing Rated to 100 Meters**
- **Months of Continuous Operation**
- **Years of Burst Operation**
- **Rugged Sealed Waterproof Design**
- **Fully Programmable via RS232**
- **PC Interface Software**
- **Binary or ASCII Data Format**
- **Sample Rate From 2 Hz to 30Hz**
- **Burst or Continuous Sampling**
- **Accuracy ± 0.05% FS, 10 to 40** °C
- **Resolution 0.0033%FS**
- **Long Term Stability ± 0.05%FS**
- **Optional Water Temperature Logging**

Dimensions and Ordering Information



Pressure Range	Battery	Part Number
0 to 1 Bar (obsolete)	6 volt	OSSI-010-003B-01
0 to 3 Bars (obsolete)	6 volt	OSSI-010-003B-03
0 to 10 Bars (obsolete)	6 volt	OSSI-010-003B-10
0 to 1 Bar	18 volt	OSSI-010-003C-01
0 to 3 Bars	18 volt	OSSI-010-003C-03
0 to 10 Bars	18 volt	OSSI-010-003C-10
0 to 1 Bar Extended Case,	21 Volt	OSSI-010-003C-01E
0 to 3 Bars Extended Case	21 Volt	OSSI-010-003C-03E
0 to 10 Bars Extended Case	21 Volt	OSSI-010-003C-10E

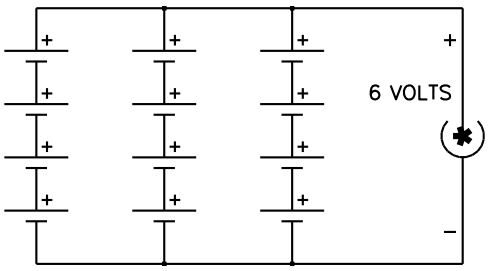
Extended case for Dual 21V, 28 cell Battery Pack

Electrical Characteristics

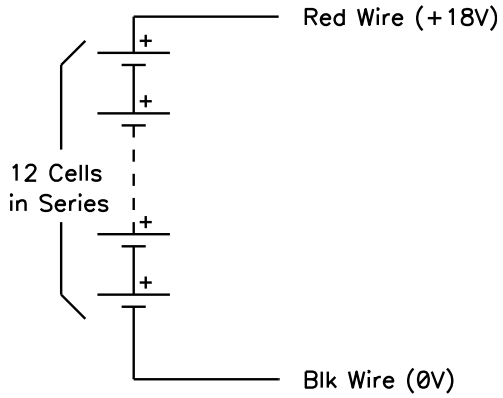
Parameter	**Conditions**	Min.	Typ.	Max.	**Units**
Battery Voltage	6 V, 12 cell battery	3.6	6.0	7.0	VDC
	18V, 12 cell battery (4)	9	18	35	VDC
	21V, 28 cell battery (3)	9	21	35	VDC
Temperature Range		-10		65	°C
Battery Drain, Sleep Mode	6 V battery Pack		3		mW
	18V battery Pack (4)		3.4		mW
	21 V battery Pack (3)		3.5		mW
Battery Drain	Sleep mode with RS232 Monitoring (1)		15.0		mW
Battery Drain, Continuous Sampling	6 V battery Pack		74.0		mW
	18V battery Pack (4)		65.2		mW
	21 V battery Pack (3)		66.2		mW
Battery Drain	Continuous Sampling with RS232 Monitoring (1)		90.0		mW
Battery Type, See schematic below	Alkaline 6V		12		C Cells
	Alkaline 18V		12		C Cells
	Alkaline 21V		28		C Cells
Battery Life Continuous Sampling	6 V battery Pack		2.5		Month
	18V battery Pack (4)		3.0		Month
	21 V battery Pack (3)		6.5		Month
Battery Life 25% Sample (2)	6 V battery Pack		8.5		Month
	18V battery Pack (4)		9.7		Month
	21 V battery Pack (3)		21.7		Month
Battery Life 10% Sample (2)	6 V battery Pack		16.7		Month
	18V battery Pack (4)		17.8		Month
	21 V battery Pack (3)		40.3		Month

(1) Powered up External Monitoring PC connected to RS232 Serial port.
(2) Industrial Alkaline Batteries 12 C cells totaling 102 Watt hr. Typ. or 28 calls totaling 238 Watt hr. Typ.
(3) Only available with the extended Wave Gauge case (Identified with the letter E at the end of the Wave Gauge part number)
(4) Version C Wave Gauge only

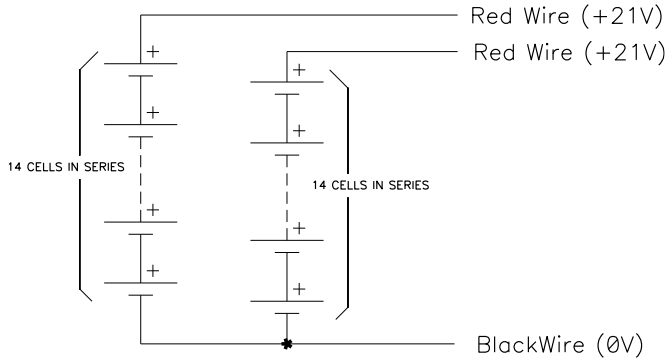
The 6V 12 alkaline C cells are connected in a Series, parallel arrangement.



The 18V 12 alkaline C cells are connected in a Series.



The 21V 28 alkaline C cells are connected in two groups of 14 cells connected in series.



Data Characteristics, Pressure

Parameter	**Conditions**	Min.	Typ.	Max.	**Units**
Pressure Numeric (4) Format & Units	OSSI-010-003C-01			+.99999	Bars
Pressure Numeric Format & Units	OSSI-010-003C-03			+3.0000	Bars
Pressure Numeric Format & Units	OSSI-010-003C-10			+9.9999	Bars
Data Accuracy (1)(2)(3)	10 to 40 °C			0.05	±% FS
Data Accuracy (1)(2)(3)	-10 to 65 °C			0.1	±% FS
Data Resolution			0.0033		% FS
Long Term Stability	OSSI-010-003C-01		0.0005		Bar
Long Term Stability	OSSI-010-003C-03, -10		0.05		% FS

(1) Linearity + Hysteresis + Repeatability + Temperature Coefficients + Zero + Span Tolerance
(2) Accuracy and Resolution are valid for Basic Pressure Range
(3) Linearity: Best Straight Line
(4) The 1 bar unit data format when over full scale (greater than +.99999) reads 1.00000 to 1.25000

Data Characteristics, Temperature

Parameter	**Conditions**	Min.	Typ.	Max.	**Units**
Temperature Numeric Format & Units	0 to 62.4375 °C			+999	counts
Temperature Data Resolution	Per count from 0°C		0.0625		°C
Temperature Accuracy	-10°C to 65°C			1.25	± °C

Timing and Interfacing Characteristics

Parameter	**Conditions**	**Min.**	**Typ.**	**Max.**	**Units**
Sample Frequency	Programmable	2		30 (1)	Hz
Serial Baud Rate			9.6		Kbaud
Flash Card Size	FAT16 format	64		2000	Mbytes
Sample Capacity 2000 Mbyte Flash Card	Binary IEEE 754 ASCII data			468 232	Msamples
Sample Burst Time	Programmable	1		60	minutes
Sample Burst Interval	Programmable	1		60	minutes
New File Interval	Programmable	1		255	days
Real Time Clock Accuracy				20	ppm

(1) Either Serial Output or Air Temperature must be off for 30 Hz sample rate.

Battery Life Calculation:

Battery life is a function of Burst Time and the Burst Interval. It may be calculated with the following formula.

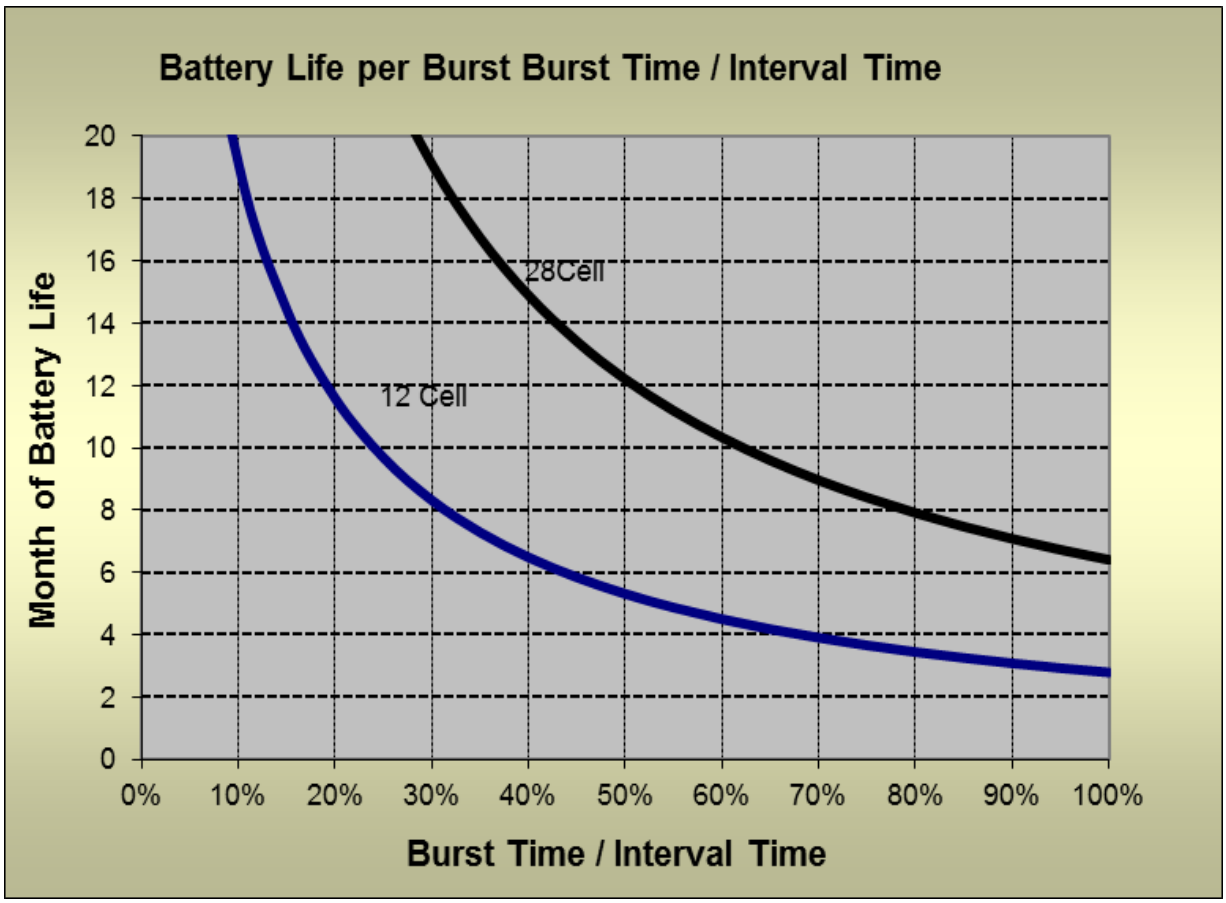
Calculate Drain power first: Dp = Sl + (Fs * (Bt / Bi))
Where Dp = Drain power in mW
Bt = Burst Time in minutes
Bi = Burst Interval in minutes

Power used with the 6V 12 Cell Battery Pack:
Fs = Power used during sampling = 74mW
Sl = Power used during sleep time = 3.0mW

Power used with the 18V 12 Cell Battery Pack:
Fs = Power used during sampling = 65.2mW
Sl = Power used during sleep time = 3.5mW

Power used with the 21V 28 Cell Battery Pack:
Fs = Power used during sampling = 66.2mW
Sl = Power used during sleep time = 3.5mW

Now Calculate Battery Life: Bl = Bc / Dp
Where Bl = Battery Life in Hours
Bc = Battery Capacity in mWhr = 140,000mWhrs typ. for 12 C size alkaline batteries
Bc = Battery Capacity in mWhr = 326,000mWhrs typ. for 28 C size alkaline batteries
Dp = Drain Power in mW



Data Storage Time:

Data Storage Time is a function of Sample Frequency, Burst Time, Interval and Data format.

The number of months of Data Storage for a Compact Flash Card may be calculated with the following formula.

St = (Sm * CF) / (F * (Bt / Bi) * 2,626,560)

Where St = Storage Time in months

Sm = Samples per Mbyte per storage format type

122,000 samples per Mbyte for ASCII

115,000 samples per Mbyte for ASCII format with Air Temperature sampling

230,000 samples per Mbyte for Binary

230,000 samples per Mbyte for Binary format with Air Temperature sampling

CF = Compact Flash card size in Mbytes

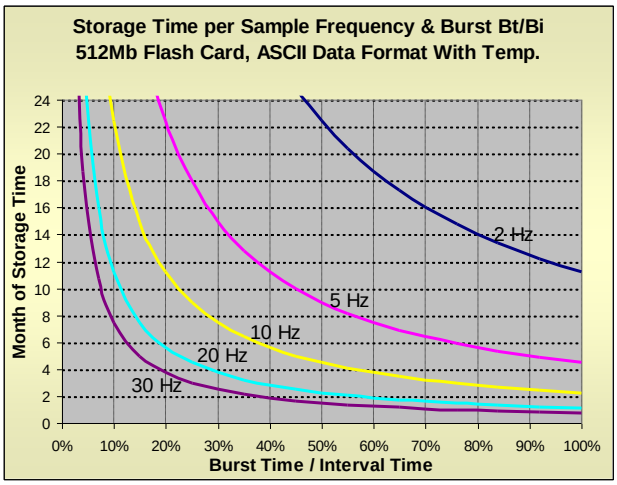
F = Programmed Sample Frequency 2Hz, 5Hz, 10Hz, 20Hz, or 30Hz

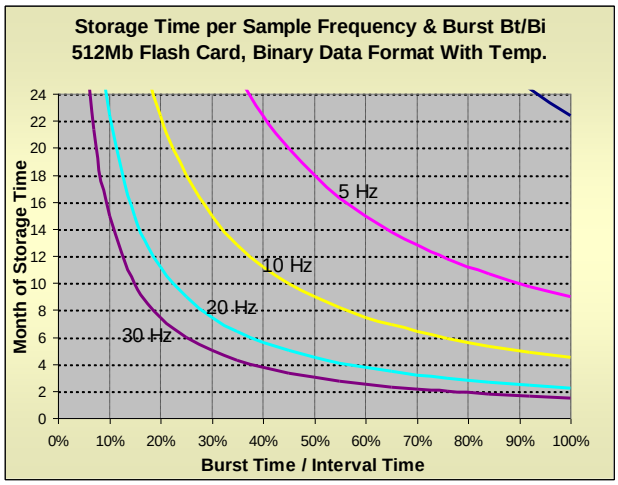
Bt = Burst Time in minutes

Bi = Burst Interval in minutes

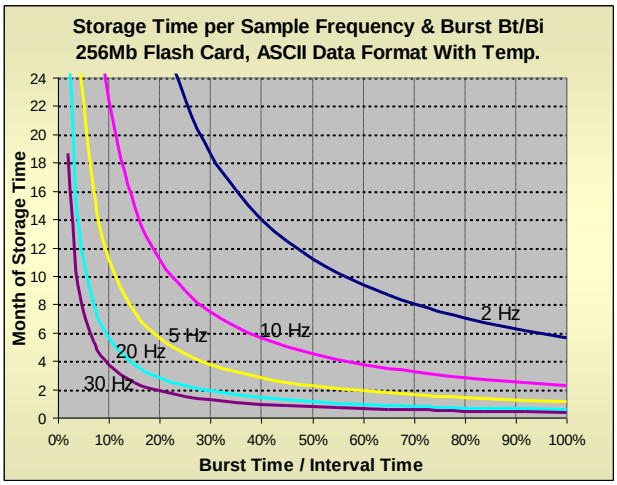
2,626,560 = Seconds per month

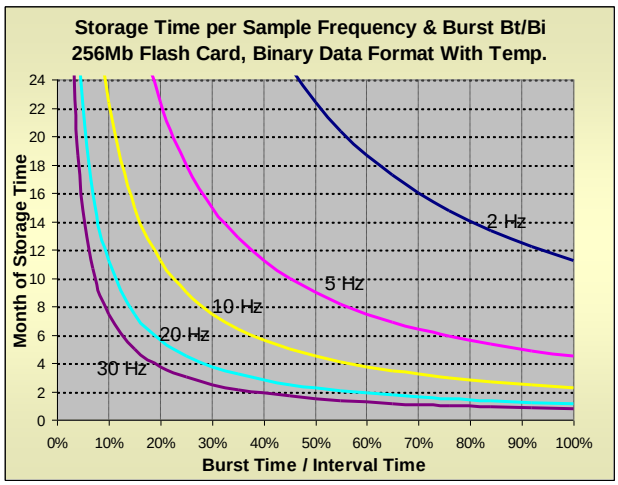
512 M byte Compact Flash card:



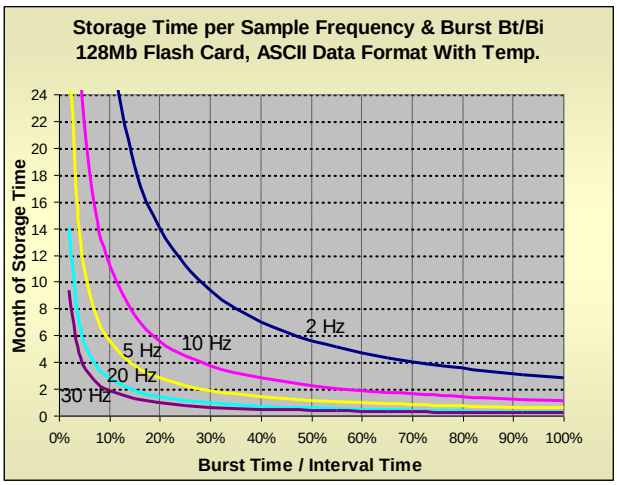


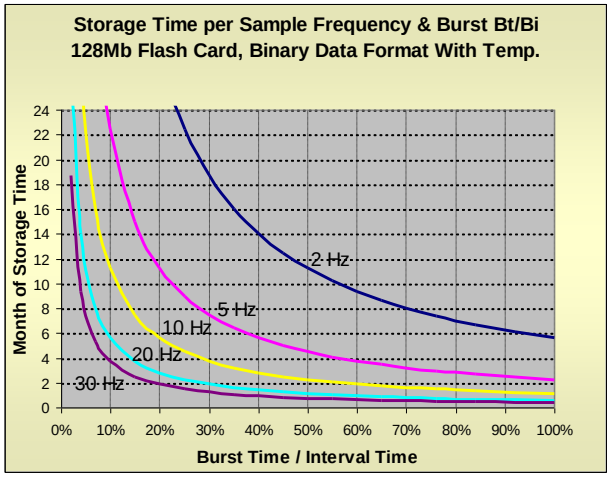
256 M byte Compact Flash card:





128 M byte Compact Flash card:





Number of Files and File Name:

The maximum number of files that the Wave Gauge can create is 512. The file names are automatically created starting at WLOG_000 and sequence up to WLOG_511. If previous files were left on the Compact Flash card those file names will be skipped. Note file name (location) WLOG_000 may be reserved and hidden by the Compact Flash Card manufacture.

File Format:

A File Header is placed at the start of each file when created. The Header contains the creation time, date and configuration information. The time and date are also placed at the start of each new burst.

New File Header Layout, Comma Delimited (separated)

Offset	Length & Type	File Status: Time, Date and Configuration Data
00h	4 ASCII bytes	Y00, to Y99, for Year 2000 to 2099
04h	4 ASCII bytes	M01, to M12, for Month Jan to Dec
08h	4 ASCII bytes	D01, to D31, for Day of month 1 to 31
0Ch	4 ASCII bytes	H00, to H23, for Hour of Day midnight to 23:00 hrs
10h	4 ASCII bytes	M00, to M59, for Minute of Hour 00 to 59
14h	4 ASCII bytes	S00, to S59, for Second of Minute 00 to 59
18h	4 ASCII bytes	F02, F05, F10, F20, F30, Sample Frequency in Hz
1Ch	4 ASCII bytes	L01, to L60, Burst Length 1 to 60 Minutes (note 1)
20h	4 ASCII bytes	I01, to I60, Burst Interval 1 to 60 Minutes
24h	5 ASCII bytes	N001, to N255, New File Interval 1 to 255 days (note 1)
28h	3 ASCII bytes	Z00 Min. Pressure Range in Bars
2Dh	5 ASCII bytes	X01, X03, X10, X30 Max. Pressure Range in Bars
30h	4 ASCII bytes	T10, Wave Gauge Type 10 = OSSI-010-003C
35h	6 ASCII bytes	R0000, Reserved
3Bh	4 Binary bytes	0Dh 0Ah 0Dh 0Ah Two carriage return line feeds

Note 1: 0 = continuous

New Burst Header Layout, Comma Delimited (separated)

Offset	Length & Type	Burst Status: Start Time and Date
3Fh	4 ASCII bytes	Y00, to Y99, for Year 2000 to 2099
43h	4 ASCII bytes	M01, to M12, for Month Jan to Dec
47h	4 ASCII bytes	D01, to D31, for Day of month 1 to 31
4Bh	4 ASCII bytes	H00, to H23, for Hour of Day midnight to 23:00 hrs
4Fh	4 ASCII bytes	M00, to M59, for Minute of Hour 00 to 59
53h	4 ASCII bytes	S00, to S59, for Second of Minute 00 to 59
57h	2 Binary bytes	0Dh 0Ah One carriage return line feed

File Data Format:

The file data may be stored in ASCII or Binary format and with or without Air Temperature. After each set of 12 Pressure Data samples stored, an Air Temperature sample is inserted if the temperature option is selected. Then a carriage return line feed is added if in ASCII format. In binary format two hex FE bytes will be added. At the end of each burst two carriage return line feeds are added in ASCII format or two hex FF bytes in binary format. The Binary Pressure Data is in IEEE 754 single precision floating point.

Sampled Data in ASCII Format, Comma Delimited with Air Temperature

Offset	**Length & Type**	**Data Description** (for a 0 to 3 Bar Sensor)
59h	8 ASCII bytes	-0.3000, to +3.0000, Pressure Sample #1
61h	8 ASCII bytes	-0.3000, to +3.0000, Pressure Sample #2
69h	8 ASCII bytes	-0.3000, to +3.0000, Pressure Sample #3
71h	8 ASCII bytes	-0.3000, to +3.0000, Pressure Sample #4
79h	8 ASCII bytes	-0.3000, to +3.0000, Pressure Sample #5
81h	8 ASCII bytes	-0.3000, to +3.0000, Pressure Sample #6
89h	8 ASCII bytes	-0.3000, to +3.0000, Pressure Sample #7
91h	8 ASCII bytes	-0.3000, to +3.0000, Pressure Sample #8
99h	8 ASCII bytes	-0.3000, to +3.0000, Pressure Sample #9
A1h	8 ASCII bytes	-0.3000, to +3.0000, Pressure Sample #10
A9h	8 ASCII bytes	-0.3000, to +3.0000, Pressure Sample #11
B1h	8 ASCII bytes	-0.3000, to +3.0000, Pressure Sample #12
B9h	6 ASCII bytes	-0640, To +1024, Air Temp. -40 to +65 C, 0.0625 C per count
BEh	2 Binary bytes	0Dh 0Ah One carriage return line feed
C91h	8 ASCII bytes	-0.3000, to +3.0000, Pressure Sample #13
??h	8 ASCII bytes	-0.3000, to +3.0000, Pressure Sample #??
??h	4 Binary bytes	0Dh 0Ah 0Dh 0Ah Two carriage return line feeds

Sampled Data in ASCII Format, Comma Delimited without Air Temperature

Offset	Length &/ Type	Data Description (for a 0 to 3 Bar Sensor)
59h	8 ASCII bytes	-0.3000, to +3.0000, Pressure Sample #1
61h	8 ASCII bytes	-0.3000, to +3.0000, Pressure Sample #2
69h	8 ASCII bytes	-0.3000, to +3.0000, Pressure Sample #3
71h	8 ASCII bytes	-0.3000, to +3.0000, Pressure Sample #4
79h	8 ASCII bytes	-0.3000, to +3.0000, Pressure Sample #5
81h	8 ASCII bytes	-0.3000, to +3.0000, Pressure Sample #6
89h	8 ASCII bytes	-0.3000, to +3.0000, Pressure Sample #7
91h	8 ASCII bytes	-0.3000, to +3.0000, Pressure Sample #8
99h	8 ASCII bytes	-0.3000, to +3.0000, Pressure Sample #9
A1h	8 ASCII bytes	-0.3000, to +3.0000, Pressure Sample #10
A9h	8 ASCII bytes	-0.3000, to +3.0000, Pressure Sample #11
B1h	8 ASCII bytes	-0.3000, to +3.0000, Pressure Sample #12
B9h	2 Binary bytes	0Dh 0Ah One carriage return line feed
BBh	8 ASCII bytes	-0.3000, to +3.0000, Pressure Sample #13
??h	8 ASCII bytes	-0.3000, to +3.0000, Pressure Sample #??
??h	4 Binary bytes	0Dh 0Ah 0Dh 0Ah Two carriage return line feeds

File Data Format cont:

Sampled Data in Binary Format with Air Temperature:

Offset	Length & Type	Data Description
59h	4 Binary bytes	32 bit floating point Pressure Sample #1
5Dh	4 Binary bytes	32 bit floating point Pressure Sample #2
61h	4 Binary bytes	32 bit floating point Pressure Sample #3
65h	4 Binary bytes	32 bit floating point Pressure Sample #4
69h	4 Binary bytes	32 bit floating point Pressure Sample #5
6Dh	4 Binary bytes	32 bit floating point Pressure Sample #6
71h	4 Binary bytes	32 bit floating point Pressure Sample #7
75h	4 Binary bytes	32 bit floating point Pressure Sample #8
79h	4 Binary bytes	32 bit floating point Pressure Sample #9
7Dh	4 Binary bytes	32 bit floating point Pressure Sample #10
81h	4 Binary bytes	32 bit floating point Pressure Sample #11
85h	4 Binary bytes	32 bit floating point Pressure Sample #12
89h	2 Binary bytes	82 80h to 04 00h, Air Temp. -40 to +65 C, 0.0625 C per count
8Bh	2 Binary bytes	FE FEh every 12 samples
??h	4 Binary bytes	32 bit floating point Pressure Sample #??
??h	2 Binary bytes	FF FFh at end of each Burst
??h	26 bytes	New Burst Header ending with FE FE

Sampled Data in Binary Format without Air Temperature:

Offset	Length / Type	Data Description
59h	4 Binary bytes	32 bit floating point Pressure Sample #1
5Dh	4 Binary bytes	32 bit floating point Pressure Sample #2
61h	4 Binary bytes	32 bit floating point Pressure Sample #3
65h	4 Binary bytes	32 bit floating point Pressure Sample #4
69h	4 Binary bytes	32 bit floating point Pressure Sample #5
6Dh	4 Binary bytes	32 bit floating point Pressure Sample #6
71h	4 Binary bytes	32 bit floating point Pressure Sample #7
75h	4 Binary bytes	32 bit floating point Pressure Sample #8
79h	4 Binary bytes	32 bit floating point Pressure Sample #9
7Dh	4 Binary bytes	32 bit floating point Pressure Sample #10
81h	4 Binary bytes	32 bit floating point Pressure Sample #11
85h	4 Binary bytes	32 bit floating point Pressure Sample #12
8Eh	2 Binary bytes	FE FEh every 12 samples
??h	4 Binary bytes	32 bit floating point Pressure Sample #??
??h	2 Binary bytes	FF FFh at end of each Burst
??h	26 bytes	New Burst Header ending with FE FE

Example - Sampled Data in ASCII Format Comma Delimited with Air Temperature Viewed in WordPad:

Y02,M11,D09,H21,M48,S10,F30,L02,I01,N001,Z00,X03,T10,R0000,

Y03,M03,D30,H00,M53,S00,
+0.0068,+0.0069,+0.0069,+0.0068,+0.0068,+0.0068,+0.0070,+0.0069,+0.0069,+0.0069,+0.0069,+0.0070,+0374,
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Example - Sampled Data in ASCII Format Comma Delimited without Air Temperature Viewed in WordPad:

Y02,M11,D09,H21,M48,S10,F30,L02,I01,N001,Z00,X03,T10,R0000,

Y03,M03,D30,H00,M53,S00,
+0.0068,+0.0069,+0.0069,+0.0068,+0.0068,+0.0068,+0.0070,+0.0069,+0.0069,+0.0069,+0.0069,+0.0070,
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+0.0067,+0.0069,+0.0068,+0.0067,+0.0067,+0.0067,+0.0069,+0.0069,+0.0068,+0.0069,+0.0069,+0.0071,
+0.0069,+0.0069,+0.0069,+0.0069,+0.0071,+0.0070,+0.0069,+0.0069,+0.0067,+0.0069,+0.0068,+0.0068,
+0.0069,+0.0068,+0.0070,+0.0069,+0.0069,+0.0069,+0.0070,+0.0071,+0.0069,+0.0069,+0.0068,+0.0068,

Y03,M03,D30,H00,M55,S00,
+0.0000,+0.5526,+0.3264,+0.1937,+0.1160,+0.0704,+0.0436,+0.0281,+0.0188,+0.0135,+0.0103,+0.0083,
+0.0075,+0.0068,+0.0064,+0.0061,+0.0061,+0.0062,+0.0061,+0.0060,+0.0059,+0.0058,+0.0060,+0.0059,
+0.0060,+0.0060,+0.0061,+0.0063,+0.0061,+0.0061,+0.0059,+0.0058,+0.0060,+0.0059,+0.0060,+0.0059,
+0.0060,+0.0062,+0.0061,+0.0061,+0.0062,+0.0060,+0.0062,+0.0062,+0.0062,+0.0061,+0.0061,+0.0063,

Estimating Battery Service Life by measuring Battery Pack voltage:

18V Pack Battery with 52mW load and 25°C:

>17.1V = 80% to 100% Service Life remaining
16.4V to 17.1V = 60% to 80% Service Life remaining
16.0V to 16.4 = 40% to 60% Service Life remaining
15.7V to 16.0V = 20% to 40% Service Life remaining
<15.7V = 0% to 20% Service Life remaining

21V Pack Battery with 52mW load and 25°C:

>19.9V = 80% to 100% Service Life remaining
19.1 to 19.9V = 60% to 80% Service Life remaining
18.7V to 19.1 = 40% to 60% Service Life remaining
18.3V to 18.7V = 20% to 40% Service Life remaining
< 18.3V = 0% to 20% Service Life remaining

Communications and Configuration:

The Wave Gauge may be configured with a PC's RS232 serial port. Use our convenient programming software or a Hyper Terminal with the following commands.

Commands are one byte and Acknowledgements are 3 bytes

Commands:

s = Stop running sample routine and wait for command instructions.
w = Write configuration data to Wave Gauge from PC.
r = Read back configuration data to PC.
i = Read back ID number to PC.
g = Go run main sample and store data to Compact Flash card routine.

Acknowledgements:

SOK = Acknowledge Stop running command and wait for command instruction.
WOK = Acknowledge Write configuration and wait to receive data from PC. (Time out in 15 sec)
ROK = Acknowledge Transmit configuration and transmit configuration data to PC.
IOK = Acknowledge ID Command and transmit ID (serial) number to PC.
GOK = Acknowledge go command and go run main sample and store data routine.
BAD = Receive failure or check sum on configuration data error
DOW = Do, write to configure Wave Gauge. Wave Gauge has not been configured.

Monitoring the sampled data:

The sampled data may be monitored via the RS232 serial port if the configuration control byte is set to enable the RS232 port:
Example with Air Temperature enabled:
+1.2345, +0384
+1.2345, +0384
: :
+1.2345, +0384
Example without Air Temperature enabled:
+1.2345
+1.2345
:
+1.2345

To Configure the Wave Gauge a 44 comma separated 2 ASCII character string must be sent to it.

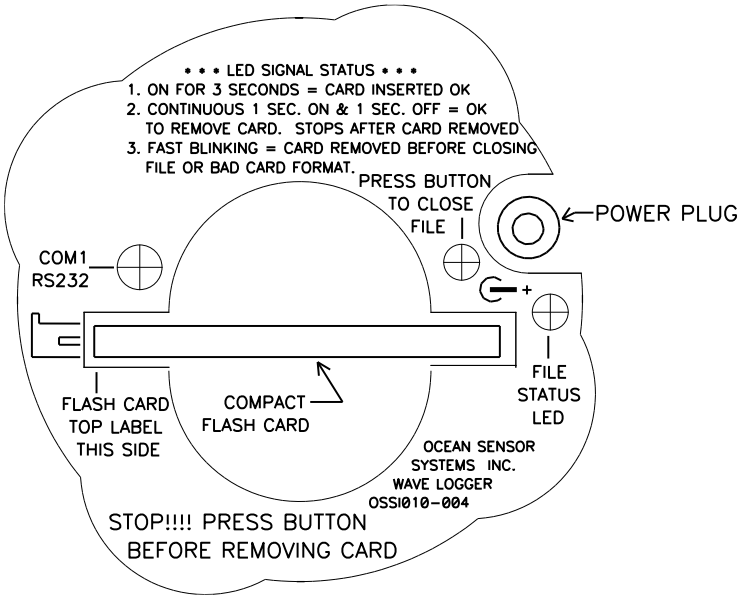
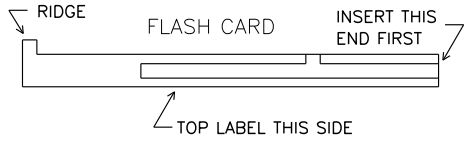
Configuration String, Comma Delimited, Transmitted via RS232 serial port to Wave Gauge

Offset	Length & Type	Name	Range and Description
00h	3 ASCII bytes	Sensor Type	0A, = Wave Gauge
03h	3 ASCII bytes	Max Pressure	01, 03, 10, or 30, The max. pressure range in Bars
06h	3 ASCII bytes	Min Pressure	00, Bars
09h	12 ASCII bytes	(reserved)	00,00,00,00,
15h	3 ASCII bytes	Sample Frequency	02, or 05, or 0A, or 14, or 1E, Hex. Selects Sample Frequency 02, or 05, or 10, or 20, or 30 Hz
18h	3 ASCII bytes	Burst Time	01, to 3C Hex value, Burst Time value, 1 to 60 Minutes (note 4)
1Bh	3 ASCII bytes	Burst Interval	01, to 3C Hex value, Burst Interval value, 1 to 60 Minutes
1Eh	3 ASCII bytes	New File Interval	01, to FF, Hex value, New File Interval 1 to 255 days (note 1)
21h	3 ASCII bytes	Set RTC seconds	00, to 59 Dec. Value, Real Time Clock, set only when control byte bit 3 is set
24h	3 ASCII bytes	Set RTC Minutes	00, to 59 Dec. Value, Real Time Clock, set only when control byte bit 3 is set
27h	3 ASCII bytes	Set RTC Hours	00, to 23 Dec. Value, Real Time Clock, set only when control byte bit 3 is set
2Ah	3 ASCII bytes	Set RTC Day of week	01, to 07 Dec. Value, Real Time Clock, set only when control byte bit 3 is set
2Dh	3 ASCII bytes	Set RTC Date	01, to 31 Dec. Value, Real Time Clock, set only when control byte bit 3 is set
30h	3 ASCII bytes	Set RTC Month	01, to 12 Dec. Value, Real Time Clock, set only when control byte bit 3 is set
33h	3 ASCII bytes	Set RTC Year	00, to 99 Dec. Value, = 2000 to 2099, set only when control byte bit 3 is set
36h	3 ASCII bytes	Start Minutes	00, to 59 Dec. Value, Start logging data on compact Flash Card
39h	3 ASCII bytes	Start Hours	00, to 59 Dec. Value, Start logging data on compact Flash Card
3Ch	3 ASCII bytes	Start Date	00, to 31 Dec. Value, Start logging data on compact Flash Card
3Fh	3 ASCII bytes	Start Month	00, to 12 Dec. Value, Start logging data on compact Flash Card
42h	3 ASCII bytes	Start Year	00, to 99 Dec. Value, Start logging data on compact Flash Card
45h	54 ASCII Bytes	(reserved)	00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00, = Reserved space, 18 comma delimited 2 ASCII char.
7Bh	3 ASCII bytes	CF Status	00, read only, Compact Flash status
7Eh	3 ASCII bytes	Control Byte	See Control Byte Table below
81h	3 ASCII bytes	Check Sum	00, to FF Hex value, is the sum of the Hex values in offset 00h to 81h (Note: Treat all Dec. values as Hex Values)

Note 4: 00, = continuous

Control Byte	
Bit 7	0
Bit 6	0
Bit 5	1 = Enable Start Sampling Time control
	0 = Start Sampling Immediately
Bit 4	1 = Water Temp. enabled
	0 = Water Temp disabled
Bit 3	1 = Set Real Time Clock Time and Date per this file
	0 = No change to Real Time Clock
Bit 2	0 = 9600 baud, default
Bit 1	1 = RS232 output enabled battery power drain 70 mW in cont. sample mode
	0 = RS232 output disabled, battery power drain 54 mW in cont. sample mode
	Note Transmit data always sent in ASCII format
Bit 0	1 = BINARY Data file format
	0 = ASCII Data File comma delimited and carriage return every 12 samples.

Installing and Removing the Compact Flash card:

Install the Compact Flash card with the top label facing down as viewed below. If the power plug is connected the File Status LED will turn on for 3 seconds. If the power plug is not connected the File Status LED will turn on for 3 seconds when it is connected. If the card size or format is incorrect the File Status LED will blink fast for 4 seconds. If the battery voltage is low the LED will not turn on at all.

To remove the card, first press the Close File Button. The File Status LED will indicate that it's ok to unplug the card by a continuous 1 second on and 1 second off blinking. The File Status LED will stop blinking when the card is removed. If the card is removed before pressing the Close File Button **the last file will be corrupted.** The File Status LED will blink fast for 4 seconds to indicate this error.