

Data Dolphin Installation Manual DLS-400

# **DLS-400** A member of the Data Dolphin Family of Data Logging Systems

### **Remote Monitoring Solution**





# Data Dolphin Installation and Usage Manual

Last Revision: September 2023



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Note to the user:

This manual may cover items not specific to your system and was prepared as a reference for the many typical uses of the DLS-400.

Please ensure all fittings and glands are tight as they may have come loose during shipping or with temperature changes.



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## **COMPLIANCE STATEMENT**



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## **Bill of Materials Data Logging System (Model 400)**

## **Bill of Materials DLS-400:**

- DD-400 Data Logger
- Internal Cellular Modem
- Solar Controller
- Fibreglass Enclosure (14" x 12" x 6")
- Enclosure Brackets
- Rechargeable Lead Acid Battery
- Lightning Arrester
- 5db Whip Antenna
- 65cm Antenna Cable
- 4m Antenna Cable
- Solar Panel with Cables
- Solar Panel Brackets
- 5' Tripod
- 10' or 20' Pop Up Mast



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## Mechanical Drawings





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### **DD-400 Specifications**

### **Input Channels**

Maximum Input Voltage: 0 V to +2.5 V (0-20mA) Analog Voltage Resolution: 1  $\mu$ V A/D Bits: 24 Input Impedance: 20 Gohm Scan Interval: 3 to 100 Hz Excitation Channels: 2 Excitation Voltage 1: +2500 mV Excitation Voltage 2: +5000 mV

- 8 24bit Single Ended Analogs or 4 Differentials or Combination of both (1 Differential = 2 Analogs)
- 5 10bit Single Ended Analog
- 2 Frequency
- 3 SDI-12 Addresses/Devices
- 4 Counter/Status
- 2 Totalizers

### **Power Requirements**

Power Supply: 6 to 25 VDC Quiescent Current: < 400 μAmp (Typical) Processing Current: 3 mA

#### Memory

Flash Memory: 4 MB Data Values: 233,472 (1 Precision Input)

Case Material Extruded Aluminum

### **Dimensions**

Size (cm) 20.32 x 7.62 x 8.89 Size (inches) 8 x 3 x 3.5 Weight DD-400 with radio module, battery and antenna 0.918kg (2.024lbs)

### **Operating Temperature Range**

Standard -40 to +60°C Extended -55 to +80°C



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**SMC-02 Specifications** 

### **Power Requirements**

Solar Panel Input Range: 14 to 30 VDC Solar Panel Wattage Range: Up to 40 W (Typical) Load Current Range: Up to 4 A

### Memory

Flash Memory: 4 MB Data Values: 233,472 (1 Precision Input)

### **Case Material**

Polyamide Enclosure

### **Dimensions**

Size (cm) 9.0 x 2.25 x 7.5 Size (inches) 3.5 x 0.88 x 2.95 Weight: 0.025kg (0.055lbs)

### **Operating Temperature Range**

Standard -40 to +60°C



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## Installation of the Enclosure Brackets

### Step 1

Brackets for pole mounting the fibreglass enclosure and/or the solar panel are available. Bracket hardware is to be assembled like the following:



Find the U-Bolts that will attach to the brackets on the fibreglass box. The same type of U-Bolts will also be used to mount the solar panel. Bushings may be necessary on the U-Bolt to clamp tightly to the mast. Newer bracket assemblies are slotted to allow different U Bolt sizes.

The Enclosure is attached to the bracket as shown below. Old style brackets (2013 or older) require feet which are attached with screws to the fibreglass enclosure. New style brackets (2014) attach directly to the enclosure.





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Mounting the Solar Panel

To bolt the brackets together, or to the panel, follow the order as shown in the figure below.



Bolt both sets of Long brackets to the short brackets. When finished both sets should look like this.







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Mount the top bracket in to the pre-existing in the solar panel frame.



Mount the bottom bracket in to the pre-existing holes on the bottom end of the panel.



The panel, with both brackets mounted. (Older tech-cable style shown)



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Hold the solar panel or fibreglass enclosure up to the pole they are to be mounted to and slide the U-Bolts over and attach to brackets as shown. Washers or bushings may be necessary as shown below if the pipe is not large enough. Newer bracket assemblies can utilize a range of U Bolts for different pipe diameters.







If your system is 24V powered then you will have two panels in series. The panels mount side by side on the same bracket. Mount and connect Type 1 and Type 2 panels together with the short cables. The longer MC4 cables go into the DLS-400 enclosure.

# DO NOT CONNECT POWER UNTIL EVERYTHING IS MOUNTED, THE ANTENNA IS INSTALLED, AND ALL SENSOR WIRING IS VERIFIED AS CORRECT



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## **Communications Connections (DLS-400)**

## **Communications Connections (DLS-400)**

### DLS-400 Cellular Radio Antenna

Insert the grounding arms and tighten them down with an Allen key through the holes on top. Then attach the other end of the N to N cable to the MBC-800 and thread on the antenna itself.



Strap the antenna to the mast using the hose clamps in an upright position.

The N to N antenna cable is attached from the antenna to the bulk head on the DLS-400.





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**Solar Power Connections (All Models)** 

The solar panel cables are pre- wired through the DLS-400 enclosure.



The wires from the cable are pre-connected to the terminals of the solar module controller inside the enclosure. The **red jacketed** wire is positive voltage from the panel, and the **black** wire is the negative.





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MC4 connectors plug into each other from the panel to the enclosure providing the battery with charge. The blue hand tool is used to disconnect the connectors.



Simply push the tool into the slots and twist it to release.



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## **DD-400 Terminal Descriptions**



#### **Previous Generations**

Screw Terminal	Description
6-25 V <sub>DC</sub> IN	Power Input for the Data Logger
Ground/Gnd/Alg. Comm	Power and Signal Ground
Switched V <sub>RAW</sub>	Sensor Excitation. Switched from Power Input
Freq 1/Freq 2	Frequency Inputs
SDI-12	SDI-12 Input. Can accept addresses 0, 1, and 2
Counter 1/Counter 2	Rain Gauge, Counter, Status Inputs
Switched 5V	Sensor Excitation. 5V
Ex+ (2.5V)	Sensor Excitation. 2.5V
ALG 11/ALG 12/ALG 13/ALG 14	24 bit Precision Analog Inputs



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### Revision H (2014)

Screw Terminal	Description
6-25 V <sub>DC</sub> IN	Power Input for the Data Logger
Ground/Gnd/Alg. Comm	Power and Signal Ground
Switched V <sub>RAW</sub>	Sensor Excitation. Switched from Power Input
Freq 1/Freq 2	Frequency Inputs
SDI-12	SDI-12 Input. Can accept addresses 0, 1, and 2
Counter 1/Counter 2	Rain Gauge, Counter, Status Inputs
Switched 5V	Sensor Excitation. 5V
Ex+ (2.5V)	Sensor Excitation. 2.5V
ALG 11/ALG 12/ALG 13/ALG 14	24 bit Precision Analog Inputs



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2.5V Ref.
2.5V Ref. - 2.5V Ref - ALM -- ALG 5 - Gnd - ALG 1 - Gnd - ALG 2 ALG 3 - ALG Gnd Gnd - Gnd 0

Screw Terminal	Description
Ex+ (2.5V)	Sensor Excitation. 2.5V
ALG 15/ALG 16/ALG 17/ALG 18	24 bit Precision Analog Inputs
Alg. Comm/Gnd	Power and Signal Ground
ALM -/ALM +	External Alarm Trigger
Counter 3/Counter 4	Rain Gauge, Counter, Status Inputs
ALG 1/ALG 2/ALG 3/ALG 4/ALG 5	10 bit Standard Analog Inputs
2.5V Ref.	Sensor Excitation. 2.5V





Port	Description
SMA Female Bulkhead (Gold)	Cellular Modem Antenna Port
RS-232 DB9	Serial Communication Port
Yellow/Green/Red LEDs	Modem Status Indicators
3 Pin Green Plug	RS-485 or CAN Communication (Optional)
16 Pin Blue Plug	External Modem or Radio Port



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**Sensor Connections** 

**Before You Start!** 

Do NOT connect sensors while data logger equipment is already powered up.

There is the possibility that the data logger or sensor could become damaged if care is not taken while working on the equipment.

Always wire equipment with the power disconnected, and verify your wiring before re-applying power to ensure safe and proper operation for the lifetime of your data logger.



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### Generic 0.0-2.5V Input



Connect the wires from your sensor to the data logger as shown. The colors shown here are suggested, but may not match your device exactly. Power is connected to the Switched Vraw output and Ground with the output from the sensor going into ALG 11.

\* Analog 11 is shown as the input in the example above. This is the typical first input of choice, but inputs 11, 12,13,14,15,16,17, and 18 are all valid inputs.

You must scale the input signal to match your units with linear equation coefficients. Eg.

V	Units	
	0.0	0
	2.5	50
m		20.0
b		0.0

For example if your sensor outputs 0.0V for 0.0 example units and 2.50V for 50 example units, you would calculate an m of 20 and b of 0 to enter into the Precision Input as a "Linear Equation" scaling in the Setup tab.

This can easily be done by using the SLOPE() and INTERCEPT() functions in Excel.



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## **Generic 4-20mA Input**



For a two wire 4-20mA sensor the V+ or V DC is connected to Switched Vraw and the V- or GND is connected to ALG 11 and a precision 100 ohm shunt resistor is tied between the input and Alg. Comm.



For a three wire 4-20mA sensor the V+ or V DC is connected to Switched Vraw and the V- or GND is connected to Ground. The signal output is connected to ALG 11 and a precision 100 ohm shunt resistor is tied between the input and Alg. Comm.



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You must scale the input signal to match your parameter with linear equation coefficients.

V = I/R	Units	
	0.4	5000
	2	10000
m		3125.0
b		3750.0

For example if your sensor outputs 4 mA (which becomes 0.4V with the 100 ohm shunt) corresponding to 5000 example units and 20 mA (2.0V) for 10000 example units, you would calculate an m of 3125 and b of 3750 to enter into the Precision Input in the Setup tab.

This can easily be done by using the SLOPE() and INTERCEPT() functions in Excel.



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### Submersible Level Probe - Analog output



Pressure Probe	DD-400 Terminal
RED	Switched Vraw
BLACK	Alg. Comm
WHITE	ALG 11 (+)

The pressure probe comes with the wiring harness and gland pre-attached, and is to be fed through the open hole on the DLS-400 case and tightened securely.

The pressure probe has a vent tube that needs to be connected to the desiccant inside the case.

The sensor head should be mounted in the fluid being measured securely such that it does not move up or down causing incorrect measurements. Please consult with an engineer on a per application basis for the best methods.

Connect the wires from the pressure probe level sensor to the data logger as shown.

\* Analog 11 is shown as the input in the example above. This is the typical first input of choice, but inputs 11, 12,13,14,15,16,17, and 18 will all work with the "Level Probe- Analog output"



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### **RST VW0420 Vibrating Wire Interface**



VW0420	Wire Color	DD-400 Terminal
P2 9-24V (Power) ① +	Red	Switched V <sub>RAW</sub>
P2 9-24V (Power) ② -	Black	Ground
P3 4-20 mA (Vibrating Wire) ① +	Purple	ALG 11(+)
P3 4-20 mA (Thermistor) ① +	Yellow	ALG 12(-)

There is a 100 ohm resistor between each ALG input and Alg. Comm to convert the 4-20mA signal to voltage for the data logger to read.

Additional interfaces wire to the other ALG input pairs in the same way.

Working range for the input is 0.4 to 2.0V. Error status is 0.3V

Power loops from V Switched Raw to each of the power inputs on the interfaces. Power also then feeds into the 4-20mA loop which then goes to the data logger input with the termination resistor.

If you have 1-2 interfaces, set your DD-400 Sample Rate to 5 seconds, if you have 3-4 interfaces set it to 7 seconds. In the VW0420 software set the first interface to a 2 second Sampling Rate, second interface to a 3 second Sampling Rate, third interface to a 4 second Sampling Rate, and the fourth interface to a 5 second Sampling Rate to help avoid plucking at the same time.



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Set slope and intercept to match 0.4V for 4mA limit and 2.0V for 20mA limit vibrating wire reading. Here the vibrating wire value is set up for B units and the temperature input is set up for degrees Celsius. Engineering units is disabled in the VW0420 so check the 20mA and 4mA limit provided by the VW0420

Host software in the Output Units tab in this instance with limits of 5000 and 10000 gave m = 3125.0, and **b** = 3750.0 after slope and intercept were calculated for the VW. For the temperature sensor, **m** = **25** and **b** = **-10**.

Calibration certificates will have a better low and high range for the sensor to input here!

4	Status 🎲	Setup	💻 Monitor	📅 Eng Units 🥖	🗿 Output Uni	:5
	-VW Sensor settin	gs				
	VW 20 mA Limit	10000	B Units	VW Error current	3	mA
	VW 4 mA Limit	5000	B Units	VW Error Threshold	100	B Units
	Units	B Units	•		Ø	⊻W Save & Apply
	Temperature Sen	sor settings				
	Temp 20 mA Limit	40.0	°C	Temp Error current	3	mA
	Temp 4 mA Limit	0.0	°C	Temp Error Threshold	2	degrees
	Units	Celsius	•		Ø	IH Save & Apply
ort	Status Status	Message			B Ma	
	🙆 5 Co	nnected		USB Port: 52		

B Units			 Temperature	
	0.4	5000	0.4	0
	2	10000	2	40
m		3125.0	m	25
b		3750.0	b	-10

Enter in these coefficients in Data Dolphin 2 for your logger.

☑ Input <u>1</u> 1 On	
Range: 2.5V V Rate: 3 Hz V	Range: 2.5V 💌 Rate: 3 Hz 💌
Name: P21591 Units: B	Name: T21591 Units: *C
Scaling: Linear Equation y = mx + b	Scaling: Linear Equation y = mx + b
Store Reading very 1 sample(s)	Store Reading vevery 1 sample(s)
m: 3125.0 b: 3750.0	m: 25.0 b: -10.0
Totalize in Inche Multiplier 1.0	Totalize T in Multiplier 1.0



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## **Schlumberger Water Services DIVER – SDI12 Connections**



Pressure Probe	DD-400 Terminal
RED	Switched Vraw
BLACK	Ground
WHITE	SDI-12 (up to 3 Devices)

The DIVER is attached to the Diver Data Cable as normal and the other end that normally connects to the USB Interface Cable is simply cut and wired to the Diver-DCX module. A yellow jacketed cable from the DCX module connects to the switched power on the green terminal block and the SDI-12 data line to the grey terminal block.



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The Diver Data Cable has a single conductor with shield that is inserted into the center and ring terminals of the DCX. Center being the stranded center wire, and ring being the shield.



Strip the wire jacket off and twist the shield together to form a pin and tin it with solder. Tin the center wire as well. The yellow jacket wire will provide the power and SDI-12 signal connections to the DD-400. Verify inside the DCX that the red is in +12, black is GND, and white in LINE.



## **SDI-12** Parameters

Parameter #	Parameter Description
0	Pressure [cmH2O]
1	Temperature [°C]
2	Conductivity [mS/cm]
3	Atmospheric Pressure [cmH2O]
4	Water Level [cmH2O]



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### **Solinst Levelogger – SDI12 Connections**



Pressure Probe	DD-400 Terminal
RED	Switched Vraw
BLACK	Ground
WHITE	SDI-12 (up to 3 Devices)

The Solinst SDI-12 Interface provides power and SDI-12 communication to the DD-400 data logger. Warning: The interface is not waterproof and needs to be inside the DLS-400 enclosure so the cable will have to be disconnected from the interface screw terminals and run through a gland to protect the interface from the outside elements.





# **SDI-12** Parameters

Parameter #	Parameter Description
0	Temperature [°C]
1	Depth [mH2O]
2	Conductivity [mS/cm]



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### Level Troll – SDI12 Connections



Pressure Probe	DD-400 Terminal
RED	6- to 25 Vdc IN
BLACK	Gnd - Ground
WHITE	SDI-12(up to 3 Devices)

The In-Situ device must be connected through a bulkhead connector that passes through the DLS-400 enclosure.

Each device MUST be on its own SDI-12 Address!

For example set the LevelTROLL to SDI-12 Address 0, and the BaroTROLL to Address 1.





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The Level Troll has to be programmed to use the SDI-12. Start the Win-Situ software and go to the setup screen.

Elle Edit View Preferences Help	2	
Device Information Name: Oak Manufacture Date: 12/27/2006 Firmware Version: 2.02 Hardware Version: 1 Boot Version: 1.11 Manual Time Set 1/ 3/2012 10:24:58 PM  Set Clock	Device Status Sensor High Sensor Low St Sensor Calibration Sensor Malfunction Hardware Reset Device Malfunction Low Battery Low Memory Low Memory	ower Management: inabled atus: Dnline cternal Power: ione Clear Status
Device Firmware Update         Available Firmware Versions         Level TROLL 500 v2.02         Analog Setup         SDI-12 Setup	tup Alarm Setup	Factory Reset Diagnostics Go Offline

Press the SDI-12 Setup button.



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On the SDI-12 setup screen choose the parameters that you want to record and in the order that you want them.



Press the check mark when done.

Please note that the Level Troll needs to be logging for the SDI-12 values to be updated


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## **YSI 6 Series Sonde – SDI12 Connections**



Pressure Probe	DD-400 Terminal	
RED	Fixed Vraw	
BLACK	Gnd - Ground	
PURPLE	SDI-12 (up to 3 Devices)	

The YSI Sonde must be set up to for which sensors are present on the unit, and which it will report back for the DD-400 to record.

Use YSI EcoWatch software with the RS-232 dry cable and bring up the Sonde Terminal to program the unit. Consult YSI documentation for further explanation if necessary.

When the sonde terminal window has appeared press **Enter** and wait until a # prompt appears. From here you can type **menu** and you will now see the sonde main menu. You will want to set up the sensors attached and have their parameters set up for reporting.



viewdatanow.com datadolphin.com emailalarm.com Configuration is fairly straightforward since the sonde is being used as a sensor that is being polled for SDI-12 data and any of the advanced uses (such as internal logging as a secondary measure) are left to the user.

The first screen presented will be a menu as shown here.

		Main
	1-Run	5-System
2-Calibrate 6-Report		6-Report
3-File 7-Sensor		7-Sensor
4-Status 8-Advanced		8-Advanced
	Select option	(O for previous menu):

Option 7 contains the menu for setting which sensors are enabled.

Sensors enabled
1-()Time
2-(*)Temperature
3- (*) Conductivity
4- (*) Dissolved Oxv
5-(*) TSE1 pH
6-() TSE2 Orp
7-() TSE3 NONE
8-() TSE4 NONE
9-()ISES NONE
<pre>&gt;-()IBED NONE &gt; (t)Optic T (Chlemenhall)</pre>
A-(^)Optic-T Chiorophyli
B-(*)Battery
Select option (O for previous menu):

Time is not necessary inside the YSI since the timestamp is recorded in the DD-200 or DD-400 data logger with the sensor parameters.

🗠 EcoWatch - Sonde - COM1	- 🗆 X
<u> Eile ⊻iew ⊂omm R</u> eal-time <u>Appl W</u> indow <u>H</u> elp	
CII DE CII NE DE CII	
💋 Sonde - COM1 📃	
Report setup         1-(*)Temp C       7-(*)pH         2-(*)SpCond mS/cm       8-( )pH mU         3-(*)Cond uS/cm       9-( )Orp mU         4-( )Resist       A-(*)Turbid+ NTU         5-( )TDS       B-(*)ODOsat %         6-( )Sal ppt       C-(*)ODO mg/L	-
Select option (O for previous menu):	-
For Help, press F1 NU	M



optinst.com viewdatanow.com datadolphin.com emailalarm.com Your own configurations will vary depending on the application, but these menu captures can serve as a useful reference.

```
-----System setup------
1-Date & time
2-Comm setup
3-Page length=25
4-Instrument ID=NotSet
5-Circuit board SN:00013F38
6-GLP filename=00013F38
7-SDI-12 address=0
8-Language:English
Select option (0 for previous menu):
```

SDI-12 address is set to 0, and can be any of 0, 1 or 2 when used with the DD-200 or DD-400. Your own conventions might dictate which address is used depending on configurations if sondes move from station to station as a way to organize the data.

```
-----Advanced setup-----

1-(*)VT100 emulation

2-()Power up to Menu

3-()Power up to Run

4-()Comma radix

5-(*)Auto sleep RS232

6-(*)Auto sleep SD112

7-()Multi SD112

8-()Full SD112

Select option (0 for previous menu): 0
```

Ensure Auto sleep SDI12 is turned on.

The DD-200 or DD-400 will from then on poll the sonde using the Data Dolphin sample rate period for these measurements and then record them. When using with ViewDataNow you will then have to enter in which parameters are configured in order to view graphs and export all of your data correctly.



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The following diagram shows a typical electrical layout of the system when powering a sonde.





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## **YSI EXO – SDI12 Connections**



Pressure Probe	DD-400 Terminal	
RED	Fixed Vraw	
BLACK	Ground	
WHITE	SDI-12 (up to 3 Devices)	
GREEN	SDI-12 Ground	

The EXO Signal Output Adapter provides an external power source to the EXO and SDI-12 communication with the DD-400 data logger. Warning : The interface is not waterproof and needs to be inside the DLS-400 enclosure so the flying lead cable will have to be run through a gland and connected to the interface screw terminals to protect the interface from the outside elements.



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The EXO Signal Output Adapter

Ensure that the EXO is configured for SDI-12 output. Make note of the parameters being output and their order for setup when used with a DD-400 with telemetry and the ViewDataNow web application.



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## **Greyline DFM – Analog and Relay Connections**



Pressure Probe	DD-400 Terminal	Definition
RED	6- to 25 Vdc IN	Power to DD-400
BLACK	Ground	Ground
WHITE	Counter 1	Pulse from DFM
GREEN	Gnd	Ground
ORANGE	Counter 2	Flow Status from DFM
YELLOW	Gnd	Ground
BLUE	ALG 11 (+)	Flow Rate from DFM
BROWN	Alg. Comm	Ground



Use Simulation to test your unit by artificially creating a flow to measure and be output to the data logger. The relays will click and you can also measure with a volt meter the flow rate output on ALG 11 to verify everything is connected.



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When configuring the DD-400 you must calculate the coefficient for your pipe with the full scale flow rate.

The DFM outputs 0-5V but the DD-400 reads 0-2.5V so a precision resistor divider is used to divide the 0-5V in half. This conditioned signal is connected to ALG 11 on the DD-400 with the blue and brown wire pair.

Using Data Dolphin 2 software, set the m and b for Input 11 after it is calculated using Excel with the SLOPE() and INTERCEPT() functions, or with any other tools you prefer.

		x's	y's
No Flow		0	0
Max Flow		2.5	13.344
	m=	5.3376	
	b=	0.00	

ıt <u>1</u> 1 On		<u>D</u> ifferenti	ial 🗖 🗌
2.5 V 💌	Rate:	3 Hz	-
Flow Rate		Units: n	n3/m
Linear Equation y = mx + b			
Reading 🗨	every	1 sa	ample(s)
5.3376	b: [0	).0	
🗖 in İinche	Multipli	er: 1.0	
	t <u>1</u> 1 On 2.5 V Flow Rate Linear Equation Reading 5.3376 in inche	t <u>1</u> 1 On 2.5 V ▼ Rate: Flow Rate Linear Equation y = m Reading ▼ every 5.3376 b: 0 in inche Multipli	tt <u>1</u> 1 On

The pulse counter input must also be set with an m that corresponds to the Relay 1 Pulse value. In the above testing it was set to 0.250 m<sup>3</sup> per pulse. These values will depend on the ID of your pipe so ensure you calculate this for each station.

Counter <u>1</u> On	Counter 2 On
Type: 📀 Counter 🔿 Status 🛛 🗖 Daily Reset	Type: C Counter 🖲 Status 🔲 Accumulate
Name: Volume Units: Cnts	Name: Flow Units: Stat
Scaling: Accumulator	Scaling: Accumulator
m: 0.250 b: 0.0	m: 1.0 b: 0.0
Record Interval: O Immediate 💿 Timed	Record Interval: 📀 Immediate 🔿 Timed

Apply your settings and the pulse and flow rate outputs from the DFM will now be recorded correctly.



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## **OTT PLS – SDI12 Connections**



Pressure Probe	DD-400 Terminal	
RED	Switched Vraw	
BLACK	Ground	
GRAY	SDI-12	
BLUE	Ground	

The factory setting for the SDI-12 address is 0. Factory level setting is for meters.

A Minimum Sensor Stabilization time of 8 seconds should be allowed for the device to boot up and take a measurement.



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## **OTT PLS – 4-20mA Connections**



Pressure Probe	DD-400 Terminal	
RED	Switched Vraw	
BLUE	ALG 11	

A precision 100 ohm shunt resistor is tied between the input and Alg. Comm. You must scale the input signal to match your parameter with linear equation coefficients.

V = I/R	Meters	
	0.4	0
	2	10

For example if your sensor outputs 4 mA (which becomes 0.4V with the 100 ohm precision resistor) corresponding to 0 meters and 20 mA (2.0V) for 10 meters, you would calculate an m of 6.25 and b of -2.5 to enter into the Precision Input m and b in the Setup tab.

This can easily be done by using the SLOPE() and INTERCEPT() functions in Excel.



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## VAISALA PTB110 Barometer - 0-2.5V Connections



PTB110	DD-400 Terminal
Pin 2 – Output Ground	Alg. Comm
Pin 3 – Supply Ground	Gnd
Pin 4 – Supply Voltage	Switched V <sub>RAW</sub>
Pin 5 – Output Voltage	ALG 11

A sensor stabilization of 3 seconds is recommended.

Range	m	b
500-1100 hPa	240	500
600-1100 hPa	200	600
800-1100 hPa	120	800
800-1060 hPa	104	800
600-1060 hPa	184	600



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## Senix ToughSonic 3 – 0-2.5V Connections



ToughSonic	DD-400 Terminal
Brown – Supply Voltage	Switched V <sub>RAW</sub>
Blue – Supply Ground	Gnd
White – Voltage Output	ALG 11

A sensor stabilization of 3 or more seconds is recommended.





Scaling of the sensor should be set such that the maximum expected range outputs 2.50V and the minimum expected range outputs 0.00V

As an example, this sensor was programmed to work between 6.00" and 32.00" for 0-2.5V which gives the following:

🖂 🔽 Inpu	ut <u>1</u> 1 OnDifferential	
Range:	2.5V 💌 Rate: 3 Hz 💌	
Name:	Distance Units: in	
Scaling:	Linear Equation y = mx + b	
Store	Reading  of 1 sample(s)	
m:	10.4 b: 6.0	
Totalize	in None Multiplier: 0.0	





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## Installation of the Battery (All Models)

The DLS-400 is shipped with the battery disconnected. Locate the 12 volt battery in the main fibreglass case and the wiring harness coming from the solar module controller. Start by removing the protector terminal covers



Then connect the **black** wire to the **black** negative terminal on the battery.



Next connect the **red** wire to the **red** positive terminal on the battery and push it all the way on.



(DLS-400 unit pictured)



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If your system is 24V the batteries will have connectors to mate to internal wiring harnesses. There is no worry about which connector goes to which side as they can mate correctly either way. To install your batteries insert the first one with the terminals on the left side and slide it into the right position. Then drop in the next battery with the terminals to the right beside the first one.



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Powering up the DLS-400

On DLS-400 or DLS-400-SAT models make sure the antenna is attached securely and all other connections are properly tightened.

To power up the processor plug the green terminal into the processor as shown below.





The DD-400 will tick and the red light will flash letting us know that the clock is not set. Using a notebook and the Dolphin software you can set the clock.

On a DLS-400-SAT the clock setting can be skipped by letting it time out and the light will flash green then go out.

On a DLS-400 the red light will flash for a moment before alarming and calling into the server. Once it connects and gets the current time, a tone will be heard while the LED is green and the ticking will stop. The following page describes the steps during this process in more detail.



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## **Cellular Radio Power Up Sequence and LED Description**



The Yellow Registration LED on the side of the DD-400 should also be on steady and will eventually start flashing. A flashing yellow LED means that we have found a cellular service provider and have successfully signed in with a valid account.

#### Yellow LED - Register:

- On while attempting to become Registered
- Flashes at a 2s interval when registered successfully.

#### Green LED - Status:

Flashes:

- Every 1s while idling (while registered but not attached)
- Every 3/4s while setting up connection to the cellular provider.
- Every 1/2s while trying to make a server connection.
- Every 1/4s while connected to the server.

#### Red LED - In Use:

On when connected to a server, off otherwise.

**RSSI** (Received Signal Strength) is defined as a measure of the radio signal strength received by the DLS-400 from the Network Service Provider tower of the current RF (Radio Frequency) channel being used.

Generally, it is an indication of how well the DLS-400 is communicating with the Cellular tower(s). The signal value is usually given in units of decibels (dBm), and it ranges in value from -30 dBm to the value of -115 dbm. The table below presents the DLS-400s signal levels from the viewpoint of practical use.

RSSI Value	Expected Quality of Communications
-30dBm to-70 dBm	Excellent
-71 dBm to -80 dBm	Very Good
-81 dBm to -90 dBm	Good to Fair
-91 dBm to -100 dBm	Weak to Spotty
-101 dBm to -110 dBm	Infrequent to Unusable
<-110 dBm	Unusable



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## Quick Guide on Setting Up Your COM Port

## **Connecting your Logger to your Computer**

#### If your computer has a COM port - Connecting via RS-232 (DB9)

Attach a standard RS-232 Communications cable from your computer to your Dolphin Data Logger. See illustration below.



Computer and DD-400 Data Logger





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## If PC only has USB ports - Connecting via Universal Serial Bus (USB)

Attach as above to the Data Logger except also add the USB to Serial Bus Adaptor to the cable.



USB to RS-232 Adaptor

## **Driver Installation**

Follow the steps below on installing the USB to Serial Bridge Cable for the first time:

- 1. Power on both computers where you will connect the USB to Serial Bridge Cable and make sure that the USB port is enabled and working properly.
- 2. Plug in the USB cable into the USB port and Windows will detect an USB Device and run the Add New Hardware Wizard to assist you in setting up the new USB Composite Device.
- 3. Insert the USB to Serial Bridge Cable driver diskette or CD into the computer and click **Next** to continue:
  - a. Select Search for the best driver for your device and click Next.
  - b. Select **Specify a location** and click **Browse**. Change the folder of your floppy drive or CDROM (i.e.: **A:\ WIN98,WIN98SE,WIN2000**) and click **OK**.
  - c. Double check the directory that Windows prompts. Click Next.
  - d. Windows will detect the driver and shows the **USB to Serial Bridge Cable**. Click **NEXT** to continue until installation is complete.



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	Windows driver file search for the device:
	USB to Serial Bridge Cable
	Windows is now ready to install the best driver for this device. Click Back to select a different driver, or click Next to continue.
<b>*</b>	Location of driver:
- <b>*</b>	A:\WIN98\USB2SER.INF
× 1	

- e. Click Next to continue and let Windows copy the needed files to your hard disk. Click **Finish** while installation is complete.
- f. Click on START, and then select Settings and then Control Panel. Double click on System and choose the Hardware tab. Click on the Device Manager tab.

Add New Hardware Wizard



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System Properties

g. After installing, the System will generate an additional COM Port, USB to Serial Port (COM3) for the connection to RS232 Serial Device. Your COM port may or may not be COM3.



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	operties					?>
General	Device Mar	nager Hard	ware Profile	s Perform	iance	
	w devices by	y <u>t</u> ype (	℃ View de	vices by <u>c</u> o	nnection	
	Monitors Mouse Network a PCMCIA so Ports (COM Commu Co	dapters ocket 4 & LPT) unications Po trinter Port (LE o Serial Port (I Infrared COM Infrared LPT deo and game vices Serial Bus cor 2371AB/EB F Soot Hub o Serial Bridge	rt (COM1) TT1) COM3) Port controllers controllers PCI to USB Cable	Universal H	fost Controller	

Device Manager

h. Use this port in your Data Dolphin Windows Configuration software as your Communications port.





Dolphin Software

Load Dolphin and click on the Options button located in the toolbar.

ſ	Program Options
	Toolbar   Misc   File Locations   Communications   Exporting
	Computer comm port: 3 TCP Internet port: 2747
	Baud rate: 19200  Dial-up Modem HDA CX11270 Soft Modem CDPD Use Concentrator Ping Configuration  One server Ping One server bing One server bi
	C     Ping until connected     Ping every 1     sec.       C     Ping until and while connected         Time-outs     Diagnostics         QK     Cancel

#### Data Dolphin Options

Select the communications tab and change the Communications port to your USB comm. Port from step g.



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## **Configuring Inputs for your Data Logger**

## Reading the Current Setup of the Data Logger

<u>File Edit V</u> iew	/ Co <u>n</u> nect	Tools Window										
60 T		<u>10000 11</u> 110011	A <u>b</u> out									
Status Set	tup Gra	phs SDI-12	<b>Print</b>	<b>Options</b>	(U) Cancel	bisconnect	GPRS	Groups	ion Dial-up	Radio	CDPD	

Data Dolphin Setup

The Setup window accessed in the Data Dolphin software by clicking on the Setup button on the toolbar, gives the user a set of tabs for configuring all areas of the data logger. Inputs, Alarms, Name and Communications are configured with each on its own tab for grouping.

Once the window is opened press **Load from Dolphin** to bring in the current settings from your connected unit.

If you change a setting, you must press **Apply** for the change to be sent to the data logger and for it to take effect.

The data logger will not start recording until its clock has been set in the Sample Rate & Time tab.



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optinst.com **Standard Inputs** 

Dolphin Setup					- 0 -
💘 Alarms	Calo'd Results	Digital Inputs	Extended Features		
Standard Inputs	Freq. Inputs	Precision Inputs	Name & Notes	Pwr/Mdm Mgmt	Sample Rate/Time
— [] Input <u>1</u> On ——					
Type: Voltage		Type: Voltage			
Name:	Units: Volt	Name:	Units: Volt		
Scaling: Linear Equation	on y = mx + b 💌	Scaling: Linear Equation	y = mx + b 💌		
m: 1.0	b: 0.0	m: 1.0	b: 0.0		
- Input 3 On		Input 4 On			
Tupe: Voltage		Tupe: Voltage			
Name:	Units: Volt	Name:	Linits: Volt		
Scaling: Linear Equation	n u = mx + h	Scaling: Linear Equation	v = mx + h		
m: 1.0	ь: 0.0	m: 1.0	b: 0.0		
These inputs have 10 bit p	precision	Show Inputs	5-8 Apply		
ad from Dolphin				Close	

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In the DD-400 and DD-200 these are 10 bit analog inputs. Linear equation scaling can be set, or if you are using a thermistor the drop down for Scaling can automatically set the coefficients appropriately.

🗹 Inpu	ut <u>1</u> 0n	
Type:	Voltage	
Name:	ALG1 Units: Volt	
Scaling:	Linear Equation y = mx + b	☐ Input <u>1</u> On
m:	Linear Equation y = mx + b YSI Thermistor 2.25K - °C YSI Thermistor 2.25K - °F YSI Thermistor 3K - °C	Type: Voltage Name: ALG1 Units: C
- Inpu	YSI Thermistor 3K - *F YSI Thermistor 5K - *C	Scaling: YSI Thermistor 5K - °C
Type: Name:	YSI Thermistor 5K - 'F YSI Thermistor 10K - 'C ALG3 Units: Volt	Grounded Thermistor

As an example Input 1 has a 5K thermistor with a 10K ohm terminated resistor. With this setup the thermistor is wired between Input 1 and Ground, and the termination resistor is wired between Ex+ (2.5V) and Input 1.



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olphin Setup					
💘 Alarms	Calo'd Results	Digital Inputs	Extended Features		
Standard Inputs	Freq. Inputs	Precision Inputs	Name & Notes	Pwr/Mdm Mgmt	Sample Rate/Time
Input 5 On Type: Voltage Name: Scaling: Linear Equatio m: 1.0	Units Volt	–––––– Log Internal Battery –			
These inputs have 10 bit p	precision	Show Inputs	1-4 Apply		
oad from Dolphin				Close	

The Data Dolphin data logger can also record its external power source voltage in order to monitor battery levels. Internal Battery provides the voltage reading for the Switched 5V terminal for sensors that need 5V excitation.



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Dolphin Setup					
( Alarms	Calc'd Results	Digital Inputs	Extended Features		
Standard Inputs	Freq. Inputs	Precision Inputs	🖉 Name & Notes	Pwr/Mdm Mgmt	Sample Rate/Time
Name: Frq 1 On	caling: Linear Equation y = mx	+ b 💌 Units: Hz	m: 1.0 b: 0.0		
Freq 2 On           Name:         Frq 2         S	caling: Linear Equation y = mx	+ b 💌 Units: Hz	m: 1.0 b: 0.0		
Name: Frq 3 On S	caling: Linear Equation y = mx	+ b 💌 Units: Hz	m: 1.0 b: 0.0		
		These inputs have 16	bit precision <u>Apply</u>		
Load from Dolphin				Close	

Frequency inputs 1 and 2 can only be configured for frequency. Frequency Input 3 can be configured for use as an SDI-12 input for newer models of the DD-400 in the Extended Features tab.



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> - - -📆 Dolphin Setup Calc'd Results Digital Inputs ( Alarms Extended Features Standard Inputs Freq. Inputs Name & Notes Pwr/Mdm Mgmt Sample Rate/Time Precision Inputs - Input <u>1</u>1 On-🗌 Input 1<u>2</u> On-- Rate: - Rate: Bange: Range: Units: Volt Units: Volt Name: Name: Scaling: Linear Equation y = mx + b Scaling: Linear Equation y = mx + b  $\overline{\mathbf{w}}$ Store Reading very 1 sample(s) Store Reading very 1 sample(s) b: 0.0 b: 0.0 m: 1.0 m: 1.0 - Input 13 On --- Input 14 On-▼ Rate: Range: ✓ Rate: Range: Units: Volt Units: Volt Name: Name: Scaling: Linear Equation y = mx + b Scaling: Linear Equation y = mx + b -Store Reading very sample(s) Store Reading very sample(s) m: 1.0 b: 0.0 m: 1.0 b: 0.0 These inputs have 24 bit precision Reset Sample Counters Show Inputs 15-18 Apply Load from Dolphin Close 📆 Dolphin Setup - • • ( Alarms Calc'd Results Digital Inputs Extended Features Standard Inputs Freq. Inputs 🗿 Name & Notes Pwr/Mdm Mgmt Sample Rate/Time Precision Inputs - Input 1<u>5</u> On-🔲 Input 1<u>6</u> On-Rate: Rate: Range: Range: Units: Volt Units: Volt Name: Name: Scaling: Linear Equation y = mx + b -Scaling: Linear Equation y = mx + b -Store Reading very 1 sample(s) Store Reading very 1 sample(s) m: 1.0 b: 0.0 m: 1.0 b: 0.0 - Input 1<u>7</u> On-- Input 1<u>8</u> On -Range: -Rate: Range: Rate: Units: Volt Units: Volt Name: Name: Scaling: Linear Equation y = mx + b -Scaling: Linear Equation y = mx + b Store Reading very 1 sample(s) Store Reading very 1 sample(s) b: 0.0 m: 1.0 b: 0.0 m: 1.0 Reset Sample Counters Show Inputs 11-14 Apply These inputs have 24 bit precision

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Precision Analog Inputs 11 through 18 have 24 bit precision. These are available on the DD-400 and will most likely be your most used inputs. They can also be configured as differentials with 11 and 12, 13 and 14, 15 and 16, and 17 and 18 being the pairs.

Close

Load from Dolphin



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Site Name & Notes

Rea Alarms	Calc'd Results	Digital Inputs	Extended Features		
Standard Inputs	Freq. Inputs	Precision Inputs	Name & Notes	Pwr/Mdm Mgmt	Sample Rate/Time
ijte Name My Site	Site Number	Version 168.9	Modbus RTU	Advanced 65	ate Site Number
ite N <u>o</u> tepad				<u> </u>	
Save to dis <u>k</u>	]		Ē	2age	
			_	Apply	

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On the Site Name and Notes tab you can give your data logger a name. This name will be the one that shows up in ViewDataNow along with the Site Number for one to uniquely identify their unit.

The Site Notepad is a scratch pad that can be used to leave notes for other colleagues on the data logger itself such as when it was installed or moved or sensor inputs changed.



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ୁଲ୍ଲ Dolphin Setup					
(k) Alarms	Calc'd Results	Digital Inputs	Extended Features		
Standard Inputs	Freq. Inputs	Precision Inputs	Site Name & Notes	Bwr/Mdm Mgmt.	Sample Rate/Time
When using turning on th Data Dolphin Modem Type Cellular GPRS Quad Cellular GPRS Quad Cellular GPRS Quad Cellular GPRS Quad Off Time: 09:00:00 Off Time: 10:00:00 (hh:mm:ss)	a modem (dialup, internet, rad ne modem between certain tim n through a direct cable conne Band vower Management at midnight. Modem will turn on at 9:00	lio) with the Data Dolphin, you es. When the modem is off, yo ection. D:00 AM and turn off at 10:00	u can extend battery life by only ou can still communicate with th 00 AM. Total on time is 01:00:0	ie 10	
Di <u>s</u> play Modem Term	inal				
Enable Low Voltage	Radio Disconnect				
SIM CUD:					
				Apply	
Load from Dolphin				<u>C</u> lose	

This tab lets you select the telemetry that is installed in your data logger. If there is none then "None (RS-232 Only) will be selected.

For data loggers with a cellular modem you can also specify a time when the modem should turn on to accept remote connections. This is typically set for 30 minutes to an hour in the morning.



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Sample Rate & Time

📆 Dolphin Setup					
Real Alarms	Calo'd Results	Digital Inputs Precision Inputs	Extended Features	Power/Modem Mgmt.	🕅 Rate & Time
Dolphin's Clock           Tjme         00:00:00         ÷           Date         01/01/2001         ▼           Zone:         (UTC-07:00)         ≤           Sample Rate         All Inputs:         01:00:00 ÷           All Inputs:         (01:00:00 ÷         (hh:mm:ss)           Delayed Start:         01/01/201         ●	Bead Appl Mountain Time (US & Stop recording data v ✓ Audibly chirp when re Use daily sample rate 999 ▼ 15:06:55 ÷	y Apply Computer's C Canada), Chihuahua, vhen memory is full cording a sample (24:00:00) Apply	Iock	T r izon: • Rate occur nples. Useful n. 12 01:00:00 - 14 01:00:00 -	
Minimum Sensor Stabiliza	3.0 seconds Apr (1 to 16)	ulu	П 1 <u>5</u> 01:00:00 Г П 1 <u>7</u> 01:00:00 Г Арріу		
Load from Dolphin				Close	P

This is the tab that initiates the data logging once the Dolphins Clock has been set. You can set the time zone, and whether or not to always use DST. The time and date will be highlighted in red if the data logger is NOT currently logging with a correctly set clock.

Sample rate is the period which the inputs will be recorded and stored into the data logger memory. For SDI-12 this is the period in which the SDI-12 device will be requested to provide its measurements as well. You can also align the sample rate by using the Delayed Start to a specific time for when the Sample Rate countdown should start.

Minimum Sensor Stabilization is also sometimes known as "sensor warm up time" and is the amount of time a sensor needs excitation, or to be turned on for, before a recording can be made. This is how long the Switched Vraw, Switched 5V, and Ex+ (2.5V) terminals will be on for before the sample is taken.



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📆 Dolphin Setup				
Standard Inputs	Freq. Inputs	Precision Inputs	Site Name & Notes	🔋 Power/Modem Mgmt. 🔗 Sample Rate & Time
( Alarms	Calc'd Results	Digital Inputs	Extended Features	
Standard Inputs       Input     Enable Valualarms       ALG1     Imput       ALG2     Imput       ALG3     Imput       ALG4     Imput       ALG5     Imput       Input     0.00%       Input     Imput	Condition     Precision     Input     Prot     Input     Inpu	& Frequency Inputs Enable Value Condition alarms 0.5000 + [±] 0.0214 + > + < 0.0000 + > 0.0400 + > 0.0000 + > 0.0000 + > + < 0.0000	Rec. only on cond. Counter 1 Counter 2 Counter 3 Counter 4 Overflow Se E E E Alarming/R F Collow 1 dty Sec	ter Inputs  En. Value  Counter 1 is disabled  Counter 2 is disabled  Counter 3 is disabled  Counter 4 is disabled  I Coun
Ongite alarming Dura     Ougete alarming Dura     Ouse ALM output     Ouse Switched Vrav     Load from Dolphin	ation: 300 sec. D.A.f	3.T. Port Offset: 2500	Configure	<u>Apply</u>

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These alarms will watch the Precision Inputs for values that meet certain conditions. When an alarm is triggered this will force the data logger to contact the server if there is telemetry enabled send e-mail and/or SMS notifications.

Press **Configure** from the Alarms tab to bring up the advanced alarm window where you can set the regular check in rate and protocols. Typical checks in rates are 4-6 hours, and Data Dolphin Standard should be enabled when a cellular modem is installed for most applications.



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Calculated Results

🙀 Dolphin Setup					
Standard Inputs	Freq. Inputs	Precision Inputs	Site Name & Notes	Power/Modem Mgmt.	🚱 Sample Rate & Time
(k Alarms	Calc'd Results	Digital Inputs	Extended Features		
Source Input: None	Calculated precision inputs n . Control sensor ty	Type: None Flow in Circular Pipe Flow in Circular Pipe Flow in Circular Pipe Flow in Circular Pipe Flow in Circulati Ver- Flow in Circulati Ver- Flow in Circulati Ver- Flow in Double Not Flow in Do	with Manning Equation with Area Velocity Pipe with Area Velocity ir Contracted Weir Suppressed Weir th Weir (Tubulent) Contacted Veir Suppressed Weir th Weir (Tubulent) Contacted Veir Contacted Veir Suppressed Veir Contacted Veir Contacted Veir Suppressed Veir Suppressed Veir Contacted Veir Suppressed Veir Suppressed Veir Contacted Veir Suppressed Veir Supp	v Bomerged be defined.	
<u>R</u> eset					
Load from Dolphin				Close	

If you have enabled one of your Precision Inputs accordingly one can use calculated results to convert Submerged Depth to a flow rate and total volume using the appropriate calculation from the drop down.

🙀 Dolphin Setup					
Standard Inputs	Freq. Inputs	Precision Inputs	Site Name & Notes	Power/Modem Mgmt.	🚱 Sample Rate & Time
(ke Alarms	Calc'd Results	Digital Inputs	Extended Features		1
Source Input: Input 11	▼ Res <u>u</u> l	Type: Flow in Rectangula	r Contracted Weir	•	
Name Flow Weir Width (m) 0.152 Weir Height (m) 0.001		Units Flow Totalling	m²/m (cubic meter/minute) m² (cubic meters)		
<u>R</u> eset	You have	unsaved changes	≜ppl	9	
Load from Dolphin				<u>C</u> lose	

For example a rectangular contracted weir is selected and output will be in m<sup>3</sup>/min for flow and cubic meters for total volume.



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🙀 Dolphin Setup					
Standard Inputs	Freq. Inputs	Precision Inputs	Site Name & Notes	Power/Moder	m Mgmt. 🔗 Sample Rate & Time
( Alarms	Calculated Results	Digital Inputs	Extended Features		
Counter <u>1</u> On Type: C Counter (© Name: Counter 1 Scaling: Accumulator m: 1.0 Record Interval: (© Name: Counter 3 Scaling: Accumulator m: 1.0 Record Interval: (© Debounce Time (ms) 48.9	Status Accumulate Units: Cnts b: 0.0 Immediate Timed	Counter 2 On Type: C Counter © S Name: Counter 2 Scaling: Accumulator m: 1.0 Record Interval: © In Type: C Counter © S Name: Counter 4 Scaling: Accumulator m: 1.0 Record Interval: © In	tatus Accumulate	Triggered Reset	☐ J1939 Enabled
Load from Dolphin				<u>C</u> lose	

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Counter Inputs can either be configured as a status or counter.Recording can also be based on the data logger sample rate or can be done at the moment the counter receives a signal.

Counter inputs that record immediately are typical for tipping rain gauge bucket installations. Counter inputs that recorded on a timed interval are typical for flow volume pulses from your sensing device.

Counter inputs configured as status allow the data logger to record the state of an external device, such as a pump on or off.



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ng Dolphin Setup					
Standard Inputs	Freq. Inputs	Precision Inputs	Site Name & Notes	Power/Modem Mgmt.	🚱 Sample Rate & Time
(ke Alarms	Calculated Results	Digital Inputs	Extended Features		
Fashira	Yalua				
Alarms	Yalue				
Communications     GPRS/CDMA/Satelli     GPRS/CDMA/Satelli     Fequency Sampling     Inputs     DST     SDI-12	STOPPED				
Enabled Manager	On Frequency Double-click to	3 Jaunch the SDI-12 Manager	ment form.		
<ul> <li>Totalizers</li> <li>LCD</li> <li>Outputs</li> <li>Recording</li> </ul>	STOPPED				
Optional Features				Apply	
Load from Dolphin				Close	

SDI-12 functionality can be enabled from the Extended Features on your Frequency 3 input. This is now the default for all DD-400 data loggers with firmware greater than 166.0.

Communications, GPRS/CDMA/Satellite timeouts and attempts should be set to the following when telemetry is used.

Feature	Value	*
HS-485	STOPPED	
- GPRS/CDMA/Satellite		m
Connection Timeout	60	
Connection Attempts	1	
Registration Timeout	120	
Network Search Timeout	300	-
Network Attach Retries	3	=
Network Attach Timeout	60	
Network Listen Retries	3	
Network Listen Timeout	60	
Network Hangup Retries	3	
Network Hangup Timeout	10	
Network Tear Down Retries	1	
Network Tear Down Timeout	60	
Listening Port	2747	
E		
		Ŧ


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Downloading the Data and Status from your Data Logger

## **Reading the Current Status of the Inputs**

🔏 Data Do	lphin 2												
<u>F</u> ile <u>E</u> dit	<u>V</u> iew Co <u>n</u>	nect <u>T</u> ools	<u>W</u> indow	A <u>b</u> out									
60 Status	Setup	Graphs	SDI-12	Print	<b>Options</b>	(U) Cancel	المج Disconnect	GPRS	Groups	iii-up	Radio	CDPD	

Data Dolphin Status

The Status window accessed in the Data Dolphin software by clicking on the Status button on the toolbar, gives the user a live update of the measured values on the inputs of the data logger. A data logger can connect to a computer with the Data Dolphin software either remotely (with a wireless modem) or directly via a serial port connection.

Note that the names of the inputs displayed in this window are those entered when the inputs were initially programmed.



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Original         Demo Unit           Name:         Demo Unit           Number:         2150           Date:         18/11/2010	Time: 19:01:47 Record Rate: 00:05:00 Next Record: 00:01:45	Memory use (0.0%):		
Standard Inputs           ALG1:         1.343170         Volt           ALG2:         1.783052         Volt           ALG3:         1.975806         Volt           ALG4:         2.227823         Volt           ALG5:         2.199414         Volt	Digital Inputs         Status           Counter 1:         0         Cnts         □           Counter 2:         0         Cnts         □           Counter 3:         0         Cnts         □           Counter 4:         0         Cnts         □	DST Inputs		
Precision Inputs	Calculated Results	Frequency Inputs		
ALG11: 0.690527 ∨	Calc 11: Units	Freq1: No Signal Hz		
ALG12: 0.094575 V	Calc 12: Units	Freq2: No Signal Hz	Advanced Status	
ALG13: 0.076329 V	Calc 13: Units	Freq3: INO Signal Hz	Restart Count: 3	Total Sectors: 8192
ALG14: 0.074535 V	Calc 14: Onits	Totals	CommSettings: 19200,N,8,2	Last Sector Written: 0004
ALGIS 0.637745 V	Calc 10: Units		A/D Version: 8:440	Last Byte Written: 0008
ALG17: 0.636147 V	Calc 17: Units	1: Not Configured None	Hrdw/Frmw Ver: 44   168.9	Serial Number: 2500
ALG18: 0.638770 V	Calc 18: Units	2: Not Configured None	RSSI: Modem: -1: On Remai	ining Alarm Lockout Time: 0
<u>[Refresh]</u> Download			Next Check-in: 01 Jan-2001 01:59:54 Modem State: Modem is idling and waitin	ng for calls (6)

Figure 1: The Data Dolphin Software's Status window

### **Refreshing the status window**

The information that the Status window displays is only valid at the time the window is opened or refreshed. As the actual measured levels are changing from second to second, the information in this window becomes less accurate and relevant as time goes by. Clicking on the "Refresh" button in the bottom right hand corner of the Status window will take a quick "snapshot" of all the inputs and operational parameters of the data logger.

### **Downloading the Data**

The data that is recorded by the data logger is stored in a permanent memory chip. Each record is timestamped and stored in the memory in a normalized database fashion that allows different inputs to be turned on and off without restarting the data logger.



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## **Reading SDI-12 Sensor Values**

A second window will open as shown below when SDI-12 is enabled and the Status window display is opened or refreshed.

DI-12 Manager				
Responses				
8.0				
		Read B	isponses	
			Close	

To read the attached SDI-12 sensors current values, press the "Read Responses" button. This will tell the data logger to poll the SDI-12 device for its current readings. Every time you press the button the progress will be shown if there is a measurement time remaining.

Se Se	nsor0 Status:Searching nsor1	
⊟—Se	Status: Measuring nsor 2 Status: Searching	



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Pressing the "Read Responses" button a second time will show the progress or, if there read is done, it will show the values.

Sensor 0	
Status: Searching	
Sensor 1	
Address Requested: 1	
Address Received: 1	
Measurement Time To	tal: 1
Measurement Time Re	maining: 0
SDI-12 Comm Version:	13
Vendor ID: IN-SITU	
Sensor Model: LT500	
Sensor Version: 206	
Vendor Description: 0	00030097
State: Standby	
Number Of Channels: 3	3
Channel 1: 13.4117	
Channel 2: 24.7078	
Channel 3: 30.9672	
Sensor 2	
Status: Searching	

Please note that in some cases SDI-12 devices need to be logging (set from their software) for the SDI-12 values to be updated.



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## Downloading the collected data from the data logger to your PC

All data downloaded from the data logger is stored on your computer in a binary cache file and in a site database (data logger *internal serial number*.mdb) that contains the time of the record and the record's value in both a raw and scaled format.

To retrieve the data from the Data logger's memory, first establish a communication session with the unit. Next, select "Download Latest Data" from the "Tools" drop down menu or click on the "Download" button in the Status window. The progress of the download can be seen beside the "Memory Use" gauge of the Status window and at the bottom of the main window on the progress bar.

The Data Dolphin software will then update the site database on your PC with the most recent data that the data logger has collected. To do this, the Data Dolphin software will compare the time of the last record in the site database with the time of the most recent data logger reading. It will then download all data collected between these two times.

### Data logger memory and site database conflicts

If the configuration of any your data logger inputs or settings have been altered since your last download, the settings stored in the site database on your computer and the settings in the data logger's memory will be in conflict. If this is case, the Data Dolphin software will not know which settings to apply to the new data that the data logger has collected, and the message box shown in Figure will appear. If you have altered them intentionally, click *Process with Dolphin settings* to use the settings in the data logger's memory. Click the *Overwrite DB settings* checkbox if you wish to overwrite the settings in your site database to reflect your new data logger configuration. If you have altered the data logger settings but still wish to process the new data using the old settings, then click *Process with Database Settings*. Whatever choice you make, click the *Ok* button to continue with the database processing.

Database an	d Dolphin Settings	Conflict	
t th	he settings in the exis an those from the Da	ting site databa ta Dolphin. The	se are different conflict is with:
Coefficient	1 of Input 11		
How do you	wish to process the	new recordings	from the Dolphin?
Proce	ss with Dolphin's sett	nas	
C Proce	ess with Data <u>b</u> ase set	ings	
C Overwrit	e <u>D</u> B Settings	<u>0</u> k	<u>C</u> ancel

#### Data Dolphin and database conflict message box



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## Loading the Data into Microsoft Excel

## **Exporting the Recorded non SDI-12 Data to a CSV File**

To allow greater flexibility in viewing the recorded data, an export function is available in the *File* drop down menu. By exporting the data to a CSV (Comma Separated Variable) file and then opening the file with a spreadsheet program such as Microsoft Excel, it is possible to analyze and manipulate the data in ways that are not yet possible with the Data Dolphin software.

#### Exporting the recorded data to a CSV file

1. Select *Export Data to CSV File* from the *File* drop down menu as shown in Figure 1 below.

🕫 D	)ata [	olphi	n			
File	Edit	View	Connect	Tools	Window	About
In	nport E	BIN File	s			-
E:	xport [	Data to	CSV File	8-		Ě
E:	xport A	Average	ed Data to	CSV File		pa
E:	xport E	BIN Set	tings to CS	V File		
Pr	rinter S	5etup	d.			
Pt	rint				Ctrl+P	
Pt	rint All					
E:	xit					
10						-

Figure 1. Export Data menu

2. Next, highlight the site or sites of interest by clicking on the site number in the sites list box. You can select multiple sites at once by holding down the Ctrl button as you click on the individual site numbers. You can also select a range of sites by selecting the first site in the range, depressing the shift key and clicking the last site in the range. You can also select a group of sites by selecting it from the Groups drop down list box above the site list.



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 Use the calendar control (Figure 2) to select the date range of the data to be exported. A separate CSV file will be created for each site that you have specified. Note that no CSV file will be generated if there is no data during your selected time period.

🕱 Export Data	
Sites	Report Period
Group: Selected Sites	August 2005 September 2005 🕨
1 1004	Sun Mon Tue Wed Thu Fri Sat 31 1 2 3 4 5 6 1 2 3
1006 1011	7 8 9 10 11 12 13 4 5 6 7 8 9 10
1036 1037	21 22 23 24 25 26 27 18 19 20 21 22 23 24 28 29 30 31 25 26 27 25 27 28 29 30 1
1064 1086 1091	2 3 4 5 6 7 8
1092 1142	1 00day. 571572005
1144 1155	Custom <u>Date</u> <u>From</u> : 9/15/2005 <u>Io</u> : 9/15/2005
1158 1172 1179	C Monthly 1
12	C Yearly All Months ☐ January ☐ May ☐ September
1229 1256	☐ February ☐ June ☐ October
	2005 🔽 🗖 April 🗖 August 🗖 December
	Eold days containing unaveraged data
	Export <u>C</u> ancel

Figure 2. Export site and date selection



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4. The 'Select Inputs to Export' input box (Figure 3) allows you to choose individual inputs of the sites or all of the recorded inputs at once by typing 'ALL'. If you wish to export calculated flow, enter input number 32. If there is no data for the time period you have selected in step 2 for a particular input, then that input will have a series of zeros entered into the CSV file.

🔳 Select Inputs To Expo	rt	×
■ Select Inputs To Expo Name Temp Rain Gauge RSSI	rt Description Input 11 Input 1 Counter CDPD	
<u>S</u> elect All	<u>D</u> K <u>C</u> ancel	

#### Figure 3. Selection of inputs to export



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After choosing the inputs, you must then enter the name of the file that will be used to store the exported data. You will have to enter a separate filename for each of the sites you chose in step 2. Each of the sites will be processed individually, always with a prompt for a CSV file name (see Figure 4). If you do not add an extension to the name, the default of 'CSV' will be added automatically.

Export Data Fo	Site '1229' As				? 🔀
Save in:	🛅 Sites		•	+ 🗈 💣 🎟 -	
My Recent Documents Desktop					
My Documents					
My Computer					
<b>S</b>		8			
My Network	File name:			- L	Save
1 10005	Save as type:	Text File (*.csv)		•	Cancel

Figure 4. Selecting filename for exported data



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An example of how the exported data might appear in Microsoft Excel is shown in Figure 5 below.

	Micro	osoft Exce	l - Test.CS	V														
:2	Eile	<u>E</u> dit <u>V</u> i	ew Insert	Format 1	ools <u>D</u> ata	Window	Help	Ado <u>b</u> e P	DF					Т	ype a questi	on for help		đΧ
1 D	2			ABC APL I	a	0 - 0		5 - AI	1 (15a 15	100%	- @		SpagIt	💓   Window				-
						-7 • (-	6	2 · Z •		100 %	•	= -	Unagit					100 -
		2 2 4	ک 🔝 🏷	8 💆 🖣	5 ( <b>1</b> ) (**	Reply with 9	hanges	End Ro	eview	÷								
Ar	ial		<b>-</b> 10 <b>-</b>	BI	u 🖃 🗐		\$ %	• •.0	.00		- 3	- <u>A</u> -						
<u> </u>	1.14	5 💌	fx										-					
		Δ	B	C	D	F		F	G	Н		1		K		M	1	
4	1	Date	Time	Temp (°C	1										-			<u>`</u> ^
	2	9/15/200	5 0:09:3	4 8.78184	4										2			
8	3	9/15/200	5 0:24:3	4 8.60294	4		1	1						1			1	
~	4	9/15/200	5 0:39:3	4 8.331641	1	2		1			1			1				
	5	9/15/200	5 0:54:3	4 7.605084	4												1	
abl	6	9/15/200	5 1:09:3	4 7.227688	3													Ξ
	7	9/15/200	5 1:24:3	4 7.933168	6													
	8	9/15/200	5 1:39:3	4 7.819676	3													
0	9	9/15/200	5 1:54:3	4 7.717288	3													
	10	9/15/200	5 2:09:3	4 7.310843	3						1			1				
	11	9/15/200	5 2:24:3	4 7.123569	3									<u>(</u>		0		
	12	9/15/200	5 2:39:3	4 6.870402	2													
5	13	9/15/200	5 2:54:3	4 7.17437	1										<u></u>	2		
₹	14	9/15/200	5 3:09:3	4 7.43524	4	-	- 12-			_				0			2	
1	15	9/16/200	5 3:24:3	4 7.350529	9									8		Į		
A	16	9/16/200	5 3:39:3	4 7.507663 4 7.502663	5		_				_						-	
	17	9/15/200	5 3:54:3	4 7.523334	2						_							_
	10	9/15/200	5 4:09:3	4 7.713287			-							2			- 12	
X	19	9/15/200	5 4:24:3	4 7.772992	4		6			- 6			2		5	2	6	_
16	20	0/15/200	5 4.35.3 5 4.EA-2	4 7.73102* 4 7 ECEEEL	+ =			8								5		—
	21	9/15/200	5 5:09:3	4 7.505555	- a									2	2	2		
	23	9/15/200	5 5.24.3	4 7.556265	7					-			2				-	_
	24	9/15/200	5 5:39:3	4 7 752658	3												Ť.	_
	25	9/15/200	5 5:54:3	4 7 737274	4												-	-
	26	9/15/200	5 6:09:3	4 7.725182	2												12	
	27	9/15/200	5 6:24:3	4 7.794874	4			1								1	1	
	28	9/15/200	5 6:39:3	4 7.69882	1	2	1	1			1			1				_
	29	9/15/200	5 6.54.3	1 7 782384	5						_					1	1	~
	IN A	I F HI/I	est /								<	J					_	>
Dr	aw ₹	Autos	hapes 🔹 🔪	V D C	) 📤 📲 :	ै 🚨 🔏	- 🖏 -	· 🚄 + 🛓	<b>↓</b> - =	≡ ₽		Ŧ						
Rea	dy															NUM		

Figure 5. Exported data in Excel



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## **Viewing SDI-12 Data in Microsoft Excel**

There are three different way to view SDI-12 data.

## Method 1

🖌 Data Dolphin 2	Connect Tools	Window About					
600 T Status Se	tup Graphs	508-12	Options Car	cel Disconnect			
					10.2	Not Connected	10/01/2012 11:57 AM



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## Method 2





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## Method 3



This will open the following dialog where you can select a SDI-12 file to view.



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Once the file is selected click the open button and the file will be opened by Windows. Please note that if nothing is displayed make sureMicrosoft Excel is installed on your computer. If you do not have Excel you may open it with any text editor such as Notepad.

0	n	) <del>-</del>				
C	Home Ins	ert I	Page Layout	t Formul	as Data	a Revie
Pa	Clipboard	ter B	al <u>IU</u> ~	• 10 •	A A   • <u>A</u> •	= = <mark>-</mark> E = 3
	M8 -	• (9	fx			
	A	В	С	D	E	F
1	Date/Time	Device	Sensor 0	Sensor 1	Sensor 2	
2	05/01/2012 20:46	2	24.039	-0.05481	0	
3	05/01/2012 21:00	2	24.001	-0.06278	0	
4	05/01/2012 21:15	2	23.886	-0.056196	0	
5	05/01/2012 21:30	2	23.775	-0.049696	0	
6	05/01/2012 21:45	2	23.667	-0.061397	0	
7	05/01/2012 22:00	2	23.553	-0.06487	0	
8	05/01/2012 22:15	2	23.445	-0.052614	0	
9	05/01/2012 22:30	2	23.338	-0.05556	0	
10	05/01/2012 22:45	2	23.247	-0.0659	0	
11	05/01/2012 23:00	2	23.174	-0.057826	0	
12	05/01/2012 23:15	2	23.094	-0.06312	0	
13	05/01/2012 23:30	2	23.018	-0.052071	0	
14	05/01/2012 23:45	2	22.947	-0.039259	0	
15	06/01/2012 0:00	2	22.881	-0.05245	0	
16	06/01/2012 0:15	2	22.828	-0.047256	0	
17	06/01/2012 0:30	2	22.747	-0.051519	0	
18	06/01/2012 0:45	2	22.706	-0.038263	0	

#### Opening the file in Notepad.

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## **Graphing the Recorded Data**

A powerful feature of the Data Dolphin Software is the ability to graph the recorded data.

(SDI-12 Data can be viewed in Excel only)

The data to be graphed is selected using the calendar selection window. Application specific graphs and tables can be generated using Optimum's accessory software packages. *PumpPro* software is used to produce pump station specific graphs and tables while *Rain Reporter* is used to generate rainfall intensity and IDF graphs and tables.

#### Graphing Functionality in the Data Dolphin Software

#### The Graph window

Click on the *Graphs* button on the tool bar or alternatively choose *Graphs* from the *View* drop down menu. This will open the *Graph* window, as shown in Figure 6 below:

🚧 Graphs	×
Sites	Report Period
<u>G</u> roup: Selected Sites	August 2005 September 2005
1 1004 1006 1011 1036 1037 1064 1086 1091	Sun Mon Tue Wed Thu       Fri       Sat         31       1       2       3       4       5       6         7       8       9       10       11       12       13       4       5       6       7       8       9       10         14       15       16       17       18       19       20       11       12       13       14       45       16       17         21       22       23       24       25       26       27       18       19       20       21       22       23       24         28       29       30       31       25       26       27       28       29       30       1         2       3       4       5       6       7       8       9       10         28       29       30       31       25       26       27       28       29       30       1         2       3       4       5       6       7       8       7       8
1092 1142 1144 1155 1158 1172 1179 12 1218 1229 1256 <	<ul> <li>Custom Date Erom: 9/15/2005 Io: 9/15/2005</li> <li>Weekly</li> <li>Monthly</li> <li>Yearly</li> <li>All Months</li> <li>February</li> <li>May</li> <li>September</li> <li>October</li> <li>March</li> <li>July</li> <li>November</li> <li>December</li> </ul>
	Make Graph

Figure 6: The Graph window



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The *Graph* window consists of two distinct sections:

*Sites:* This box lists the unit numbers of sites that have a site database. A site database is automatically created when the raw data is retrieved from the Data Dolphin.

*Report Period*: This box allows the user to specify a specific time period to be reflected in the generated graphs.

Generating a graph of site data is a simple process of selecting the site for which you want to generate a graph and then a time period for that graph. Follow the steps for successful graph creation:

- 1. If you want to generate graphs for a designated group, choose the group name in the *Group* drop down box and a separate graph will be generated for each site defined in the group. Note that the selection box will be grayed out if you have not created any groups. Pick Selected Sites in the drop down box if you wish to generate a graph for a specific site.
- Select the site or sites for which you want to generate a graph by clicking on their numbers. Hold down the CTRL key while selecting the site numbers to select multiple sites. A separate graph window will be generated for each site you select.
- 3. Now select the time period for your graph(s). The *Graph* window's intuitive time controls allow the user to quickly specify time periods.
  - a. Click on the *Yearly* option button with your mouse if you want to graph the data for a specific year. When you click on this button, only the year combo box will be enabled near the bottom of the *Graph* window. Click on this drop down box to choose the year you wish to graph.
  - b. Click on the *Monthly* option button to specify a month or months. The Month check boxes to the right of the year drop down box will be enabled when the *Monthly* option button is selected. Clicking the *All Months* button will place a check in all of the month check boxes.
  - c. Click on the "Weekly" option button to pick a specific week in the year. The month and year controls will be disabled, and the calendar control and week controls will be enabled. The week controls consist of two drop down boxes as shown below in Figure 7:



Figure 7: Week controls



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- d. The first control selects the number of weeks, and the second control selects which week from a 52-week year to begin graphing. You can enter the desired values into these boxes with your keyboard, the mouse or by clicking on the calendar control above. Click on the *Custom Date* option button to graph a specific time range outside regular week and month boundaries. You can specify the dates by clicking on the *From* and *To* text boxes and entering the dates in your system date format. Another, more intuitive method would be to use a click and drag operation on the calendar control (see below).
- e. Calendar control A time period may be selected on this control by simply using a select and drag method. A month can be quickly selected by clicking on the month text to reveal a pop-up menu as shown below in Figure 8. You can also rotate through the months by clicking on the arrow buttons in the upper left-hand and right-hand corners.

🖓 Graphs	
_ <u>S</u> ites ⊟	
<u>G</u> roup: Selected Sites <u>▼</u> 1 1004 1006	September 2005         October 2005           January         ad Thu Fri Sat         Sun Mon Tue Wed Thu Fri Sat           35         February         1         2         3         39         1           36         March         8         9         10         40         2         3         4         5         6         7         8
1011 1036 1037 1064 1086 1091	37       April       75       16       17       41       9       10       11       12       13       14       15         38       May       22       23       24       42       16       17       18       19       20       21       22         39       June       3       29       30       43       23       24       25       26       27       28       29         July       July       05       005       005       005       005       005
1092 1142 1144 1155 1158 1172 1172	August         September         C       October         n:       9/4/2005         jo:       9/10/2005         Io:       9/10/2005         November       ✓         Notember       ✓         Veeks starting at week:       36 ✓
1173 12 1218 1229 1256	▲II Months       January       May       September         ▲II Months       February       June       October         2005       April       August       December
	Eold days containing data
	Make Graph Cancel

Figure 8: Graph selection with month drop-down



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- f. A year control can also be exposed by clicking on the year text. A scroll control will appear, to allow you to scroll up and down through the years.
- g. The calendar control is only enabled for the *Weekly* and *Custom Date* options. In the *Weekly* option, a week or group of weeks can be selected, depending on the value set in the *Weeks* drop down box. For example, if a 3 is entered into this combo box, 3 weeks will be selected at a time. To select a week or group of weeks, simply click on any day of the week(s) you wish to graph on the calendar control. They will instantly be highlighted and the combo boxes below will be updated to reflect this selection.
- h. When using the *Custom Date* option, click and drag functionality is enabled on the calendar control allowing you to pick a specific day or days within the two months currently being displayed. To specify a time range, select the start day by clicking on it, hold down the shift key and then select the end day.
- i. For your reference, the current day is shown on the control with a red marker circle and printed in the bottom left-hand corner of the calendar control as shown in Figure 6.
- 4. Click *Make Graph*. This will bring up the input selection box, shown in Figure 9 below. After the sites and date range has been selected, the inputs to be graphed must be chosen. The inputs can be selected separately (1,3,8), sequentially (1-4) or all at once (ALL). If you wish to export calculated flow, enter input number 32.

I Select Inputs To G	iraph	
■ Select Inputs To G	Description Input 11 Input 1 Counter CDPD	
<u>S</u> elect All	<u>O</u> K	cel

Figure 9. Selecting the inputs to graph



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5. Click *OK*. Your computer will begin processing the data for the sites, time period and inputs you have specified. The progress of the current data processing operation will appear on the progress and status bars. When complete, a window similar to the one below in Figure 10 should appear.



Figure 10: Graphing output window

- 6. If you do not get a graph window after following steps 1-4 above, then it is likely that the site database contains no valid data for the time period you specified.
- 7. To find the value of any point on the graph, simply hold your mouse pointer over the point, and the time and intensity values at that point in time will be displayed below the graph as shown in Figure 11.



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Figure 11 : Graph output with cursor data display

### Advanced Graphing Options

For more advanced control of your graph window, you will want to open the **2D Chart Control** *Properties* window.

To open this properties window, simply right-click with your mouse pointer on any *Graph Output* window. A small pop-up menu, similar to the one displayed in Figure 13 will appear.



datadolphin.com emailalarm.com optinst.com viewdatanow.com \_ 🔏 Data Dolphin 2 Edit Options \*<sup>2</sup> Etherne 60 T 9 Cancel ۲ CDPD X XTend 43 **(** CDMA 123 Sample Data 01/04/2004 - 20/05/2004 Print Site: 123 Sample Data - Mouse Creek Print All Graphs April 1 to May 20, 2004 Properties. 2.6 2.4 2.2 2.0 1.6 1.4 Apr 15 00:00 Apr 29 00:00 May 13 00:00 Time Depth (m) To zoom graph: Left click and drag while pressing Shift. Press 'r' to restore. COM2 18/11/2010 7:06 PM

Figure 12. Right click the graph to expose the graph properties

Next, select and click *Properties*. This will open the **2D Chart Control Properties** window, as shown in Figure 13. For help on using this properties window, click on the *Help* button in the bottom right hand corner. Note that any changes you make in the **2D Chart Control Properties** window will only apply to the current graph you are modifying. These changes will be lost as soon as this graph is closed.



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Figure 13: Advanced graph properties

### Printing Graphs

The Data Dolphin Software provides three different ways to print a graph. Print a graph by

- 1. Clicking on a graph so that it is selected as the current graph. Then click the Print button on the toolbar. The graph will be printed by your system's default printer.
- 2. Selecting a graph to print, and then selecting *Print* under the *File* drop down menu.

3. Right clicking on the graph you wish to print, and selecting *Print* from the pop-up menu. To print multiple graphs, make sure the graphs for all the sites you wish to print are open. Next, select *Print All* from the *File* menu **OR** right click on a graph and select *Print All Graphs* from the pop-up menu to print all the currently open graphs.



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### **ViewDataNow**

VDN is going to be getting a bit of a facelift and we want to just give everyone a heads up, as well as take a look at how to navigate through the site and use some of the new features.

### Main Welcome

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Viecome to the latest version of ViewDataNow.   Our goal is to provide access to your data in a clear, efficient, visual, and informative way.   See your sites and get what you need. Now.     Email   Bassword   Sign in   Forgot your password?   Not registered? Contact us!	VDN5.1 VIEWDATANOW HOME	OPTIMUM INSTRUMENTS INC NEED HELP? CALL USI 780.450.0591
See your sites and get what you need. Now.  Sign in  Forgot your password? Not registered? Contact us!	VIEWDATANOW5 Welcome to the latest version of ViewDataNow. Our goal is to provide access to your data in a clear, efficient, visual, and informative way.	Email Password
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Log in with your e-mail and password. If you forgot it you can follow the "Forgot your password?" link to have a reset code sent.

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### We're in!

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As usual green data loggers have made their check-in, orange have missed a few, and red data loggers have been missing for over a day. Loggers can be marked as inactive or under construction and will be a teal color. You can use the toolbar in the middle to filter based on status.

Some menus contain sub menus.



Just hover over the items with your mouse to see the available sub-menu choices.



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Above the data logger tiles area is a menu that allows one to filter by the various sites they have.



For example, selecting the filter for the data loggers that are under the Kearl Lake Site will hide the McClelland Lake data loggers and only show unit 2444 in this case.



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## **Site Page**

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							OPTIMUM INSTRUMENTS INC NEED HELP? CALL USI 780.450.0591	
VIEWDATANOW	SITES	MCCLELLAND LAKE	ADMIN	PROFILE	HELP	SIGN OUT		
5. 2	Mc	Clelland Lake					Optimum Instruments	
-shee							Server Time: 2013-10-25 15:28:16 -0600	
					REPORTS			
Site Alarms								
								Ξ
😃 Left Bank (2420) - Extern	al power dropp	ed below 11.5 V with a valu	e of 11.301 at 20	13-10-24 16:55	:25. Check b	attery health and p	power connections!	
							(Show History)	
LIVE ACTIVE ALARMING	LATE CHECK I	N MISSED CHECK IN IN/	ACTIVE CONSTR	RUCTION				
2415 Southw	est Weir	DD-400-SDI	Ext Power: 14.0	1 V 2013-1	0-25 02:35:1	4 PM (-63 dBm)	Alg Graphs   Diver Di501 Graphs   Settings	
2416 Well 12	30	DD-400-SDI	Ext Power: 14.04	4 V 2013-1	0-25 02:32:3	7 PM (-65 dBm)	Alg Graphs   Diver Di501 Graphs   Settings	
2417 Northe	ast Weir	DD-400-SDI	Ext Power: 13.8	2 V 2013-1	0-25 02:51:0	9 PM (-81 dBm)	Alg Graphs   Levellogger Edge Graphs   Settings	
2419 Right B	ank	DD-400-SDI	Ext Power: 13.8	3 V 2013-1	0-25 03:03:1	3 PM (-65 dBm)	Alg Graphs   Solinst 1234 Graphs   Settings	
SDI12 2420 Left Ba	nk	DD-400-SDI	Ext Power: 14.0	2 V 2013-1	0-25 02:42:5	6 PM (-81 dBm)	Alg Graphs   Solinst 1234 Graphs   Settings	
2423 Well 12	49	DD-400-SDI	Ext Power: 13.9	V 2013-1	0-25 02:51:5	4 PM (-65 dBm)	Alg Graphs   Levellogger Edge Graphs   Settings	
د 2425 Well 13	92	DD-400-SDI	Ext Power: 13.9	4 V 2013-1	0-25 03:18:4	1 PM (-81 dBm)	Alg Graphs   Solinst 1234 Graphs   Settings	
د 2429 Well 11	84	DD-400-SDI	Ext Power: 14.0	5 V 2013-1	0-25 02:48:4	9 PM (-67 dBm)	Alg Graphs   Solinst M100 Graphs   Settings	
د 2434 Well 11	74	DD-400-SDI	Ext Power: 13.9	9 V 2013-1	0-25 03:00:1	2 PM (-65 dBm)	Alg Graphs   Solinst M100 Graphs   Settings	
د 2435 South F	Pier	DD-400-SDI	Ext Power: 13.94	4 V 2013-1	0-25 03:20:3	2 PM (-69 dBm)	Alg Graphs   Solinst M100 Graphs   Settings	
2436 Main O	ffice	DD-400-SDI	Ext Power: 13.9	8 V 2013-1	0-25 03:28:5	8 PM (-63 dBm)	Alg Graphs   Solinst M100 Graphs   Settings	
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Data loggers that belong to the site appear on the site page.

Further below is a map of the data loggers in the site (not shown)



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# Data logger Page



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Here you will see some details about your unit, and some preview graphs of the sensors connected. The legends for the graphs are clickable in order to toggle which parameters are shown in the graph area. Guest users will not be able to access the settings areas of the page.



datadolphin.com emailalarm.com optinst.com viewdatanow.com Graphing 💮 ViewDataNow | David Smelquist | 2409 + OPTIMUM INSTRUMENTS INC. - NEED HELP? CALL US! 780.450.0591 **VDN5.1** SITES MCCLELLAND LAKE ADMIN PANEL HEI P PROFILE SIGN OUT David Smelquist 2409 DD-400-SDI **Example Site** Start Date Finish Date 2012-10-29 12:35:30 -0600 2012-11-05 12:35:30 -0700 External Power [V] RSSI [dBm] Set Y Axis Minimum to Zero? Generate Graph Generate .CSV Example Site - 2409 \*Clic 14 13.75 13.5 - External Power 13.25 13 12.75 01:00 02:00 03:00 07:00 09:00 10:00 11:00 12:00 04:00 05:00 06:00 08:00 Name Minimum Maximum Mean Median Variance Std Deviation External Power 12.9365 13.9046 13.199158 13.03865 14.399082 3.794612 © 2012. OPTIMUM INSTRUMENTS INC. ALL RIGHTS RESERVED. OPTIMUM INSTRUMENTS WEBSITE CONTACT ABOUT

Select your inputs by clicking on them to shift from the Available Inputs to the Selected Inputs. You can then set your date range for the graph or csv export, and if you wish click the checkbox indicating you want to view your graph with a minimum y-axis value fixed to zero.

At the bottom are some additional statistics on your sensor inputs.

Analog and SDI-12 graphing and exporting both work in the same way.



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### **Data logger settings**

				OPTIMUM INSTRU	IMENTS INC NEED HELP? C	ALL US! 780	450.0591
VIEWDATANOW SITES MCC	LELLAND LAKE	ADMIN PROFILE HELP	SIGN OUT				
dit Datalogger: 2420							
Data Dolphin	Data Logg	ger Inputs (3 Active)					
Init Name (blank for none)	Inactive inputs w	vill show for 14 days after being turned off.	Inputs will automatically sh	ow up again when being	data is being logged.		
	SDI12 Input:	Address 0, Channel 1 - Temperatu	re (°C) [active]	Show in preview?	As? Line 💌	Axis #	0 -
Vatched input	SDI12 Input:	Address 0, Channel 2 - Depth (m)	[active]	Show in preview?	As? Spline	Axis #	2 •
7	Analog Input:	Channel 7 - External Power (V)	[active]	Show in preview?	As? Line 💌	Axis #	0 -
atitude							
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-111.3093566895 show Preview Graph? 2  a  a  a  a  a  a  a  a  b  b  b  b  b  b  b  b  b  b  b  b  b	ew Alarm				Update C	Cancel	

Here you can change the model type, address, and the lat/long for your data logger. Lat/long takes priority over address and is used for placing icons on the map. As well you can toggle the preview graphs that show up on the data logger page.

Flagging a data logger as under construction or parked for winter removes it from the top menu list and is indicated by a teal color icon. This keeps it separate from the currently running sites.



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## **SDI-12 Sensor Settings Page**

<b>VDN5.1</b>	01750								
VIEWDATANOW	SITES	ADMIN PANEL	PROFILE	HELP	SIGN OU				
Edit SDI-12 So 2409	ensor foi	<sup>r</sup> Data Logger					Decommissio	on Device	
Model Name		Parameter 1			Use these paran	neters to let the o	data logger know how	you programme	d
Sensor		Water Pressu	re [cmH2O]	-	graphing, and ex	porting data.	ipuoris will be used w	men displaying,	
Model Number		Parameter 2							
SDI12		Temperature [	°C]	•	Hydrolab	In-Situ Y	SI DIVER S	Solinst	
Serial Number		Parameter 3							
1234		Cond [mS/cm]		•	Input Name				
Transmitter Address		Parameter 4			Pressure [c	:mH2O]			
0		Air Pressure [	cmH2O]	•	Temperatur	re [°C]			
		Parameter 5			Conductivity	/ [mS/cm]			
		Water Level [c	:mH2O]	•			10.01		
		Parameter 6			Atmosphen	ic Pressure (cm)	H2U]		
				-	Water Level	I [cmH2O]			
		Parameter 7							
				•					
		Parameter 8							
				•					
		Parameter 9		_					
				•					
		Parameter 10		_					
				•					
							Update	Cancel	

Some of the details for your sensor can be changed from here. This page also allows you to set up a custom alert for the sensor, as well as a link to decommission the SDI-12 sensor if it has been disconnected, or another took its place and you don't want the data to get mixed up.



datadolphin.com viewdatanow.com emailalarm.com optinst.com **The Big Red Button** \_ **D** \_× 💮 ViewDataNow | Decommission SDI-12 Se... 🕂 OPTIMUM INSTRUMENTS INC. - NEED HELP? CALL US! 780.450.0591 **VDN5.1** ADMIN PANEL PROFILE HELP SIGN OUT Decommissioning on Datalogger 2409: Sensor SDI12 at SDI-12 Address 0 with Serial Number 1234 **CAUTION! Verfiy the Date!** In order to correctly decommission this sensor you will Enter When the Sensor was have to enter in a time after it was disconnected, but Removed: before another sensor was put in its place. 2012-11-05 16:47:50 This helps ViewDataNow by ensuring the old data isn't grouped with the new when a replacement sensor shares the same SDI-12 address. Cancel © 2012. OPTIMUM INSTRUMENTS INC. ALL RIGHTS RESERVED OPTIMUM INSTRUMENTS WEBSITE CONTACT ABOUT



datadolphin.com optinst.com emailalarm.com viewdatanow.com **Manage users** ( ViewDataNow | David Smelquist + OPTIMUM INSTRUMENTS INC. - NEED HELP? CALL US! 780.450.0591 **VDN5.1** ADMIN PANEL SITES PROFILE HELP SIGN OUT **David Smelquist**  $^{\odot}$ **Optimum Instruments Inc.** ta Dolohir Invite a new user under your supervision that that can be given David Smelquist's Managed Users (7 Users) read only access to your dataloggers User Name E-mail Address After they have been created, simply edit the user and select Photo which dataloggers you want to share! David Smelguist (edit) | You david@optinst.com 0 Last seen: 2012-11-05 16:44:21 0 Demo User (edit) I Delete david@datadolphin.com Last seen: 2012-09-07 14:28:38 Susan Smelguist (edit) | Delete susan@optinst.com 0 Last seen: 2012-09-05 12:44:37 Ken Smelquist (edit) | Delete ken@optinst.com 0 Last seen: 2012-08-31 08:25:18 Allan Smelqu uist (edit) | Delete allan@optinst.com 0 Last seen: 2012-08-02 09:08:20 Robert Gagnon (edit) | Delet robg@optinst.com C Last seen: 2012-07-03 13:59:59 0 Jay Holterhus (edit) | Delete jayh@optinst.com Last seen: © 2012. OPTIMUM INSTRUMENTS INC. ALL RIGHTS RESERVED OPTIMUM INSTRUMENTS WEBSITE CONTACT ABOUT

You can add and edit users that are under your control. Simply click the edit button on a user to get to their profile page in order to give them access to some of your data loggers.



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Firefox <b>v</b>	ser +										
							OPTIMUM INS	STRUMENTS INC NEED HELP	? CALL US! 780.45	0.0591	
	VIEWDATANOW	SITES	ADMIN PANEL	PROFILE	HEL	P SIGN	DUT				
	U D	liting Us emo Use	ser r						Change Picture		
	Your Name*		Select the dataloggers this user can see								
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	Company		2417	*		2426					
	Example Company		2418			2427					
	Email		2419			2429					
	david@datadolphin.com		2421			2430					
			2422			2431					
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In the same way as selecting inputs for graphing and exporting you can click on data logger serial numbers to add them to the user you wish to share them with.



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Updating the Firmware

## Optiloader

Note the COM port that you have connected to the Data Dolphin logger.



Now that the cable is connected to the unit we can start "OptiLoader.exe" program.

OptiLoader can be found on the website, <u>www.datadolphin.com</u> in the Support and Downloads section. The firmware upgrade file will be provided to you by Optimum Instruments. Start up OptiLoader now by double clicking on the exe from where you have downloaded it to.



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🖋 AES Boot Loader 🛛 🗾 📈									
Download									
- Device									
Aspire Modem									
Aspire Modem AVC System									
Data Dolphin Browse Mass Customization									
Motorola Modem Multiplexor									
PG5100 Quik-Tie Fieldbox									
Quik-Tie Master									
Indata Fimware									
,									

Under Device select 'Data Dolphin' to be upgraded.

The bottom portion of the dialog contains a status box where status information is displayed. The box is read only and displays status information with the most current message at the top. Prior messages can be read by clicking in the box and navigating with the arrow keys.



#### Usage

- 1. Select the "Data Dolphin" setting for the **Device** to boot load.
- 2. Select the firmware file that is to be boot loaded into the device by clicking the **Browse** button and clicking **open** once you have located it on your computer.
- 3. Select the **Comm** Port (from Device Manager Ports Com) that is connected to the device. The application will detect all valid com ports on the computer.
- 4. When you are ready, cycle the power on the data logger and press **Update Firmware**.


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5. The internal clock of the data logger will count down 8 seconds. It is during this time that the Update Firmware button must be pressed. If the 8 second boot load window passes, the Data Dolphin will start up for normal operation, and the logger will have to be reset to restart the boot load process again.

Successful start of a boot load will be indicated by the progress indicator that appears above the **Update Firmware** button as well as in the status box at the bottom of the application. When the boot load completes (100%) the Data Dolphin will be restarted automatically.

6. Close the OptiLoader program by clicking the 💹 button in the top-right corner.



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# **Troubleshooting the DLS-400**

# **Flow of Data**

The flow of data through the system originates as a voltage at the level transmitter probe. This voltage is read by the logger, at programmable set intervals, this stored data is sent as a message via satellite. This message is received and transferred into a database where the values can be read on the ViewDataNow website.

#### **Check List**

- ALWAYS make sure the Antenna is properly connected BEFORE power Is applied
- Has the antenna been installed with a good clearance?
- Voltage is lower than expected across battery/solar panel/logger? See how to measure it below.
- LEDs on solar charger not as expected? Fault LED should be off and the charge LED will be on if there is sun shining on the solar panel
- LEDs on logger not as expected? The LED next to the green power connector should flash red for a short amount of time (10 to 60 seconds) after power up - then flash green and/or go out once it has contacted the server and had its clock set.
- LEDs on modem not as expected? See section above for all of the LED combinations and what they mean.



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# **Check Antenna Connector**

Is the connection between the Satellite Communicator and the lightning arrestor tightly screwed in? The back of the N connector may have become loose. Shown below is the back fully un screwed. This gold pin needs to be fully inserted into the back of the N connector and tightened fully.







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# **Check DC Power**

Has power making a good connection between the battery, solar panel controller, and logger? Measure the voltage across the logger power 6-25 VDC IN and Ground terminals. You should see between 11.5 VDC to 13.5 VDC. To measure the power to the processor use a multi-meter set to volts DC and put the probes on the green power connector as shown. Check this location with the system running on solar only, as well as with the battery terminals connected to ensure the SMC-02 is working correctly.



Measure the voltage at the solar panel connection. You should see between 14 VDC to 21 VDC if the sun is shining.



Disconnect the solar panel and check that the system runs on just battery power as well in the case of a battery not holding any charge and in need of replacement.



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### **Check Level Transmitter**

Has the Level Transmitter been connected correctly? The probe will have a label similar to the following:



The wire colors and connection is listed on this label. See the section "Level Transmitter – Analog output" wiring section in this manual.

The depth can be verified by measuring the voltage on the Level Transmitter as follows:

Cycle power to the data logger. Just when the red LED that is flashing beside the power connector stops flashing and turns green, read the DC voltage across the white and black wires



Given the voltage, the depth can be calculated using the formula:

Depth = voltage measured on the probe above \* (range of Level Transmitter as it appears on the label attached) / 2.5. For example, with a voltage reading of 0.3 V and using a Level Transmitter labelled as having a 4 MH2O range we would expect a depth = 0.3 \* 4 / 2.5 = 0.48 meters of water.

Calibration sheets can be retrieved from http://www.datadolphin.com/support



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#### **Compliance Statement**

Operation is subject to the following two conditions: (1) This device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Specifications and operational details subject to change without notice.

Printed in Canada

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Optimum Instruments Inc. #201, 3132 Parsons Road Edmonton, Alberta, Canada, T6N 1L6