

QUICK-START GUIDE

Configuring the SignalFire (SF) Sentinel Node to Work with TempSens™ or a Model 2100 Digital Level Sensor (DLS)



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Configuring the SignalFire (SF) Sentinel Node to Work with TempSens[™] or a Model 2100 Digital Level Sensor (DLS) – Quick Start Guide

Installation Instructions

The SignalFire Sentinel Node should ship as a complete unit that includes the radio core, the housing, mounting hardware with integrated pig-tail, and the integrated battery. The PT-SF pig-tail is pre-wired into the terminal strip on the radio with the proper connections on the MODBUS Terminal for PWR, GND, and 2-wire RS-485 (MB_A and MB_B).

Note: If the SF Node does not have the mounting hardware attached, it will need to be wired and assembled in the field. To install the mounting kit, perform the following steps.

1. Remove the 4 Phillips head screws from the SF Sentinel housing.



2. Pull up on the metal bracket that holds the battery and PCB, using both hands, leaving the base plate.



3. Apply thread sealant to the mounting kit's ½" SS pipe threads.



4. Screw the assembly together and tighten.





- 5. Insert the PT-SF wires into the mounting assembly starting from the 1" union.
- Connect the PT-SF wires to the MODBUS Phoenix connector (Red and Black pair go to PWR and GND respectively, Black pair goes to MB_B and White & Green pair go to MB_A). Note: The connector may need to be removed for wiring.



7. Route the wires to the left side of the PCB closest to the Phoenix connector for MODBUS. Connect to the Phoenix connector on the PCB and verify the wiring connections are in the proper locations



Press the metal bracket back onto the support studs on the mounting plate.
 Caution: The coiled antenna in the center of the board is easily damaged. Only press from the bracket, not the board.





9. If ready to be installed or configured, connect the battery connector to the connector labeled "LITHIUM BATTERY".



Configuring the SF Sentinel Node to communicate with TempSens[™] or a Digital Level Sensor

Follow the steps below to successfully configure the SF Sentinel Node to communicate with a TempSens[™] or a Model 2100 Digital Level Sensor.

 Install and use the SignalFire Toolkit (v2.2.30.00) software to configure both the gateway and Sentinel. The SignalFire Toolkit is available from the Resources section of the SignalFire website <u>https://www.signal-fire.com/resources/</u>



2. Connect a computer to the Sentinel via the TTL cable provided by SignalFire (USB Serial-4Pin).



3. <u>Connect the Sentinel's battery</u>, if it isn't connected.





4. Launch the SignalFire Toolkit Software.



- 5. Select "Refresh" and then select the COM Port from the drop-down menu.
- 6. Select "Auto-Detect Device on COM Port." If successful, a configuration window will pop up with "Sentinel Modbus with 2DI" as the window name.

								Firmware	Update	Avai	i la
			Reported Ser	sor Values			_				
COM Port: COM15	▼ F	Refresh	Address	Description			Valu	je			
COM1	5 Open		3010-3011	Counter1 (co	(etcu)		Link	nown			
		-	3012	Counter1 Sta	te		Unk	nown			
Open Q	ose	ffine	3013	Ava, Frea1 (h	Hz x10)		Unk	nown			
			3014	Inst Freq1 (H	1z x 10)		Unk	nown			
Connec	t/Update		3015	Counts/Minut	te1 (x10)		Unk	nown			
Den du est	MODBILE	201	3016-3017	Counter2 (co	unts)		Unk	nown			
Node Name DLS 1		3018	Counter2 Sta	te		Unk	nown				
Radia Connectivity Connected 31d		3019	Avg. Freg2 (H	Hz x10)		Unk	nown				
Hainboard Vertico	0.59	1-010	3020	Inst, Freq2 (H	Iz x10)		Unk	nown			
Radio Version	2.51 (elase	(pair	3021	Counts/Minut	te2 (x10)		Unk	nown			
Radio Address	29932	160.00	65523	Status Regist	ter		Unk	nown			
Comorate ID	Encounter	da l	65532	Battery Voltag	ge (mV)		Unk	nown			
Radio Mode	Unknown									-	-
Radio Network	0		1000	Upd	date Report	ed Sensor Va	lues				
Badio Network Groun	0									r.	
Radio Power (dBm)	14		Modbus Prog	ram Steps							
Theckin Interval	1 minute		Raud Rate	× 0039	Command	Timeout (ma)	1000	-			
State Change Checki	0 00			0000	Communia	ranoour (na)	1000		Find 5	Sensor	ċ.
Modbus Baud Bate	9600		UART Mode	a 8N1 👻	Command	Pause (ms)	100	-	Mode	ius ID	
Modbus UART Mode	8N1										
Command Timeout (m	s) 1000					[ouble-clic	k on Statu	s for regi	ster vie	e
Command Pause (ms	100			5	1	Register	0.1	Register			T
Sensor On Time (sec	0.5			Function Code		Address	Count	Size	Sta	stus	ľ
Sensor Power Mode	HIGH		▶ 1 0x0	3 - Read Holding Reg	jister 💌	3996	2	16-bit	+ Unk	nown	l
Cat Encountion Key		Hala	2 0x0	3 - Read Holding Reg	ister •			16-bit	+ Unk	nown	1
Earthle Essentia		[Help]	2						- 11-1		ł
Enable Encryption	1	Cat							• •		
Key: signaff	re	Set	4		- 10 (1				• 173		Į,
inoj, orginali			5		- 10 C				• 110		
Settings			6						•		l
Node Name DLS	1	Set	-						- Parties		ł
			/		1997 (1		-		• 1000		ł
Radio Mode Sleep	ng 🔻	Set	8		. 10 F				• 175		l
Pada Naturada	0 -		9		10 P				• 177		
Hadio Network	U	Set	10						- 12-2		l
Radio Network Group	• 0 •		10								ł
			11		14 J.				• 873		l
Checkin Interval 1	minute 🔻	Set	12		- 10 M				• 0.0		
Slave ID	1	Set	13	3 Read Holding Rea				Sht	. 673		
	_						Class		D	-	
Sensor On Time (sec	0.5	Cat	Read Steps	write Steps			Table		Program	Steps	
		Set	nom berun	u Seruher					and a second	and a large	1
Sens	or Always On										
Sens	or Always On					Register Add	essing Ma	de			
Sensor Power Mode	or Always On HIGH 💌	Set	Load Steps	Save Steps	ĩ i	 Register Addr Zero Base 	essing Mo	ode sing: 40001	is enter	ed as	0
Sensor Power Mode	HIGH V	Set	Load Steps from File	Save Steps	Ĩ	Register Add Zero Base	essing Mo d Address	ode sing: 40001	l is enter	ed as	0

7. From the Settings Tab, Configure Sentinel for the DLS by selecting "Configure Sentinel for Electrolab DLS2100" and accept changes.



🛉 Sentinel Modbu	s with 2DI		1.0		/
File Options	Settings	Updates	Tools	Help	
	State	e Change La	tch Settin	gs	
	Digit	tal Input Del	ounce		
COM Port: CON	Set E	ncryption K	ey Unrec	overable	
CO	Con	figure Sentir	nel for Ele	ctrolab DLS2100	

8. The following pop-up will appear. Accept the changes.

Configure S	Sentinel for Electrolab DLS2100	and the second second	
?	Are you sure that you want to configure DLS2100?	the Sentinel for the	e Electrolab
	The following settings will be changed:		
	- Radio Mode: Sleeping - Checkin Interval: 2 minutes - Sensor On Time (sec): 0.25 - Sensor Mode: HIGH - State Change Checkin: On - Program Steps: Read Holding Registers 3990: Float1 (Top Float) 3991: Float2 (Bottom Float) 3995: Ernor Register 4005: Ernor Register 4006: Warnings Register		
		Yes	No

- 9. Edit "Checkin Interval" to 1 minute Checkin Interval 1 minute - Set
- 10. Edit "Sensor On Time (sec)" to .5 Seconds

Sensor On Time (sec)	0.5	Cat
Sensor	Always On	Set

11. Edit "Slave ID" to the DLS Unit Number (1 - 31) Note: The DLS Unit Number must match the Slave ID in Sentinel.

Slave ID 1 Set

12. Holding Registers

Mod	dbus	Program Steps							
Ba	ud R	Rate 9600 Commi	and	Timeout (ms)	1000	•		Find Sensor Modbus ID	
		Function Code		D Register Address	Count	k on State Registe	us fo	r register vi Status	ew.
×	1	0x03 - Read Holding Register	•	3996	2	16-bit		Unknown	1
_	2	0x03 - Read Holding Register	•			16-bit	*	Unknown	=
_	3	0x03 - Read Holding Register	٠			16-bit	٠	Unknown	



- a. Edit the Holding registers (There is no level on the TempSens™.)
- b. Delete or re-assign Registers 3990, 3991, 4005 and 4006.
 - i. Register 4005 can be kept to see TempSens[™] errors.
- a. Edit or Add Registers 3996 count of 1 register and 3997 count of 1 register or simply 3996 count of 2 registers for reading Temperature sensor 1 (3996) and Temperature sensor 2 (3997).
- b. Select "Write Steps to Sentinel"



c. Select "Run Modbus Program Steps".



d. If all achieve a "Pass" status, select "Save Steps to File" for later use, if necessary.



e. Disconnect the programming cable from the Node.

Configuring the SF Gateway (GW) to communicate with the SF Sentinel Node

Follow the steps below to successfully configure the SF Gateway on a Stick to communicate with the SF Sentinel Node.

- 1. Use SignalFire Toolkit Software. The Toolkit will need to be downloaded from the SignalFire website at https://www.signal-fire.com/resources/
- 2. Connect to the Break-out box provided in the Gateway on a Stick package (CBBL-DIN) via RS232 (USB-Serial-DB9).



3. Launch the SignalFire Toolkit Software.



File Options Updates Tools He	elp
Auto-Detect Device COM Port: COM1 Refresh Select COM Port to Auto-Detect Auto-Detect Device on COM Port	SIGNALFIRE WIRELESS TELEMETRY Customer Login: None
Select Device Modbus Gateway	Open Device Window

- 4. Select "Refresh" and select the COM port from the drop-down menu. Then select "Auto Detect Device on COM Port."
- 5. If the Sentinel is detected, data will populate the table "Modbus Slaves Reporting" and other fields will automatically populate.

	Double-clic	k a Row to View R	9 legisters					- A	uto Refresh Re	efresh List
114 Open Close Offline	Slave ID	Node Type	Node Name	RSSI (dBm)	Battery Voltage (V)	Checkin Interval	TTL (min): Current/Max	Mainboard Firmware	Radio Firmware	Configu
	1	Sent MB 2DI	DLS_1	-56	3.385	1 min	7/7	0.58	2.51 (sleeping)	
Apply All Settings										
GATEWAY(STICK)										
12.647										
2.02										
8.31										
8.31 12-Mar-2021										
8.31 12-Mar-2021 2.52										
8.31 12-Mar-2021 2.52 98723										
8.31 12-Mar-2021 2.52 98723 19 of 4700										
8.31 12-Mar-2021 2.52 98723 19 of 4700 1 of 240										
8.31 12-Mar-2021 2.52 98723 19 of 4700 1 of 240 1 (Ideal Max of 60)										
8.31 12-Mar-2021 2.52 99723 19 of 4700 1 of 240 1 (Ideal Max of 60) MODBUS R:	5485 Setting	3							Remote Configur	ation
8.31 12-Mar-2021 2.52 99723 19 of 4700 1 (Ideal Max of 60) 0 - Gateway Slave Gateway Slave	5485 Setting ID: 247	3	View Gateway Log		NOTE: Mod	bue Register Dat	a Format is		-Remote Configur	ation
8.31 12-Mar-2021 2.52 98723 19 of 4700 1 (Ideal Max of 60) MODBUS R: Gateway Slave 0 v Baud Hate:	6485 Setting ID: 247 9600	S	View Gateway Log	ter	NOTE: Mod High Word Fi	bue Regieter Dat inst/High Byte Fin	a Format ie st [AB] [CD]		Remote Configur	ation
	Offline Offline Apply All Settings SATEWAY(STICK) 12.647 U2.2	Offline ID Apply All Settings SATEWAY(STICK) 2,2647 10 1	Set Type Type Type Type Sett MB 2D1 Apply All Settings SATEWAY(STICK) (2.647 L02	See Offine Offine Offine Offine Sert MB 2DI DLS_1 Apply All Settings SATEWAY(STICK) 2.647 L02	Offline Node Name (ddfm) 1 Sent MB 2DI DLS_1 -56 Apply All Settings SATEWAY(STICK) 2.647 -56	Store Hode Name (133) Voltage 0fine 1 Sert MB 2DI DLS_1 -56 3.385 Apply Al Settings SATEWAY(STICK) 2.647	Side Node Name (dDm) Voltage Circular 0se Offine 1 Sent MB 2DI DLS_1 -56 3.385 1 min Apoly All Settings SATEWAY(STICK) 2.847 -	Offine Node Name (cbin) (cbin) Voltage (M) Circlenti Interval Circlenti Current/Nax Apply AI Settings Sent MB 2DI DLS_1 -56 3.385 1 min 7/7 Apply AI Settings SATEWAY(STICK) 2.847	Office Hode Name (125) (125) Voltage (M) Cretival Interval Office Interval Interval Interval Apply AI Settings Sert MB 2DI DLS_1 -56 3.385 1 min 777 0.58 Apply AI Settings SATEWAY(STICK) (2.647	Offine Node Name (cDm) (cDm) Voltage (M Critical Interval Critical Firmware Firmware Firmware Apply Al Settings Sent MB 2DI DLS_1 -56 3.385 1 min 7/7 0.58 2.51 (sleeping) Apply Al Settings SATEWAY(STICK) (2.647

6. Double-clicking on a Modbus Slave "Node Type," will pop up a window with Register Data. The values of the contents of each Register can be viewed here.



ilave 1	_		x
Sentinel Modbus with	2DI	Update Register Values	
DLS_1		Load Tage Save Tag	
1			
89932			
3.378 V			
-49 dBm			
1 (-49 dBm) > G	W	Auto Refresh	
Register Address	Register Value	Description	Â
- 3010	0	Counter1 (counts)	
• 3011			
• 3012	0	Counter1 (state)	
 3013 	0	Avg. Frequency1 (Hz x10)	
• 3014	0	Inst. Frequency1 (Hz x10)	Ξ
• 3015	0	Counts/Minute1	
• 3016	0	Counter2 (counts)	
• 3017			
• 3018	0	Counter2 (state)	
• 3019	0	Avg. Frequency2 (Hz x10)	-
• 3020	0	Inst. Frequency2 (Hz x10)	
3021	0	Counts/Minute2	
• 3996	69		
• 3997	69		
	Jave 1 Sentinel Modbus with DLS_1 1 89932 3.378 V -49 dBm 1 - (-49 dBm) - > G Register Address - 3010 - 3012 - <td>Isertinel Modbus with 2DI DLS_1 1 1 8932 3.378 V - -49 dBm 1 - (-49 dBm) - > GW Register Register Value - 3010 0 - 3012 0 - 3013 0 - 3014 0 - 3015 0 - 3016 0 - 3017 - - 3018 0 - 3020 0 - 3021 0 - 3024 0</td> <td>Iave 1 Update Register Values DLS_1 Load Tags Save Tag 1 Load Tags Save Tag 89932 3.378 V -49 dBm 1 - (49 dBm) -> GW Auto Refresh Register Register Value Description 2 3010 0 Courter1 (sourts) 2 3012 0 Courter1 (state) 2 3013 0 Avg. Frequency1 (Hz x10) 2 3015 0 Courter2 (sourts) 3016 0 Courter2 (state) 3017 0 Avg. Frequency2 (Hz x10) 3013 0 Avg. Frequency2 (Hz x10) 3013 0 Avg. Frequency2 (Hz x10) 3016 0 Courter2 (state) 3017 0 Avg. Frequency2 (Hz x10) 3020 0 Inst. Frequency2 (Hz x10) 3021 0 Courter2 (state) 3021 0 Courter2 (state) 3021 0 Courter3 (Hz x10) 3021 0 Courter4 (state)</td>	Isertinel Modbus with 2DI DLS_1 1 1 8932 3.378 V - -49 dBm 1 - (-49 dBm) - > GW Register Register Value - 3010 0 - 3012 0 - 3013 0 - 3014 0 - 3015 0 - 3016 0 - 3017 - - 3018 0 - 3020 0 - 3021 0 - 3024 0	Iave 1 Update Register Values DLS_1 Load Tags Save Tag 1 Load Tags Save Tag 89932 3.378 V -49 dBm 1 - (49 dBm) -> GW Auto Refresh Register Register Value Description 2 3010 0 Courter1 (sourts) 2 3012 0 Courter1 (state) 2 3013 0 Avg. Frequency1 (Hz x10) 2 3015 0 Courter2 (sourts) 3016 0 Courter2 (state) 3017 0 Avg. Frequency2 (Hz x10) 3013 0 Avg. Frequency2 (Hz x10) 3013 0 Avg. Frequency2 (Hz x10) 3016 0 Courter2 (state) 3017 0 Avg. Frequency2 (Hz x10) 3020 0 Inst. Frequency2 (Hz x10) 3021 0 Courter2 (state) 3021 0 Courter2 (state) 3021 0 Courter3 (Hz x10) 3021 0 Courter4 (state)

- a. Edit the Descriptions if desired.
- b. The Modbus Slave should have the Holding Registers previously set up in the Sentinel, 3996 and 3997 with values in the "Register Value" column.
- Edit the Gateway Slave ID using the drop-down menu from the "MODBUS RS485 Settings." (This will be used to read MODBUS data from the Gateway. The default ID is 247.)

MODBUS RS485	Settings	
Gateway Slave ID:	247	•
Baud Rate:	9600	•
UART Mode:	8N1	•

- a. Any changes will cause the "Apply All Settings" button to display. Select "Apply All Settings" to apply changes.
- 8. From the Settings tab, remap the Slave Modbus Registers to the GW Modbus Registers by selecting "Slave Register Remapping."



									Refresh	
	Remapped Address	Slave ID	Register Address	Data Type		Node Name	Register Value	Description	ſ	
	5000	1	3996	16bit UINT		DLS_1	69			
	5001	1	3997	16bit UINT		DLS_1	69			
	5002	2	3996	16bit UINT		•	65535			
	5003	2	3997	16bit UINT		•	65535			
	5004	3	3996	16bit UINT		•	65535			
	5005	3	3997	16bit UINT		•	65535			
	5006	4	3996	16bit UINT		•	65535			
	5007	4	3997	16bit UINT		•	65535			
	5008	5	3996	16bit UINT			65535			
	5009	5	3997	16bit UINT		•	65535			
	5010	6	3996	16bit UINT 16bit UINT	16bit UINT		•	65535		
	5011	6	3997			•	65535			
	5012			16bit UINT		•				
Dee	All Desister	to Data Tura	Dent	Les . Luit	Display	1		Fail Mode	1	
Read	From GW	Write to G	W Ck	ar Gateway	Short	w Register Addresse w Register Values in	es in HEX HEX	Fail with High Va	lue	
Load	from File	Save to Fi	le (Dear Table	🔲 Use	Extended Slave ID	(2-bytes)	Fail with Last Val	lue <mark>(</mark> else High	
Import	from CSV	Export to CS	SV CS	V Template			Set	Fail with Last Val	lue (else Low)	

- a. Edit Registers 5000 and up to the desired Slave ID Registers (Address 5000, ID 1, 3996 & 5001, ID 1, 3997).
- b. Edit the Description to easily identify the Sensor Data.
- c. Select "Write to GW."

Write to GW

d. Select "Save to File" for later use, if necessary.

Save to File

Connecting TankChek LCD210 to the SF Gateway

Follow the steps below to successfully connect and configure the TankChek LCD210 to the Gateway via RS485 Modbus RTU as a Snooper. Configuration will require the TankChek Wizard 1.2 software, USB Serial Adapter ribbon cable or 2-wire RS485 USB adapter and 12-24vdc power supply. Prior to connecting the LCD210 to the Gateway, the LCD210 will need to be connected to a computer running the TankChek Wizard Configuration Software in order to set up the Modbus Registers configuration and the display.

- Connect the LCD210's RS485 wiring connector to the computer's USB/RS485 cable connector (LCD210 connector D+ to USB/RS485 D+ and LCD210 D- to USB/RS485 D-) or if the USB Serial Adapter ribbon cable programming cable is used for programming, connect the ribbon cable to the back of the LCD210 and launch the TankChek Wizard.
- 2. If using the USB Serial Adapter ribbon cable, skip the next step.
- 3. Apply 12-24vdc power to the LCD210 terminal strip P+ and COM.



- 4. Launch the TankChek Wizard Software. **Note**: The software will automatically begin to read the LCD210 configuration from the unit. Not using the USB Serial Adapter will require configuring com ports and knowing the LCD210's Modbus ID, default is 240, before the configuration can be read from the unit.
- 5. Set up the TankChek LCD210 to read or Snoop on the Registers entered in the GW (5000 and 5001). Note: TankChek will require +1 to each Register (5001 and 5002).
- 6. Configure the Process Variables in TankChek for the appropriate Slave ID (default 247 from the SF Gateway) and Registers (Maximum of 16 PV's).
- 7. Setup the LCD210 as a Snooper to read/echo the values for the Modbus Registers that are being requested by the PLC. Note: The Modbus Registers must be requested one at a time by the PLC in order for the LCD210 to see and display all the requested Registers. Requesting a range of Registers will result in only the first Register being displayed.
- 8. Disconnect the Computer wiring from the LCD210.
- 9. Connect the LCD210's RS485 wiring connector to the Gateway's RS485 connector (LCD210 connector D+ to Gateway A and LCD210 D- to Gateway B.

Mounting and Sealing the Node to the DLS

Follow the steps below to successfully mount the SF Sentinel Node to TempSens[™] or a Model 2100 Digital Level Sensor.

- 1. Loosen the nut on the top part of the 1-inch union until the nut is almost removed.
- 2. Apply thread sealant to the sensor's 1-inch NPT connector.
- 3. Hold the SF Sentinel Node above the sensor flange connector. Insert the PT-SF connector into the sensor and tighten.
- 4. Unscrew the bottom part of the union from the node.
- 5. Screw the bottom part of the union (1-inch FNPT) onto the sensor's 1-inch MNPT flange.
- 6. Route the PT-SF wires into the union. **Caution:** Ensure the connector wires are not caught in the threads or in the union joint.
- 7. Screw and tighten the parts of the union together and onto the sensor.



Technical Support

For more information contact Electrolab:



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