

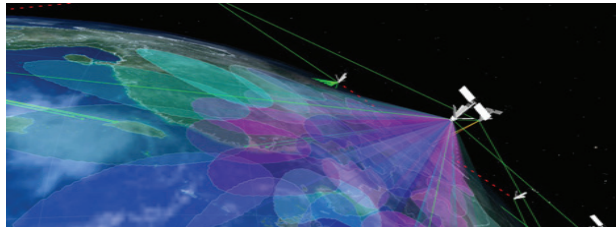


HOSKIN
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PRE-OPERATION TEST AND
VERIFICATION PLAN (POPVP) FOR
ND1 HEADWORKS

APPLICATION NOTE

ONTARIOPOWER
GENERATION



Client: *Ontario Power Generation*

Project: *DeCew Gauging Station Upgrades*


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Enclosure External Inspection	
Date: D__ / M__ / Y_____	Time: H__ : M__
Gauge #	
Site Name	
Inspected by:	

Description	Completed Y/N
Inspect for Damage	
Station Name Label Correct	
Enclosure mounting tabs secured to enclosure	
Enclosure mounting tabs secured to mounting structure	
Cable glands Installed/secured and with grommets or Liquid Tight Conduit	
Power connected to proper enclosure port	
Sensors connected to proper enclosure port	
GPS Garmin Antenna connected to proper enclosure port	
Earth Ground connected to external enclosure ground lug	
Door and door latch functional	
Door key lock located and functional	
Spare Kit located (desiccant, corrosion inhibitor, conduit putty)	

Comments:



Enclosure Internal Inspection	
Date: D__ / M__ / Y ____	Time: H __ : M __
Gauge #	
Site Name	
Inspected by:	

Description	Completed
Inspect for Damage	
Back panel secured	
Sunsaver Solar Regulator Secured	
ES450 Cellular Modem a) Mounting screws tight____ b) Coaxial Cable Connected to ES450 SMA Connector____ c) Coaxial Cable from ES450 connected to Antenna Lightning Arrestor d) Power Cable Connector installed and secure____ e) Ethernet cable installed and secure____	
Sutron 9210 Datalogger f) Mounting screws tight____ g) 9210 Display- check for cracks, scratches h) Power connections installed and secure____ i) Ethernet cable installed and secure____	
Weidmuller Terminals Secured to DIN Rail / Terminal Jumpers Present / Secured _____	
Inspect for loose/damaged wires _____	
Spare Fuses Installed in Fuse Holder _____	
Desiccant Pack, Corrosion Inhibitor, Conduit putty installed _____	
Comments:	



Panel Power Connections and System Startup Guide	
Date: D__ / M__ / Y_____	Time: H__ : M__
Gauge #	
Site Name	
Inspected by:	

Description	Completed
Open Fuse Terminals: L(120VAC), CHG+, 9210+, BAT+, ETH+, 9210+, FIBER+, CELL+	
Connect 120VAC power as per wiring chart (Licensed Electrician required)	
Measure AC Volts between L & N if 110-120 VAC VAC = _____	
Open Disconnect Terminals BAT(+), PWR	
Make sure battery terminal BAT(+) is open	
Connect Battery (+) ---->BAT(+)	
Connect Battery (-) ---->BAT(-)	
Close terminal switch BAT(+)	
Measure Battery voltage between BAT(+) & BAT(-) if >12VDC to 14VDC go to next step VDC = _____	
Close terminal L(120VAC) to connect AC Power to panel	
Close terminal CHG to enable battery charging system . Charger Ready Led will illuminate	
Wait for the Charging LED to come on which indicates battery is charging (refer to Marinco 28210 charger manual to review LED operation) . Note: the state of charging is dependent on the battery voltage	
When charging LED comes on, measure battery Voltage again it should be increasing slowly increasing.	



Close disconnect terminal PWR to enable 12V power to system components	
Close Fused terminal 9210+ note the datalogger powers ON\	

Comments:



Sierra Wireless ES450 Cellular Modem Inspection and Test Plan			
Date: D ___ / M ___ / Y _____		Time: H ___ : M ___	
Model #		Serial #	
Site Name		Firmware Version	
Inspected by:			

Description	Completed
Inspect for Damage a) Modem Housing _____ b) Antenna Connections _____ c) Coaxial Cable _____ d) Ethernet Cable _____ e) Power Cable and Connections	
ES450 Modem Connections a) ES450 SMA antenna connector tight _____ b) ES450 antenna cable connected to antenna lightning arrestor _____ c) Antenna lightning arrestor oriented correctly (to equipment / to antenna) _____ d) Antenna lightning arrestor N Male connector tight _____ e) ES450 modem Ethernet cable connected directly to 9210 datalogger bypassing the Ethernet switch _____ f) ES450 power connector attached and secure	
ES450 Yagi Cell Antenna a) Outside inspection of ES450 Yagi directional antenna _____ b) Yagi antenna mast mounting bracket secure c) Aim the Yagi antenna pointing it to the closest Bell/Telus tower. Further adjustments of the antenna can be made using the cell modem diagnostics signal strength. d) Connect LMR400 Coaxial cable from Omni antenna to the enclosure antenna lightning arrestor. Verify the connections are tight _____. Verify the cable is not kinked and there is no stress on the coaxial connectors. e) Ensure the coaxial cable connections are weather proofed with splicing / electrical tape _____	
Power on and Test ES450 Cellular Modem a) ES450 modem SIM cards have been previously installed b) Follow power-on sequence from previous steps under "Panel Power Connections". c) Close fused terminal switch CELL+ and verify the ES450 modem power on	



<p>by checking that the LED's start flashing when power is first applied ____</p> <p>d) POWER LED: Solid Green ____</p> <p>e) Signal LED: 4-5 Bars: Solid Green (no action required) ____ 2-3 Bars: Solid Amber (no action required) ____ 1 Bar: Flashing Amber (make adjustments to improve signal) ____ 0 Bar: Flashing Red (make adjustments to improve signal) ____</p> <p>f) Network LED: • Solid Green: Registered to an LTE network ____ • Solid Amber: Registered to a 3G or 2G network ____ • Flashing Green: Registered to the Bell network ____ • Flashing Red: No network available (check antenna, SIM card and APN) ____</p> <p>g) Activity: Flashing Green Traffic is being transmitted or received over the WAN interface. Check when network is talking: ____</p> <p>h) Ethernet LED Activity: right LED is solid amber when a link is present and flashing amber when there is activity check when network talking ____</p>	
<p>ACE Manager Using LAP top computer plug in straight through Ethernet cable into the lap top Ethernet port</p> <p>a) From browser URL type: 192.168.13.31:9191 (direct Ethernet connection) 10.0.1.29 :9191 Cell modem communications with Static IP Address</p> <p>b) ACEManager HTML web page will load</p> <p>c) User Name: User / Password: Jegwaig4</p> <p>d) Status Page verify: • Verify Active WAN IP Address: 10.0.1.29 ____:____:____:____ • Verify Network Service Type: 2G____, 3G:____, LTE____ • Signal Quality(ECIO) : ____ 0 to -6 Good -7 to -10 Fair -11 to -20 Poor • RSCP (Expected values are in the range of -50 dB to -120 dB) ____</p> <p>e) ALEOS Software Version ____</p> <p>f) WAN/ Cellular SIM Card Slot 1 Verify APN in use: opgdecew.cntlstatic.bell.ca____</p>	



<p>g) WAN/Cellular Network Roaming Preference: Home Only h) LAN: Ethernet Port 192.168.13.31 _____ i) Services / Ace Manager : Both HTTP and HTTPS</p>	
<p>ES450 Modem Test</p> <p>a) With a remote Gauging station with ES450 modem installed and commissioned plug lap top computer into the Gateway Ethernet switch _____</p> <p>b) From browser enter the static IP address of the Montrose Gauge remote site as follows: Example: 10.0.1.29 :9191 make sure you can access the ES450 web page _____</p> <p>c) From Xterm software use Telnet and Static IP address of the remote site.</p> <p>d) Make sure you can connect with Xterm to the remote site. _____</p>	

Comments

Xlite 9210 Datalogger Inspection and Verification

Date: D ___ / M ___ / Y _____		Time: H ___ : M ___	
Model #		Serial #	
Site Name		Firmware Version	
Inspected by:			

Note: steps may be redundant if following other procedures in test plan

Description	Completed
Inspect for Damage: housing ____, display ____, mounting, ____, terminals ____	
Connect the sensors to the enclosure terminal strip as per the wiring chart	
Close terminals BAT+ then Solar Breaker, 9210+ and note that the 9210 datalogger powers on	
Connect serial cable to COM1 of 9210 and connect using Xterm software	
From Xterm main tab check to make sure Date and Time Correct (see GPS testing sequence below: __:__:__)	
In Sutron Xterm using file transfer make sure modbus.sll file is in the flash directory.	
Verify 9210 Station Name:ND1HW Matches Site Setup File Name ND1HW.ssf and verify in the setup ta ND1HW is the current setup file. _____	
Verify the Battery Voltage shown on the main Xterm tab is between 12.3 and 14.4VDC: _____	
Start the datalogger recording from the Xterm Main tab	
Go to Xterm Log Tab and view the data strings which are updated at 1 minute intervals Refer to data string documentation	
Verify data string, and compare with sensor readings	
Verify Watchdog Counter increments by 1 each reading	
Comments:	



WatchDog Counter Inspection and Verification

Date: D / M / Y

Time: H : M

Inspected by:

Description	Completed
On the 9210 terminal trip verify that a jumper is installed between #3 I/O2 and #5 I/O3	
From the Xterm file transfer verify the file watchdogDO3.bas is in the flash file directory	
From Xterm Setup Tab / Basic and go to "Scheduled Subroutines" making sure the DO3ON is enabled at 00:00:05 and DO3OFF enabled at 00:00:06 each with an interval of 00:01:00	
Start the datalogger recording and go to Xterm log tab and note the counter value (5 th value in data string) increments by one each logging interval.	
If the counter value is not at 0 when the recording starts <ul style="list-style-type: none"> a) Stop the 9210 recording b) From Sensor tab go to "Calibrate" c) Select WatchDog counter and change the value to 0 d) Start the recording and verify counter value 	

Comments:



Garmin GPS Inspection and Test Plan			
Date: D / M / Y		Time: H : M	
Model #		Serial #	
Site Name		Firmware Version	
Inspected by:			

Description	Completed
Inspect for Damage a) GPS Housing ____ b) GPS Garmin Connector ____ c) GPS Garmin Cable ____	
Power Garmin GPS Antenna a) Open terminal GPS 12V ____ b) Connect Garmin GPS Antenna to Panel Terminals as per wiring chart ____ c) Close terminal 12V to power on Garmin GPS	
Test Garmin GPS a) The Garmin Basic file is programmed to synch the 9210 logger clock to GMT -5. If you want to edit the local time offset you have to download the basic file , edit the time zone then reload it on the 9210 flash drive. b) Connect to 9210 with Xterm ____ c) Go to Setup tab – Basic – Scheduled Subroutines d) Ensure that Garmin.BAS is scheduled to run at: e) Time: 00:00:02 ____ / for testing change Interval to: 00:01:00 ____ f) Change to to arbitrary time that is different from local Eastern time g) Start datalogger recording and wait 2 minutes ____ h) Goto Xterm main tab and ensure that the automatically changes to local Eastern time. ____ i) If time switches correctly go to next step to change GPS.BAS schedule to final configuration at Time 00:00:02 @ 06:00:00 Interval. ____ j) If time shift is not correct then edit GPS.BAS file and adjust local time offset k) If GPS time does not shift then go to the Log Tab / system Log and check for GPS errors then test GPS by going to a) Hyperterminal 38400, 8N1. b) Connect Null modem cable from PC into GPS RS-232 termination module. c) Start Hyperterminal and GPS data from Garmin should stream data. d) check GPS location is correct. Correct cabling or switch Garmin GPS and cable. Check Garmin for proper line of site to satellites.	



Final Sutron Xterm Software Configuration for GPS

- a) Connect to 9210 with Xterm
- b) Go to Setup tab – Basic – Scheduled Subroutines
- c) Ensure that Garmin.BAS is scheduled to run at:
Time: 00:00:02____ / Interval: 06:00:00 ____

Comments:



Door Switch Alarm Inspection and Verification	
Date: D ___ / M ___ / Y _____	Time: H ___ : M _____
Inspected by:	

Description	Completed
In the enclosure locate the terminal section digital and note terminal I/O4	
Wire the normally closed door switch dry contact into terminals I/O4 and DGND	
While in the Xterm sensors tab view the DoorAlarm status DIO1 Ch. 4=1 with the door closed. Then open the door and verify the value goes to 0 indicating an alarm. To update the value highlight door alarm then select MEAS.	
Start the datalogger recording and go to Xterm log tab and note the Door Alarm value in the data string and Modbus register	
Verify Operation: Door Closed: I/O4 = 1 _____ Door Open : I/O4 = 0 _____	

Comments:



Heat Lamp Alarm Inspection and Verification	
Date: D ___ / M ___ / Y _____	Time: H ___ : M ___
Inspected by:	_____

Description	Completed
In the enclosure locate the terminal section digital and note terminal I/O5	
Wire the normally closed heat lamp switch dry contact into terminals I/O5 and DGND	
While in the Xterm sensors tab view the HeatLampAlarm status DIO1 Ch. 5=1 with the Heatlamp off. Then turn off the heat lamp and verify the value goes to 0 indicating an alarm. To update the value highlight HeatLamp then select MEAS.	
Start the datalogger recording and go to Xterm log tab and note the HeatLamp Alarm value in the data string and Modbus register	
Verify Operation: HeatLamp Off: I/O4 = 1 _____ HeatLamp On : I/O4 = 0 _____	

Comments:



Shaft Encoder Inspection and Verification			
Date: D ___ / M ___ / Y _____		Time: H ___ : M ___	
Model #		Serial #	
Site Name		Firmware Version	
Inspected by:			

Description	Completed
Inspect for Damage – housing, shaft bearings, display, mounting, cable	
<ul style="list-style-type: none"> a) Install the lithium 1/2AA battery as per the encoder manual. Verify the display powers on with the battery installed. b) Connect shaft encoder SDI-12 cable to enclosure terminals as per wiring chart c) Open disconnect terminal SDI-12 12V during sensor wiring (assumes 9210 datalogger panel has been energized) 	
Without the SDI-12 12V terminal open, the encoder has no external power, note that shaft encoder display still operates from its back up battery ____ note the battery voltage from the display	
Close disconnect terminal SDI-12 12V and note that the shaft encoder LED powers on	
Using a laptop computer open Sutron Xterm software and connect the serial port to the 9210 datalogger	
Go to the Xterm Sensors tab and select the SDI button. Select Find making sure the shaft encoder is detected on address 0	
Note shaft encoder SDI-12 Address = 0 (if the encoder address is not 0 then send xA0 command to encoder from Xterm. Where x is the current address)	
Send Command 0XWC+.375+4 (sets encoder wheel circumference to 0.375m and right digits 4)	
Send 0XWC then D0 to verify this programming	
Send command 0XT+30 (sets encoder averaging to 30 seconds)	
Send 0XT then D0 to verify this programming	



<ul style="list-style-type: none"> a) Send command C4 to initiate an average measurement, wait 35 seconds b) Send command D0 c) Note encoder value _____ d) Rotate encoder wheel 360 degrees e) Send command C4, wait 35 seconds, Send command D0 f) Note encoder value changes by 0.375 meters _____ 	
Take a manual stage measurement	
Send SDI-12 Command 1XSddd.dddd where ddd.dddd is the observer data in meters	
<p>Start the 9210 datalogger recording</p> <p>From Xterm Log Tab verify that first data point matches observer value. The encoder values are logged and updated once per minute.</p>	
Once complete follow OPG Encoder Commissioning Guide	

Comments:



Xlite 9210 Modbus TCP Communications with ES450 Modem Inspection and Verification			
Date: D / M / Y		Time: H : M	
Model #		Serial #	
Site Name		Firmware Version	
Inspected by:			

Description	Completed
Make sure the Ethernet communication cable from the 9210 ETH port is connected directly to the ES450 cell modem Ethernet port.	
From Xterm Setup tab go to Modbus Slave and verify: a) Modbus TCP Slave setup on Port 502 _____ From Xterm Graphical Set-up MB Block verify: a) SE1 Registers are: 1-2 b) Register Type: Holding Register c) MSW: Hi Register	
During this procedure you can enable the panel ethernet switch and connect the ES450 modem and the 9210 datalogger. The user can now poll the Using Modscan to Verify the Modbus Readings on 9210 a) Turn 9210 datalogger recording on, b) Turn on the Ethernet switch by closing terminal ETH+ c) Connect 9210 ethernet cable to the ethernet switch then connect the lap top computer to the ethernet switch. d) Change the laptop network settings for IPV4 with Fixed IP: 192.168.13.40 / 255.255.255.0 / Gateway 192.168.13.31 e) Poll the 9210 logger using Modscan 192.168.13.34 Port 502 f) See Modbus table below. Cross check the Modbus data with the data in the 9210 Log_____	
Start datalogger recording from Xterm Main tab	
Verify Watchdog Counter increments by 1 each reading	

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