Ecologic Ingeniería

Ecologic Ingeniería S.A.S.
NIT | 901370333-2

CONTRATO No. 221 DEL 18 DE JULIO DE 2022.

OBJETO: REALIZAR EL SUMINISTRO E INSTALACIÓN DE TRES ESTACIONES METEOROLÓGICAS EN CUMPLIMIENTO DE LA RESOLUCIÓN N° 1627 DEL 28 DE MAYO DE 2021 EXPEDIDA POR CORTOLIMA.

CONTRATISTA: ECOLOGIC INGENIERIA SAS

Ecologic Ingeniería

Ecologic Ingeniería S.A.S.
NIT | 901370333-2

CONTENIDO

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MANUAL DE OPERACIÓN Y MANTENIMIENTO.....5

Ecologic Ingeniería S.A.S.
NIT | 901370333-2

OFICIO ACTA DE ENTREGA

No. ECO-07

Ing Bejarano

Ecologic Ingeniería S.A.S.
NIT | 901370333-2

Ecologic
Ingeniería

IMDRI INSTITUTO MUNICIPAL PARA EL DEPORTE Y LA RECREACIÓN DE IMAGUÉ
04 MAY 2023 Hora: 1:08.
Nº 1098
Recibe: Marcela.
194 Folios

Código: ECO-07
Fecha: 10/03/2023
Versión: 0

Bogotá, Colombia, 04 de mayo de 2023

Señores

INSTITUTO MUNICIPAL PARA EL DEPORTE Y LA RECREACIÓN DE IMAGUÉ - IMDRI
NIT: 900.406.856-6
Atn. Oscar Julián Bejarano Patarroyo
Supervisor del Contrato
Ciudad

ASUNTO: Entrega Final del Contrato No. 221 del 18 de julio del 2022.

Cordial saludo,

Por medio del presente oficio, me dirijo a ustedes en calidad de representante legal de la empresa **ECOLOGIC INGENIERIA SAS,** con el fin de informarles que en cumplimiento del contrato No. 221 del 18 de julio del 2022, se ha realizado la entrega oficial de las 3 estaciones meteorológicas objeto del mismo.

La entrega se realiza el día de hoy 4 de mayo del 2023, en las instalaciones del IMDRI, ante la presencia de los representantes designados por su empresa para recibir las estaciones.

Adjunto a este oficio, se hace entrega en físico de un folder que contiene el manual de operación y mantenimiento de las estaciones, documentos administrativos requeridos, así como el informe técnico correspondiente.

Ecologic Ingeniería

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Es importante destacar que las estaciones meteorológicas entregadas cumplen con todas las especificaciones técnicas y requisitos estipulados en el contrato, y se encuentran en perfecto estado de funcionamiento.

Agradecemos su confianza en nuestra empresa.

Quedamos a su disposición para cualquier consulta o aclaración adicional que puedan requerir.

Cordialmente,

Camilo Salamanca
Representante Legal

Oscar Julián Bejarano
Supervisor del Contrato-IMDRI

Ecologic Ingeniería

Ecologic Ingeniería S.A.S.
NIT | 901370333-2

FACTURA No. FVEI-240

7

ECOLOGIC INGENIERIA S.A.S
NIT 901.370.333-2
CRA 136 A 151 B 52 T 6 OF 403
Tel: 3168217548
Bogotá - Colombia
facturacion@ecologicingenieria.com
www.ecologicingenieria.com

Factura electrónica de venta
No. FVEI 240

Señores	INSTITUTO MUNICIPAL PARA EL DEPORTE Y LA RECREACION DE IBAGUÉ - IMDRI		
NIT	900.406.856-6	Teléfono	(57) 3183497767
Dirección	KM 1 VIA AEROPUERTO PERALES	Ciudad	Ibagué - Colombia

Fecha y hora Factura	
Generación	03/05/2023, 11:32
Expedición	04/05/2023, 08:33
Vencimiento	02/06/2023

Ítem	Descripción	Cantidad	Vr. Unitario	Vr. Bruto	Impto. Cargo	Valor Impto.Cargo	Vr. Total	Vendedor
1	DATA LOGGER Módem celular 3G / 4G con WiFi· 2x entradas analógicas (resolución de 16 bits)· 2x canales de entrada / salida digital· 2x canales de entrada digital· 2x salidas de excitación analógicas· Transmisión FTP directa (CSV / XML) de los datos registrados a uno o dosdestinos· Modbus RS485· 3 x indicadores LED· Entrada SDI-12· Proteccion IP65· Memoria flash de 16 MB· Regulador Solar Integrado (Entrada 10-30V DC)· Reloj en tiempo real· Requiere fuente de alimentación de 12VDC· Incluye software operativo iLINK (el usuario debe registrarse en HyQuestSitio web de soluciones)· Registra la temperatura del sistema, los voltajes / corriente de la batería y la señal RSSIfuerza)· Cumplimiento de RoHS, CE y FCC (WEEE pendiente)· Rango de operación (-40 a +70 grados Celsius) SERIALES: AG5-0187; AG5-0186; AG5-0147	3.00	8,880,600.00	26,641,800.00	19 %	5,061,942.00	31,703,742.00	SALOMON VACA AHUMADA
2	Piranómetro - Radiación Global Clase C Clasificacion ISO 9060:2018 Salida (MODBUS RS485 RTU, SDI-12, 4-20mA)Tiempo de respuesta 95% < 18 Seg.No linealidad a 1000W/m² +/- 1 %,Respuesta direccional a 1000W/m² +/- 20 W/m2Respuesta de temperatura -10°C a 40°C +/- 3 %Cero Offset A 200W/m² +/- 12 W/m2Cero Offset B 5K/hr +/- 5 W/m2Incluye : Cable 5m SERIALES: S22055142; S22055143; S22055141	3.00	5,816,300.00	17,448,900.00	19 %	3,315,291.00	20,764,191.00	SALOMON VACA AHUMADA
3	Sensor AnemometroPrincipio de Medición: UltrasonicoProtocolo de Comunicación : SDI-12IP: 68Alimentación : 12Vdc @ 20mARango de Temperatura de Operación :-40...+70°CMaterial: Aleación de aluminio con revestimiento de teflónVelocidad VientoRango de Medida: 0...60m/sPrecisión: ±0.3 m/s o 3% de la medidaResolución :0.1m/sDirección VientoRango de Medida: 0...359.9°Precisión: ± 3° Resolución :0.1°Incluye: Cable 5m SERIALES: 223029; 223057; 223049	3.00	9,491,100.00	28,473,300.00	19 %	5,409,927.00	33,883,227.00	SALOMON VACA AHUMADA
4	Sensor de Precipitación Tipping Bucket Resolución : 0.2mmRango : 700mm por horaPrecisión : +/- 5% entre 0 a 200 mm/hMaterial de la Cazoleta: Teflon ImpregnadoCarzaca Material y Base: UV resistente ASA SERIALES: 22-302; 22-305; 22-301	3.00	1,798,900.00	5,396,700.00	19 %	1,025,373.00	6,422,073.00	SALOMON VACA AHUMADA
5	SuministroeInstalaciónsistemadeenergíaygabineteparaconexionadodeequipos*GabineteIP66NEMA4X,600X400X200mm(alto XanchoXprofundo),02 chapas en acero, material poliéster insaturado GFK* Panel Solar policristalino: 50W -12V* Batería de Gel: 26Ah 12V ciclo profundo*Accesoriosparaconexiódelgabinete: (10BornerasdeConexión4mm,01Braeker Protección6ADC,01Portafusibles,01BorneradeTierra,Canaleta paraelfiguradodecableado,Marquillado,RielDINparalafijaciónborneras,cableadointernoyPlano eléctrico de conexión)* Ensamble del Gabinete*Sistemadepuestaatierra(unavarillacooperweldde1,5 mencobre/cobre,cable2/0AWGdesnudo,cajadeinspecciónpuestaatierraenconcreto30X30contapa,soldadura exotérmica SERIALES GABINETE: E-22X-10352110906; E-22X-10298150852 Modelo: AX 1446.000; E-22X-103521110917 Modelo: AX 1446.000 SERIALES PANEL SOLAR: RTM040M-2022101300113; RTM040M-2022101300183; RTM040M-2022101300061 BATERIAS: Modelo: NDP12-26AH 12V26AH; Modelo: NDP12-26AH 12V26AH; Modelo: NDP12-26AH 12V26AH	3.00	4,544,400.00	13,633,200.00	19 %	2,590,308.00	16,223,508.00	SALOMON VACA AHUMADA
6	Suministro e instalación de mástil y soporte para pluviómetroIncluye:*Suministroeinstalacióndemástilabatiblede 6mdealtoentuberíade3dediámetro,terminacióntuberíagalvanizadaencalienteypinturaelectrostática,conbase cuadrada en lamina de 35cm x 35cm de 3/8 con orificio de 3/4*Suministroeinstalacióndebaseparapluviómetrode1mdealtoentuberíade2,terminacionestuberíagalvanizadaencalienteypinturaelectrostática,conbasecuadrada en lámina de ¼ de 0,25m	3.00	3,314,600.00	9,943,800.00	19 %	1,889,322.00	11,833,122.00	SALOMON VACA AHUMADA

Elaborado por software Siigo Nube y enviado electrónicamente por proveedor tecnológico Siigo. Siigo S.A.S Nit. 830.048.145-8

Ítem	Descripción	Cantidad	Vr. Unitario	Vr. Bruto	Impto. Cargo	Valor Impto.Cargo	Vr. Total	Vendedor
	x 0,25m.*Cimentación:Construcciòndedosdadosenconcretode3000psi,dedimensiones0,40x0,40x0,60enconcretode3000psi(con aceroderefuerzode1/2,conflejesde1/4)parafijaciòndebaseprincipaldelmàstily0,30mx0,30mx0,50mprofundidadenconcretode3000psiparafijaciondelpluviometroelpluviómetro,conacero de refuerzo de 1/2 con flejes de 1/4.							
7	Servicio de instalación y configuración de las estaciones. Incluye: * Instalación y configuración de los equipos y sensores	3.00	1,859,600.00	5,578,800.00	19 %	1,059,972.00	6,638,772.00	SALOMON VACA AHUMADA
8	Suministro e instalación cerramiento de 3X3X2m (largo, ancho, alto)Incluye:* Localizacion y replanteo*Suministrodecerramientode3X3X2(largo,ancho,alto) enmallaeslabonadacalibre10,tuberíade2enacerogalvanizadoe ncalienteypintadoconpinturaelectrostatica,conpuertade1mdean choy3lineasdealambredepuaseniapartesuperiordelcerramiento calibre14,5,marcosenángulo3/16x11/4paratemplarmalla.* Adecuación del terreno en el punto de instalación* Instalación del cerramiento*Cimentación:construcciòndevigaperimetralenconc retode3000pside0.20x0.30 (ancho x alto), con varilla de ½, con flejes de ¼	3.00	15,747,000.00	47,241,000.00	19 %	8,975,790.00	56,216,790.00	SALOMON VACA AHUMADA
9	Sensor de Temperatura y humedad. Voltaje de Alimentacion: 7 a 28VdcRango de Operación: -40° to +70°CMaterial : PET-P blanco – resistente a los rayos UV, el polvo y la lluviaProtocolo : SDI-12 V1.4 ó RS-485 Modbus RTUTemperatura AireRango de Medida: -40°C to +70°CPrecision: ±0.2°C (en el rango -40 to +70°C)±0.1°C (en el rango -20 to +60°C)Deriva por año: 0.03°CResolución: 0.1°CHumedad AireRango de Medida: 0 to 100% RHPrecisión: ±1.5% (at 25°C, sobre el rango 0 to 80% RH)±2% (at 25°C, sobre el rango 80 to 100% RH)Resolución : 0.1% RHDeriva: ±0.5% Por año como máximo SERIALES: B22059023; B22059028;B22039043	3.00	6,531,500.00	19,594,500.00	19 %	3,722,955.00	23,317,455.00	SALOMON VACA AHUMADA

Total items: 9

Total Bruto	173,952,000.00
IVA 19%	33,050,880.00
Total a Pagar	207,002,880.00

Valor en Letras:
Doscientos siete millones dos mil ochocientos ochenta pesos m/cte

Condiciones de Pago:
Crédito - Cuota No. 001 vence el 2023-06-02 por $ 207,002,880.00

Observaciones:
CONTRATO 221 DEL 18 DE JULIO DE 2022
OBJETO: REALIZAR EL SUMINISTRO E INSTALACIÓN DE TRES ESTACIONES METEOROLÓGICAS EN CUMPLIMIENTO DE LA RESOLUCIÓN Nº 1627 DEL 28 DE MAYO DE 2021 EXPEDIDA POR CORTOLIMA.

MODELO EQUIPOS: Datalogger IRIS UNDERCOVER PRO MARCA: HYQUEST; Anemometro AR200 MARCA: HYQUEST; Pluviometro TB7/0.2 MARCA: HYQUEST; Piranometro MS40S MARCA EKO; Sensor RH+T MARCA: BARANI DESIGN

"En cumplimiento de la Ley 1231 de 2008, modificada por la Ley 1676 de 2013 la Empresa dará por aceptada irrevocablemente la factura a los tres (3) días hábiles siguientes a su recepción, de lo contrario, el rechazo se informará a través del mecanismo electrónico apropiado.
El pago de la factura se realizará al tenedor legítimo de ésta, en la fecha del vencimiento por el valor neto que resulte después de los descuentos por ley y contractuales.".

Consignar a nombre de ECOLOGIC INGENIERIA SAS NIT: 901370333-2 a la cuenta de ahorros del Banco Davivienda 462600067211.

Orden de compra: CONTRATO - 221

Orden de entrega: - Fecha:

A esta factura de venta aplican las normas relativas a la letra de cambio (artículo 5 Ley 1231 de 2008). Con esta el Comprador declara haber recibido real y materialmente las mercancías o prestación de servicios descritos en este título - Valor. **Número Autorización 18764045213811 aprobado en 20230228 prefijo FVEI desde el número 233 al 1000 Vigencia: 12 Meses**
Responsable de IVA - Actividad Económica 4659 Comercio al por mayor de otros tipos de maquinaria y equipo n.c.p. Tarifa 11.04
CUFE: baead3942cb77e77777bea7917d64718059be81e55997679864bce57e5db0cae5d5f8d063767755370a5b4d383edacbc

Recibí: SED
4 de agosto 1/2023
10:34 a.m.

DIAN
POR UNA COLOMBIA MÁS HONESTA

Formulario del Registro Único Tributario

001

2. Concepto 0 2 Actualización

4. Número de formulario 14907373807

(415)7707212489984(8020) 000001490737380 7

5. Número de Identificación Tributaria (NIT)	6. DV	12. Dirección seccional	14. Buzón electrónico
9 0 1 3 7 0 3 3 3	2	Impuestos de Bogotá 3 2	

IDENTIFICACIÓN

24. Tipo de contribuyente	25. Tipo de documento	26. Número de Identificación	27. Fecha expedición
Persona jurídica 1			

Lugar de expedición	28. País	29. Departamento	30. Ciudad/Municipio

31. Primer apellido	32. Segundo apellido	33. Primer nombre	34. Otros nombres

35. Razón social
ECOLOGIC INGENIERIA SAS

36. Nombre comercial	37. Sigla

UBICACIÓN

38. País	39. Departamento	40. Ciudad/Municipio
OLOMBIA 1 6 9	Bogotá D.C. 1 1	Bogotá, D.C. 0 0 1

41. Dirección principal
CL 9 C BIS 68 G 29 TO 5 OF 303

42. Correo electrónico comercial@ecologicingenieria.com

43. Código postal	44. Teléfono 1	45. Teléfono 2
	3 0 1 5 6 2 7 5 4 1	

CLASIFICACIÓN

Actividad económica

Actividad principal		Actividad secundaria		Otras actividades			Ocupación	
46. Código	47. Fecha inicio actividad	48. Código	49. Fecha inicio actividad	50. Código	1	2	51. Código	52. Número establecimientos
4 6 5 9	2 0 2 0 0 2 2 5	4 2 9 0	2 0 2 0 0 2 2 5		3 3 1 9			

Responsabilidades, Calidades y Atributos

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
53. Código 5	7	9	1 0	1 4	4 2	4 8	5 2	5 5																	

05- Impto. renta y compl. régimen ordinar
07- Retención en la fuente a título de rent
09- Retención en la fuente en el impuesto
10- Obligado aduanero
14- Informante de exogena
42- Obligado a llevar contabilidad
48 - Impuesto sobre las ventas - IVA
52 - Facturador electrónico
55 - Informante de Beneficiarios Finales

Obligados aduaneros

1	2	3	4	5	6	7	8	9	10
54. Código 2 2	2 3								

11	12	13	14	15	16	17	18	19	20

Exportadores

55. Forma	56. Tipo	Servicio	1	2	3
2	3	57. Modo	4		
		58. CPC	8 2		

IMPORTANTE: Sin perjuicio de las actualizaciones a que haya lugar, la inscripción en el Registro Único Tributario -RUT-, tendrá vigencia indefinida y en consecuencia no se exigirá su renovación

Para uso exclusivo de la DIAN

59. Anexos SI [ ] NO [X] 60. No. de Folios: 0 61. Fecha 2023 - 04 - 10 / 11 : 36: 12

La información suministrada a través del formulario oficial de inscripción, actualización, suspensión y cancelación del Registro Único Tributario (RUT), deberá ser exacta y veraz; en caso de constatar inexactitud en alguno de los datos suministrados se adelantarán los procedimientos administrativos sancionatorios o de suspensión, según el caso.
Parágrafo del artículo 1.6.1.2.20 del Decreto 1625 de 2016
Firma del solicitante:

Sin perjuicio de las verificaciones que la DIAN realice.
Firma autorizada:

984. Nombre SALAMANCA FLOREZ CAMILO ANDRES
985. Cargo Representante legal Certificado

COPIA CERTIFICADO DOCUMENTO SIN COSTO

DIAN
POR UNA COLOMBIA MÁS HONESTA

Formulario del Registro Único Tributario

001

Espacio reservado para la DIAN

4. Número de formulario: 14907373807

(415)7707212489984(8020) 000001490737380 7

5. Número de Identificación Tributaria (NIT)	6. DV	12. Dirección seccional		14. Buzón electrónico
9 0 1 3 7 0 3 3 3	2	Impuestos de Bogotá	3 2	

Características y formas de las organizaciones

62. Naturaleza	2	63. Formas asociativas	1 2	64. Entidades o institutos de derecho público de orden nacional, departamental, municipal y descentralizados	
65. Fondos		66. Cooperativas		67. Sociedades y organismos extranjeros	
68. Sin personería jurídica		69. Otras organizaciones no clasificadas		70. Beneficio	1

Constitución, Registro y Última Reforma

Composición del Capital

Documento	1. Constitución	2. Reforma
71. Clase	0 4	0 1
72. Número		0 1
73. Fecha	2 0 2 0 0 2 2 4	2 0 2 0 0 8 0 6
74. Número de notaría		
75. Entidad de registro	0 3	0 3
76. Fecha de registro	2 0 2 0 0 2 2 5	2 0 2 0 0 8 3 1
77. No. Matrícula mercantil	0 0 0 3 2 2 5 2 0 9	0 0 0 3 2 2 5 2 0 9
78. Departamento	1 1	1 1
79. Ciudad/Municipio	0 0 1	4
Vigencia		
80. Desde	2 0 2 0 0 2 2 4	
81. Hasta	9 9 9 9 1 2 3 1	

82. Nacional	1 0 0 %
83. Nacional público	0 . 0 %
84. Nacional privado	1 0 0 . 0 %
85. Extranjero	0 %
86. Extranjero público	0 . 0 %
87. Extranjero privado	0 . 0 %

Entidad de vigilancia y control

88. Entidad de vigilancia y control: Superintendencia de Sociedades — 5

Estado y Beneficio

Item	89. Estado actual	90. Fecha cambio de estado	91. Número de Identificación Tributaria (NIT)	92. DV
1	4 9	2 0 2 0 0 2 2 5		-
2	8 1	2 0 2 0 0 2 2 5		-
3				-
4				-
5				-

Vinculación económica

93. Vinculación económica	94. Nombre del grupo económico y/o empresarial	95. Número de Identificación Tributaria (NIT) de la Matriz o Controlante	96. DV.

97. Nombre o razón social de la matriz o controlante

170. Número de identificación tributaria otorgado en el exterior	171. País	172. Número de identificación tributaria sociedad o natural del exterior con EP	

173. Nombre o razón social de la sociedad o natural del exterior con EP

COPIA CERTIFICADO DOCUMENTO SIN COSTO

DIAN
POR UNA COLOMBIA MÁS HONESTA

Formulario del Registro Único Tributario
Representación

001

Espacio reservado para la DIAN

4. Número de formulario: 14907373807

(415)7707212489984(8020) 000001490737380 7

5. Número de Identificación Tributaria (NIT)	6. DV	12. Dirección seccional	14. Buzón electrónico
9 0 1 3 7 0 3 3 3	2	Impuestos de Bogotá 3 2	

Representación

1

98. Representación	99. Fecha inicio ejercicio representación
REPRS LEGAL PRIN 1 8	2 0 2 0 0 2 2 5

100. Tipo de documento	101. Número de identificación	102. DV	103. Número de tarjeta profesional
Cédula de Ciudadani 1 3	1 0 3 0 5 4 6 8 8 8		

104. Primer apellido	105. Segundo apellido	106. Primer nombre	107. Otros nombres
SALAMANCA	FLOREZ	CAMILO	ANDRES

108. Número de Identificación Tributaria (NIT)	109. DV	110. Razón social representante legal

2

98. Representación	99. Fecha inicio ejercicio representación
REPRS LEGAL SUPL 1 9	2 0 2 0 0 2 2 5

100. Tipo de documento	101. Número de identificación	102. DV	103. Número de tarjeta profesional
Cédula de Ciudadan 1 3	1 1 2 3 2 3 6 9		

104. Primer apellido	105. Segundo apellido	106. Primer nombre	107. Otros nombres
CIFUENTES	VARGAS	JOSE	HERNAN

108. Número de Identificación Tributaria (NIT)	109. DV	110. Razón social representante legal

3

98. Representación	99. Fecha inicio ejercicio representación

100. Tipo de documento	101. Número de identificación	102. DV	103. Número de tarjeta profesional

104. Primer apellido	105. Segundo apellido	106. Primer nombre	107. Otros nombres

108. Número de Identificación Tributaria (NIT)	109. DV	110. Razón social representante legal

4

98. Representación	99. Fecha inicio ejercicio representación

100. Tipo de documento	101. Número de identificación	102. DV	103. Número de tarjeta profesional

104. Primer apellido	105. Segundo apellido	106. Primer nombre	107. Otros nombres

108. Número de Identificación Tributaria (NIT)	109. DV	110. Razón social representante legal

5

98. Representación	99. Fecha inicio ejercicio representación

100. Tipo de documento	101. Número de identificación	102. DV	103. Número de tarjeta profesional

104. Primer apellido	105. Segundo apellido	106. Primer nombre	107. Otros nombres

108. Número de Identificación Tributaria (NIT)	109. DV	110. Razón social representante legal

COPIA CERTIFICADO
DOCUMENTO SIN COSTO

DAVIVIENDA

Banco Davivienda S.A.

CERTIFICACION

BOGOTA D.C., DISTRITO CAPITAL, 07/07/2023

Por medio de la presente hacemos constar que nuestro cliente **ECOLOGIC INGENIERIA SAS** con **NIT 901.370.333-2** posee en el Banco Davivienda:

CUENTA DE AHORROS DAMAS

Número 462600067211

Cordialmente,

BANCO DAVIVIENDA

VIGILADO SUPERINTENDENCIA FINANCIERA DE COLOMBIA

Ecologic Ingeniería

Ecologic Ingeniería S.A.S.
NIT | 901370333-2

DOCUMENTOS ADMINISTRATIVOS

Ecologic Ingeniería S.A.S.
NIT | 901370333-2

Bogotá, Colombia. 03 de mayo de 2023

Con el objetivo de acreditar el cumplimiento de lo dispuesto en el artículo 50 de la Ley 789 del 27 de diciembre del 2002, todo lo consignado a continuación queda previsto bajo la gravedad de juramento.

CERTIFICO

Que ECOLOGIC INGENIERIA S.A.S., con NIT 901.370.333-2

Ha cumplido en forma oportuna y completa con los aportes y demás obligaciones legales que le corresponden respecto al Sistema de Seguridad Social, en las ocasiones que se ha dado lugar a dichos pagos, en cuanto a salud, pensiones y riesgos laborales, y en las circunstancias en las que ha sido necesario los aportes parafiscales al Servicio Nacional de Aprendizaje, el Instituto Colombiano de Bienestar Familiar y las Cajas de compensación familiar.

Dado en Bogotá D.C. a los tres (03) días del mes de mayo de 2023.

Actuando en calidad de:

Camilo Salamanca
Representante Legal

Luz Helena Ordoñez Coronado
Contador Público
TP 156342-T

CONTRATO No.:	221 **DE:** 18 de julio de 2022
OBJETO DEL CONTRATO:	"REALIZAR EL SUMINISTRO E INSTALACION DE TRES ESTACIONES METEOROLOGICAS EN CUMPLIMIENTO DE LA RESOLUCION No. 1627 DEL 28 DE MAYO DE 2021 EXPEDIDA POR CORTOLIMA".
PLAZO DE EJECUCIÓN:	TRES (3) MESES
FECHA DE INICIACIÓN:	06 de septiembre de 2022.
PRORROGA No. 1:	Del 09 de marzo de 2023, dos (02) meses de prórroga, nueva fecha de terminación 08 de mayo de 2023
VALOR DEL CONTRATO:	DOSCIENTOS SIETE MILLONES DOS MIL OCHOCIENTOS OCHENTA PESOS M/CTE ($207.002.880) INCLUIDO IVA.
ADICIÓN No. 1:	N/A
VALOR DEL CONTRATO LUEGO DE ADICIONES:	DOSCIENTOS SIETE MILLONES DOS MIL OCHOCIENTOS OCHENTA PESOS M/CTE ($207.002.880) INCLUIDO IVA.
CONTRATISTA:	ECOLOGIC INGENIERIA S.A.S.
NIT:	901.370.333-2
INTERVENTOR:	N/A
NIT:	N/A
SUPERVISOR(A):	JUAN SEBASTIAN FONSECA ROA
C.C.:	1.110.544.351

1. VALOR PAGADO SISTEMA DE SEGURIDAD CONTRATISTA:

Nombre-Cargo	Salud	Pensión	ARL	No. Planilla	Mes
CAMILO ANDRES SALAMANCA FLOREZ REPRESENTANTE LEGAL ECOLOGIC INGENIERIA S.A.S.	$ 558.200	$ 2.182.600	$ 956.600	9439919905	AGOSTO 2022
CAMILO ANDRES SALAMANCA FLOREZ REPRESENTANTE LEGAL ECOLOGIC INGENIERIA S.A.S.	$ 769.300	$ 2.531.800	$1.014.400	9441264424	SEPTIEMBRE 2022
CAMILO ANDRES SALAMANCA FLOREZ REPRESENTANTE LEGAL ECOLOGIC INGENIERIA S.A.S.	$ 724.300	$ 2.350.500	$ 984.200	9441264424	OCTUBRE 2022
CAMILO ANDRES SALAMANCA FLOREZ REPRESENTANTE LEGAL ECOLOGIC INGENIERIA S.A.S.	$ 762.100	$ 2.501.200	$ 1.088.500	9444012651	NOVIEMBRE 2022
CAMILO ANDRES SALAMANCA FLOREZ REPRESENTANTE LEGAL ECOLOGIC INGENIERIA S.A.S.	$ 877.500	$ 3.509.400	$1.526.900	9446693139	ENERO 2023

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CAMILO ANDRES SALAMANCA FLOREZ REPRESENTANTE LEGAL ECOLOGIC INGENIERIA S.A.S.	$ 957.800	$ 3.829.700	$1.666.400	9448042221	FEBRERO 2023
CAMILO ANDRES SALAMANCA FLOREZ REPRESENTANTE LEGAL ECOLOGIC INGENIERIA S.A.S.	$ 984.700	$ 4.003.400	$1.712.800	9449513467	MARZO 2023
CAMILO ANDRES SALAMANCA FLOREZ REPRESENTANTE LEGAL ECOLOGIC INGENIERIA S.A.S.	$ 827.500	$ 3.429.500	$ 1.440.000	9450709351	ABRIL 2023
CAMILO ANDRES SALAMANCA FLOREZ REPRESENTANTE LEGAL ECOLOGIC INGENIERIA S.A.S.	$795.800	$3.182.900	$1.384.900	9452166061	MAYO 2023

2. INFORMACIÓN DEL PERSONAL

Personal - cargo	% dedicación	Período delinforme	Meses de Participación	Tipo de vinculación	Contratante
JHON EIDER GIRALDO ASESOR TÉCNICO SENIOR	100%	06 de septiembre a 24 de noviembre del 2022 y de 27 febrero al 10 de mayo de 2023	5	CONTRATO TERMINO INDEFINIDO	ECOLOGIC INGENIERIA S.A.S.
SILVIA NAVAS INGENIERA PRE VENTA	100%	06 de septiembre a 24 de noviembre del 2022	3	CONTRATO TERMINO INDEFINIDO	ECOLOGIC INGENIERIA S.A.S.
CAMILO SALAMANCA GERENTE GENERAL/CEO	100%	06 de septiembre a 24 de noviembre del 2022 y de 27 febrero al 10 de mayo de 2023	5	CONTRATO TERMINO INDEFINIDO	ECOLOGIC INGENIERIA S.A.S.
JOSE MANUEL DORANTE AUXILIAR DE OBRA	100%	27 de febrero del 2023 a 30 de marzo del 2023	1	CONTRATO LABOR U OBRA	ECOLOGIC INGENIERIA S.A.S.
JHON JAIRO MENDOZA MAESTRO DE OBRA	100%	27 de febrero del 2023 a 30 de marzo del 2023	1	CONTRATO LABOR U OBRA	ECOLOGIC INGENIERIA S.A.S.
LUIS ERNESTO PELAEZ INGENIERO DE SOPORTE	100%	27 de febrero del 2023 a 10 de mayo de 2023	3	CONTRATO TERMINO INDEFINIDO	ECOLOGIC INGENIERIA S.A.S.

3. INGRESO BASE DE COTIZACIÓN DEL PERSONAL.

Año 2022

Personal - cargo	Tarifa Mensual	Factor Multiplicador	% dedicación	Sueldo oferta económica con factor multiplicador	IBC
JHON EIDER GIRALDO ASESOR TÉCNICO SENIOR	$ 1.107.000	2,29	100%	$ 2.535.030	$ 1.107.000

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SILVIA NAVAS INGENIERA PRE VENTA	$ 1.600.000	2,29	100%	$ 3.664.000	$ 1.600.000
CAMILO SALAMANCA GERENTE GENERAL/CEO	$ 3.000.000	2,29	100%	$ 6.870.000	$ 3.000.000

Año 2023

Personal - cargo	Tarifa Mensual	Factor Multiplicador	% dedicación	Sueldo oferta económica con factor multiplicador	IBC
JHON EIDER GIRALDO ASESOR TÉCNICO SENIOR	$ 1.383.750	2,29	100%	$ 3.168.787	$ 1.383.750
CAMILO SALAMANCA GERENTE GENERAL/CEO	$ 4.000.000	2,29	100%	$ 9.160.000	$ 4.000.000
JOSE MANUEL DORANTE AUXILIAR DE OBRA	$ 1.160.000	2,29	100%	$ 2.656.400	$ 232.000
JHON JAIRO MENDOZA MAESTRO DE OBRA	$ 1.160.000	2,29	100%	$ 2.656.400	$ 309.334
LUIS ERNESTO PELAEZ INGENIERO DE SOPORTE	$ 1.160.000	2,29	100%	$ 2.656.400	$ 1.600.000

4. VALOR PAGADO SISTEMA SEGURIDAD SOCIAL PERSONAL.

Nombre-Cargo	Salud	Pensión	ARL	No. Planilla	Mes
JHON EIDER GIRALDO ASESOR TÉCNICO SENIOR	$ 44.300	$ 177.200	$ 77.100	9441264424	SEPTIEMBRE
	$ 22.200	$ 88.600	$ 38.600	9442598406	OCTUBRE
	$ 44.300	$ 177.200	$ 77.100	9444012651	NOVIEMBRE
	$ 55.400	$ 221.400	$ 96.400	9448042221	FEBRERO
	$ 55.400	$ 221.400	$ 96.400	9449513467	MARZO
	$ 55.400	$ 221.400	$ 96.400	9450709351	ABRIL
	$ 55.400	$ 221.400	$ 96.400	9452166061	MAYO
SILVIA NAVAS INGENIERA PRE VENTA	$ 200.000	$ 256.000	$ 111.400	9441264424	SEPTIEMBRE
	$ 200.000	$ 256.000	$ 111.400	9442598406	OCTUBRE
	$ 200.000	$ 256.000	$ 111.400	9444012651	NOVIEMBRE
CAMILO SALAMANCA GERENTE GENERAL/CEO	$ 120.000	$ 480.000	$ 208.800	9441264424	SEPTIEMBRE
	$ 120.000	$ 480.000	$ 208.800	9442598406	OCTUBRE
	$ 120.000	$ 480.000	$ 208.800	9444012651	NOVIEMBRE
	$ 160.000	$ 640.000	$ 278.400	9448042221	FEBRERO
	$ 160.000	$ 640.000	$ 278.400	9449513467	MARZO
	$160.000	$640.000	$278.400	9450709351	ABRIL
	$160.000	$640.000	$278.400	9452166061	MAYO
LUIS ERNESTO PELAEZ INGENIERO DE SOPORTE	$ 64.000	$ 256.000	$ 111.400	9448042221	FEBRERO
	$ 64.000	$ 256.000	$ 111.400	9449513467	MARZO
	$ 64.000	$ 256.000	$ 111.400	9450709351	ABRIL
	$ 64.000	$ 256.000	$ 111.400	9452166061	MAYO
	$ 12.400	$ 49.500	$ 21.600	9448042221	FEBRERO

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JHON JAIRO MENDOZA MAESTRO DE OBRA	$ 35.600	$ 142.300	$ 61.900	9449513467	MARZO
JOSE MANUEL DORANTE AUXILIAR DE OBRA	$ 9.300	$ 37.200	$ 16.200	9448042221	FEBRERO
	$ 35.600	$ 142.300	$ 61.900	9449513467	MARZO

Contratista: ECOLOGIC INGENIERIA S.A.S.
Rep. Legal: CAMILO ANDRES SALAMANCA FLOREZ
NIT/cédula: 1.030.546.888 De Bogotá D.C.
Dirección: Calle 9C BIS 68 G 29 TO 5 OF 303
Teléfono: 3015627541
Mail: comercial@ecologicingenieria.com

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aportes en línea

Resumen General de Pago

DATOS GENERALES DEL APORTANTE

Identificación	dv	Razon Social	Clase Aportante	Sucursal Principal	Direccion	Ciudad-Departamento	Teléfono	Exonerado SENA e ICBF
NIT 901370333	2	ECOLOGIC INGENIERIA SAS	B - MENOS DE 200 COTIZANTES	ECOLOGIC	CR 136 A 151 B 52 TO 6 OF 403	BOGOTA-BOGOTA D.E.	4607078	SI

DATOS GENERALES DE LA LIQUIDACION

Periodo		Clave		Tipo	Fecha		Pago		
Pensión	Salud	Pago	Planilla	Planilla	Limite	Pago	Banco	Dias Mora	Valor
2023-04	2023-05	2069245193	9450709351	E	2023/05/09	2023/05/08	BANCO DAVIVIENDA	0	$6,524,500

LIQUIDACION DETALLADA DE APORTES

EMPLEADO				PENSION				SALUD				CCF				RIESGOS				PARAFISCALES		
No.	Identificación		Nombres	Codigo	Días	IBC	Aporte	Codigo	Días	IBC	Aporte	Codigo	Días	IBC	Aporte	Codigo	Días	IBC	Aporte	Días	IBC	Aporte
1	CC	11230183	CIFUENTES CARLOS	230301	30	$1,160,000	$185,600	EPS017	30	$1,160,000	$46,400	CCF24	30	$1,160,000	$46,400	14-25	30	$1,160,000	$80,800	30	$0	$0
2	CC	1071171300	CIFUENTES JHONY	230301	30	$1,750,000	$280,000	EPS005	30	$1,750,000	$70,000	CCF24	30	$1,750,000	$70,000	14-25	30	$1,750,000	$121,800	30	$0	$0
3	CC	11232369	CIFUENTES JOSE	230301	30	$3,750,000	$600,000	EPS008	30	$3,750,000	$150,000	CCF24	30	$3,750,000	$150,000	14-25	30	$3,750,000	$261,000	30	$0	$0
4	CC	1110487350	GIRALDO JOHN	230201	30	$1,383,750	$221,400	EPS005	30	$1,383,750	$55,400	CCF24	30	$1,383,750	$55,400	14-25	30	$1,383,750	$96,400	30	$0	$0
5	CC	1018408587	MARQUEZ MARIA	230301	30	$1,900,000	$304,000	EPS005	30	$1,900,000	$76,000	CCF24	30	$1,900,000	$76,000	14-25	30	$1,900,000	$132,300	30	$0	$0
6	CC	1048850537	MELO LAURA	230301	16	$1,333,334	$213,400	EPS037	16	$1,333,334	$53,400	CCF24	16	$1,333,334	$53,400	14-25	16	$1,333,334	$92,900	16	$0	$0
7	CC	1048850537	MELO LAURA	230301	9	$750,000	$120,000	EPS037	9	$750,000	$0	CCF24	9	$750,000	$0	14-25	9	$750,000	$0	9	$0	$0
8	CC	1014260873	MORA LUISA	230301	11	$806,667	$129,100	EPS005	11	$806,667	$32,300	CCF24	11	$806,667	$32,300	14-25	11	$806,667	$56,200	11	$0	$0
9	CC	1110450458	PELAEZ LUIS	231001	30	$1,600,000	$256,000	EPS005	30	$1,600,000	$64,000	CCF24	30	$1,600,000	$64,000	14-25	30	$1,600,000	$111,400	30	$0	$0
10	CC	1030546888	SALAMANCA CAMILO	230201	30	$4,000,000	$640,000	EPS008	30	$4,000,000	$160,000	CCF24	30	$4,000,000	$160,000	14-25	30	$4,000,000	$278,400	30	$0	$0
11	CC	1014177023	VACA SALOMON	25-14	30	$3,000,000	$480,000	EPS008	30	$3,000,000	$120,000	CCF24	30	$3,000,000	$120,000	14-25	30	$3,000,000	$208,800	30	$0	$0
Total			**Afiliados(10)**			$21,433,751	$3,429,500			$21,433,751	$827,500			$21,433,751	$827,500			$21,433,751	$1,440,000		$0	$0

RESUMEN DE PAGO

RIESGO	CODIGO	NIT	DV	AFILIADOS	VALOR LIQUIDADO	INTERESES MORA	SALDOS E INCAPACIDADES	VALOR A PAGAR
AFP (ADMINISTRADORAS: 4)				10	$3,429,500	$0	$0	$3,429,500
COLFONDOS	231001	800,227,940	6	1	$256,000	$0	$0	$256,000
COLPENSIONES	25-14	900,336,004	7	1	$480,000	$0	$0	$480,000
PORVENIR	230301	800,224,808	8	6	$1,832,100	$0	$0	$1,832,100
PROTECCION	230201	800,229,739	0	2	$861,400	$0	$0	$861,400
ARL (ADMINISTRADORAS: 1)				10	$1,440,000	$0	$0	$1,440,000
COLMENA	14-25	800,226,175	3	10	$1,440,000	$0	$0	$1,440,000
CCF (ADMINISTRADORAS: 1)				10	$827,500	$0	$0	$827,500
COMPENSAR	CCF24	860,066,942	7	10	$827,500	$0	$0	$827,500
EPS (ADMINISTRADORAS: 4)				10	$827,500	$0	$0	$827,500
COMPENSAR	EPS008	860,066,942	7	3	$430,000	$0	$0	$430,000
FAMISANAR	EPS017	830,003,564	7	1	$46,400	$0	$0	$46,400
NUEVA E.P.S.	EPS037	900,156,264	2	1	$53,400	$0	$0	$53,400
SANITAS	EPS005	800,251,440	6	5	$297,700	$0	$0	$297,700
TOTAL				**10**	**$6,524,500**	**$0**	**$0**	**$6,524,500**

PLANILLA PAGADA

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Resumen General de Pago

DATOS GENERALES DEL APORTANTE

Identificación	dv	Razon Social	Clase Aportante	Sucursal Principal	Direccion	Ciudad-Departamento	Teléfono	Exonerado SENA e ICBF
NIT 901370333	2	ECOLOGIC INGENIERIA SAS	B - MENOS DE 200 COTIZANTES	ECOLOGIC	CR 136 A 151 B 52 TO 6 OF 403	BOGOTA-BOGOTA D.E.	4607078	SI

DATOS GENERALES DE LA LIQUIDACION

Periodo		Clave		Tipo	Fecha		Pago		
Pensión	Salud	Pago	Planilla	Planilla	Limite	Pago	Banco	Dias Mora	Valor
2023-05	2023-06	2129381400	9452166061	E	2023/06/08	2023/06/09	BANCO DAVIVIENDA	1	$6,167,200

LIQUIDACION DETALLADA DE APORTES

EMPLEADO				PENSION				SALUD				CCF				RIESGOS				PARAFISCALES		
No.	Identificación		Nombres	Codigo	Días	IBC	Aporte	Codigo	Días	IBC	Aporte	Codigo	Días	IBC	Aporte	Codigo	Días	IBC	Aporte	Días	IBC	Aporte
1	CC	11230183	CIFUENTES CARLOS	230301	8	$309,334	$49,500	EPS017	8	$309,334	$12,400	CCF24	8	$309,334	$12,400	14-25	8	$309,334	$21,600	8	$0	$0
2	CC	1071171300	CIFUENTES JHONY	230301	30	$1,750,000	$280,000	EPS005	30	$1,750,000	$70,000	CCF24	30	$1,750,000	$70,000	14-25	30	$1,750,000	$121,800	30	$0	$0
3	CC	11232369	CIFUENTES JOSE	230301	30	$3,750,000	$600,000	EPS008	30	$3,750,000	$150,000	CCF24	30	$3,750,000	$150,000	14-25	30	$3,750,000	$261,000	30	$0	$0
4	CC	1110487350	GIRALDO JOHN	230201	30	$1,383,750	$221,400	EPS005	30	$1,383,750	$55,400	CCF24	30	$1,383,750	$55,400	14-25	30	$1,383,750	$96,400	30	$0	$0
5	CC	1018408587	MARQUEZ MARIA	230301	30	$1,900,000	$304,000	EPS005	30	$1,900,000	$76,000	CCF24	30	$1,900,000	$76,000	14-25	30	$1,900,000	$132,300	30	$0	$0
6	CC	1014260873	MORA LUISA	230301	30	$2,200,000	$352,000	EPS005	30	$2,200,000	$88,000	CCF24	30	$2,200,000	$88,000	14-25	30	$2,200,000	$153,200	30	$0	$0
7	CC	1110450458	PELAEZ LUIS	231001	30	$1,600,000	$256,000	EPS005	30	$1,600,000	$64,000	CCF24	30	$1,600,000	$64,000	14-25	30	$1,600,000	$111,400	30	$0	$0
8	CC	1030546888	SALAMANCA CAMILO	230201	30	$4,000,000	$640,000	EPS008	30	$4,000,000	$160,000	CCF24	30	$4,000,000	$160,000	14-25	30	$4,000,000	$278,400	30	$0	$0
9	CC	1014177023	VACA SALOMON	25-14	30	$3,000,000	$480,000	EPS008	30	$3,000,000	$120,000	CCF24	30	$3,000,000	$120,000	14-25	30	$3,000,000	$208,800	30	$0	$0
Total	**Afiliados(9)**					$19,893,084	$3,182,900			$19,893,084	$795,800			$19,893,084	$795,800			$19,893,084	$1,384,900		$0	$0

RESUMEN DE PAGO

RIESGO	CODIGO	NIT	DV	AFILIADOS	VALOR LIQUIDADO	INTERESES MORA	SALDOS E INCAPACIDADES	VALOR A PAGAR
AFP (ADMINISTRADORAS: 4)				9	$3,182,900	$3,900	$0	$3,186,800
COLFONDOS	231001	800,227,940	6	1	$256,000	$300	$0	$256,300
COLPENSIONES	25-14	900,336,004	7	1	$480,000	$600	$0	$480,600
PORVENIR	230301	800,224,808	8	5	$1,585,500	$1,900	$0	$1,587,400
PROTECCION	230201	800,229,739	0	2	$861,400	$1,100	$0	$862,500
ARL (ADMINISTRADORAS: 1)				9	$1,384,900	$1,700	$0	$1,386,600
COLMENA	14-25	800,226,175	3	9	$1,384,900	$1,700	$0	$1,386,600
CCF (ADMINISTRADORAS: 1)				9	$795,800	$1,000	$0	$796,800
COMPENSAR	CCF24	860,066,942	7	9	$795,800	$1,000	$0	$796,800
EPS (ADMINISTRADORAS: 3)				9	$795,800	$1,200	$0	$797,000
COMPENSAR	EPS008	860,066,942	7	3	$430,000	$600	$0	$430,600
FAMISANAR	EPS017	830,003,564	7	1	$12,400	$100	$0	$12,500
SANITAS	EPS005	800,251,440	6	5	$353,400	$500	$0	$353,900
TOTAL				**9**	**$6,159,400**	**$7,800**	**$0**	**$6,167,200**

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aportes en línea

Resumen General de Pago

DATOS GENERALES DEL APORTANTE

Identificación	dv	Razon Social	Clase Aportante	Sucursal Principal	Direccion	Ciudad-Departamento	Teléfono	Exonerado SENA e ICBF
NIT 901370333	2	ECOLOGIC INGENIERA SAS	B - MENOS DE 200 COTIZANTES	ECOLOGIC	CR 136 A 151 B 52 TO 6 OF 403	BOGOTA-BOGOTA D.E.	4607078	Si

DATOS GENERALES DE LA LIQUIDACION

Periodo		Clave		Tipo	Fecha		Pago		
Pensión	Salud	Pago	Planilla	Planilla	Limite	Pago	Banco	Dias Mora	Valor
2022-08	2022-09	1644418086	9439919905	E	2022/09/08	2022/09/08	BANCO DAVIVIENDA	0	$4,243,100

LIQUIDACION DETALLADA DE APORTES

EMPLEADO				PENSION				SALUD				CCF				RIESGOS				PARAFISCALES		
No.	Identificación		Nombres	Codigo	Dias	IBC	Aporte	Codigo	Dias	IBC	Aporte	Codigo	Dias	IBC	Aporte	Codigo	Dias	IBC	Aporte	Dias	IBC	Aporte
1	CC	11230183	CIFUENTES CARLOS	230301	30	$1,000,000	$160,000	EPS017	30	$1,000,000	$40,000	CCF24	30	$1,000,000	$40,000	14-25	30	$1,000,000	$69,600	30	$0	$0
2	CC	1071171300	CIFUENTES JHONY	230301	30	$1,400,000	$224,000	EPS005	30	$1,400,000	$56,000	CCF24	30	$1,400,000	$56,000	14-25	30	$1,400,000	$97,500	30	$0	$0
3	CC	11232369	CIFUENTES JOSE	230301	30	$3,000,000	$480,000	EPS008	30	$3,000,000	$120,000	CCF24	30	$3,000,000	$120,000	14-25	30	$3,000,000	$208,800	30	$0	$0
4	CC	1110487350	GIRALDO JOHN	230201	30	$1,107,000	$177,200	EPS005	30	$1,107,000	$44,300	CCF24	30	$1,107,000	$44,300	14-25	30	$1,107,000	$77,100	30	$0	$0
5	CC	1105616456	GOMEZ JHONATHAN	230301	7	$233,334	$37,400	ESSC91	7	$233,334	$9,400	CCF24	7	$233,334	$9,400	14-25	7	$233,334	$16,300	7	$0	$0
6	CC	1018408587	MARQUEZ MARIA	230301	30	$1,400,000	$224,000	EPS005	30	$1,400,000	$56,000	CCF24	30	$1,400,000	$56,000	14-25	30	$1,400,000	$97,500	30	$0	$0
7	CC	1005335925	NAVAS SILVIA		0	$0	$0	EPS010	3	$100,000	$12,500		0	$0	$0	14-25	3	$100,000	$7,000	0	$0	$0
8	CC	1030546888	SALAMANCA CAMILO	230201	30	$3,000,000	$480,000	EPS008	30	$3,000,000	$120,000	CCF24	30	$3,000,000	$120,000	14-25	30	$3,000,000	$208,800	30	$0	$0
9	CC	1014177023	VACA SALOMON	25-14	30	$2,500,000	$400,000	EPS008	30	$2,500,000	$100,000	CCF24	30	$2,500,000	$100,000	14-25	30	$2,500,000	$174,000	30	$0	$0
Total			**Afiliados(9)**			**$13,640,334**	**$2,182,600**			**$13,740,334**	**$558,200**			**$13,640,334**	**$545,700**			**$13,740,334**	**$956,600**		**$0**	**$0**

RESUMEN DE PAGO

RIESGO	CODIGO	NIT	DV	AFILIADOS	VALOR LIQUIDADO	INTERESES MORA	SALDOS E INCAPACIDADES	VALOR A PAGAR
AFP (ADMINISTRADORAS: 3)				8	$2,182,600	$0	$0	$2,182,600
COLPENSIONES	25-14	900,336,004	7	1	$400,000	$0	$0	$400,000
PORVENIR	230301	800,224,808	8	5	$1,125,400	$0	$0	$1,125,400
PROTECCION	230201	800,229,739	0	2	$657,200	$0	$0	$657,200
ARL (ADMINISTRADORAS: 1)				9	$956,600	$0	$0	$956,600
COLMENA	14-25	800,226,175	3	9	$956,600	$0	$0	$956,600
CCF (ADMINISTRADORAS: 1)				8	$545,700	$0	$0	$545,700
COMPENSAR	CCF24	860,066,942	7	8	$545,700	$0	$0	$545,700
EPS (ADMINISTRADORAS: 5)				9	$558,200	$0	$0	$558,200
COMPENSAR	EPS008	860,066,942	7	3	$340,000	$0	$0	$340,000
EPS ECOOPSOS S.A.S	ESSC91	901,093,846	0	1	$9,400	$0	$0	$9,400
EPS SURA (ANTES SUSALUD)	EPS010	800,088,702	2	1	$12,500	$0	$0	$12,500
FAMISANAR	EPS017	830,003,564	7	1	$40,000	$0	$0	$40,000
SANITAS	EPS005	800,251,440	6	3	$156,300	$0	$0	$156,300
TOTAL				9	$4,243,100	$0	$0	$4,243,100

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Resumen General de Pago

DATOS GENERALES DEL APORTANTE

Identificación	dv	Razon Social	Clase Aportante	Sucursal Principal	Direccion	Ciudad-Departamento	Teléfono	Exonerado SENA e ICBF
NIT 901370333	2	ECOLOGIC INGENIERIA SAS	B - MENOS DE 200 COTIZANTES	ECOLOGIC	CR 136 A 151 B 52 TO 6 OF 403	BOGOTA-BOGOTA D.E.	4607078	Si

DATOS GENERALES DE LA LIQUIDACION

Periodo		Clave		Tipo	Fecha		Pago		
Pensión	Salud	Pago	Planilla	Planilla	Limite	Pago	Banco	Dias Mora	Valor
2022-09	2022-10	1700201577	9441264424	E	2022/10/10	2022/10/11	BANCO DAVIVIENDA	1	$4,978,600

LIQUIDACION DETALLADA DE APORTES

EMPLEADO				PENSION				SALUD				CCF				RIESGOS				PARAFISCALES		
No.	Identificación		Nombres	Codigo	Dias	IBC	Aporte	Codigo	Dias	IBC	Aporte	Codigo	Dias	IBC	Aporte	Codigo	Dias	IBC	Aporte	Dias	IBC	Aporte
1	CC	11230183	CIFUENTES CARLOS	230301	30	$1,000,000	$160,000	EPS017	30	$1,000,000	$40,000	CCF24	30	$1,000,000	$40,000	14-25	30	$1,000,000	$69,600	30	$0	$0
2	CC	1071171300	CIFUENTES JHONY	230301	30	$1,400,000	$224,000	EPS005	30	$1,400,000	$56,000	CCF24	30	$1,400,000	$56,000	14-25	30	$1,400,000	$97,500	30	$0	$0
3	CC	11232369	CIFUENTES JOSE	230301	30	$3,000,000	$480,000	EPS008	30	$3,000,000	$120,000	CCF24	30	$3,000,000	$120,000	14-25	30	$3,000,000	$208,800	30	$0	$0
4	CC	1110487350	GIRALDO JOHN	230201	30	$1,107,000	$177,200	EPS005	30	$1,107,000	$44,300	CCF24	30	$1,107,000	$44,300	14-25	30	$1,107,000	$77,100	30	$0	$0
5	CC	1018408587	MARQUEZ MARIA	230301	30	$1,400,000	$224,000	EPS005	30	$1,400,000	$56,000	CCF24	30	$1,400,000	$56,000	14-25	30	$1,400,000	$97,500	30	$0	$0
6	CC	1005335925	NAVAS SILVIA	230301	30	$1,600,000	$256,000	EPS010	30	$1,600,000	$200,000	CCF24	30	$1,600,000	$64,000	14-25	30	$1,600,000	$111,400	30	$1,600,000	$80,000
7	CC	1105611603	OCAMPO DIEGO	230301	24	$800,000	$128,000	EPS037	24	$800,000	$32,000	CCF24	24	$800,000	$32,000	14-25	24	$800,000	$55,700	24	$0	$0
8	CC	1030546888	SALAMANCA CAMILO	230201	30	$3,000,000	$480,000	EPS008	30	$3,000,000	$120,000	CCF24	30	$3,000,000	$120,000	14-25	30	$3,000,000	$208,800	30	$0	$0
9	CC	1014177023	VACA SALOMON	25-14	15	$1,250,000	$200,000	EPS008	15	$1,250,000	$50,000	CCF24	15	$1,250,000	$50,000	14-25	15	$1,250,000	$87,000	15	$0	$0
10	CC	1014177023	VACA SALOMON	25-14	15	$1,250,000	$200,000	EPS008	15	$1,250,000	$50,000	CCF24	0	$0	$0	14-25	15	$1,250,000	$0	0	$0	$0
Total			**Afiliados(9)**			**$15,807,000**	**$2,529,200**			**$15,807,000**	**$768,300**			**$14,557,000**	**$582,300**			**$15,807,000**	**$1,013,400**		**$1,600,000**	**$80,000**

RESUMEN DE PAGO

RIESGO	CODIGO	NIT	DV	AFILIADOS	VALOR LIQUIDADO	INTERESES MORA	SALDOS E INCAPACIDADES	VALOR A PAGAR
AFP (ADMINISTRADORAS: 3)				9	$2,529,200	$2,600	$0	$2,531,800
COLPENSIONES	25-14	900,336,004	7	1	$400,000	$400	$0	$400,400
PORVENIR	230301	800,224,808	8	6	$1,472,000	$1,500	$0	$1,473,500
PROTECCION	230201	800,229,739	0	2	$657,200	$700	$0	$657,900
ARL (ADMINISTRADORAS: 1)				9	$1,013,400	$1,000	$0	$1,014,400
COLMENA	14-25	800,226,175	3	9	$1,013,400	$1,000	$0	$1,014,400
CCF (ADMINISTRADORAS: 1)				9	$582,300	$600	$0	$582,900
COMPENSAR	CCF24	860,066,942	7	9	$582,300	$600	$0	$582,900
EPS (ADMINISTRADORAS: 5)				9	$768,300	$1,000	$0	$769,300
COMPENSAR	EPS008	860,066,942	7	3	$340,000	$400	$0	$340,400
EPS SURA (ANTES SUSALUD)	EPS010	800,088,702	2	1	$200,000	$200	$0	$200,200
FAMISANAR	EPS017	830,003,564	7	1	$40,000	$100	$0	$40,100
NUEVA E.P.S.	EPS037	900,156,264	2	1	$32,000	$100	$0	$32,100
SANITAS	EPS005	800,251,440	6	3	$156,300	$200	$0	$156,500
ICBF (ADMINISTRADORAS: 1)				1	$48,000	$100	$0	$48,100
INSTITUTO COLOMBIANO DE BIENESTAR FAMILIAR	PAICBF	899,999,239	2	1	$48,000	$100	$0	$48,100
SENA (ADMINISTRADORAS: 1)				1	$32,000	$100	$0	$32,100
SENA	PASENA	899,999,034	1	1	$32,000	$100	$0	$32,100
TOTAL				9	$4,973,200	$5,400	$0	$4,978,600

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aportes en línea

Resumen General de Pago

DATOS GENERALES DEL APORTANTE

Identificación	dv	Razon Social	Clase Aportante	Sucursal Principal	Direccion	Ciudad-Departamento	Teléfono	Exonerado SENA e ICBF
NIT 901370333	2	ECOLOGIC INGENIERIA SAS	B - MENOS DE 200 COTIZANTES	ECOLOGIC	CR 136 A 151 B 52 TO 6 OF 403	BOGOTA-BOGOTA D.E.	4607078	SI

DATOS GENERALES DE LA LIQUIDACION

Periodo		Clave		Tipo	Fecha		Pago		
Pensión	Salud	Pago	Planilla	Planilla	Limite	Pago	Banco	Dias Mora	Valor
2022-10	2022-11	1750044925	9442598406	E	2022/11/09	2022/11/10	BANCO DAVIVIENDA	1	$4,727,000

LIQUIDACION DETALLADA DE APORTES

EMPLEADO				PENSION				SALUD				CCF				RIESGOS				PARAFISCALES			
No.	Identificación		Nombres	Codigo	Días	IBC	Aporte	Codigo	Días	IBC	Aporte	Codigo	Días	IBC	Aporte	Codigo	Días	IBC	Aporte	Días	IBC	Aporte
1	CC	11230183	CIFUENTES CARLOS	230301	10	$333,334	$53,400	EPS017	10	$333,334	$13,400	CCF24	10	$333,334	$13,400	14-25	10	$333,334	$23,300	10	$0	$0
2	CC	1071171300	CIFUENTES JHONY	230301	30	$1,400,000	$224,000	EPS005	30	$1,400,000	$56,000	CCF24	30	$1,400,000	$56,000	14-25	30	$1,400,000	$97,500	30	$0	$0
3	CC	11232369	CIFUENTES JOSE	230301	30	$3,000,000	$480,000	EPS008	30	$3,000,000	$120,000	CCF24	30	$3,000,000	$120,000	14-25	30	$3,000,000	$208,800	30	$0	$0
4	CC	1110487350	GIRALDO JOHN	230201	15	$553,500	$88,600	EPS005	15	$553,500	$22,200	CCF24	15	$553,500	$22,200	14-25	15	$553,500	$38,600	15	$0	$0
5	CC	1110487350	GIRALDO JOHN	230201	15	$553,500	$88,600	EPS005	15	$553,500	$22,200	CCF24	15	$553,500	$22,200	14-25	15	$553,500	$0	15	$0	$0
6	CC	1018408587	MARQUEZ MARIA	230301	30	$1,400,000	$224,000	EPS005	30	$1,400,000	$56,000	CCF24	30	$1,400,000	$56,000	14-25	30	$1,400,000	$97,500	30	$0	$0
7	CC	1005335925	NAVAS SILVIA	230301	30	$1,600,000	$256,000	EPS010	30	$1,600,000	$200,000	CCF24	30	$1,600,000	$64,000	14-25	30	$1,600,000	$111,400	30	$1,600,000	$80,000
8	CC	1105611603	OCAMPO DIEGO	230301	10	$333,334	$53,400	EPS037	10	$333,334	$13,400	CCF24	10	$333,334	$13,400	14-25	10	$333,334	$23,300	10	$0	$0
9	CC	1030546888	SALAMANCA CAMILO	230201	30	$3,000,000	$480,000	EPS008	30	$3,000,000	$120,000	CCF24	30	$3,000,000	$120,000	14-25	30	$3,000,000	$208,800	30	$0	$0
10	CC	1014177023	VACA SALOMON	25-14	30	$2,500,000	$400,000	EPS008	30	$2,500,000	$100,000	CCF24	30	$2,500,000	$100,000	14-25	30	$2,500,000	$174,000	30	$0	$0
Total			**Afiliados(9)**			$14,673,668	$2,348,000			$14,673,668	$723,200			$14,673,668	$587,200			$14,673,668	$983,200		$1,600,000	$80,000

RESUMEN DE PAGO

RIESGO	CODIGO	NIT	DV	AFILIADOS	VALOR LIQUIDADO	INTERESES MORA	SALDOS E INCAPACIDADES	VALOR A PAGAR
AFP (ADMINISTRADORAS: 3)				9	$2,348,000	$2,500	$0	$2,350,500
COLPENSIONES	25-14	900,336,004	7	1	$400,000	$500	$0	$400,500
PORVENIR	230301	800,224,808	8	6	$1,290,800	$1,300	$0	$1,292,100
PROTECCION	230201	800,229,739	0	2	$657,200	$700	$0	$657,900
ARL (ADMINISTRADORAS: 1)				9	$983,200	$1,000	$0	$984,200
COLMENA	14-25	800,226,175	3	9	$983,200	$1,000	$0	$984,200
CCF (ADMINISTRADORAS: 1)				9	$587,200	$600	$0	$587,800
COMPENSAR	CCF24	860,066,942	7	9	$587,200	$600	$0	$587,800
EPS (ADMINISTRADORAS: 5)				9	$723,200	$1,100	$0	$724,300
COMPENSAR	EPS008	860,066,942	7	3	$340,000	$400	$0	$340,400
EPS SURA (ANTES SUSALUD)	EPS010	800,088,702	2	1	$200,000	$300	$0	$200,300
FAMISANAR	EPS017	830,003,564	7	1	$13,400	$100	$0	$13,500
NUEVA E.P.S.	EPS037	900,156,264	2	1	$13,400	$100	$0	$13,500
SANITAS	EPS005	800,251,440	6	3	$156,400	$200	$0	$156,600
ICBF (ADMINISTRADORAS: 1)				1	$48,000	$100	$0	$48,100
INSTITUTO COLOMBIANO DE BIENESTAR FAMILIAR	PAICBF	899,999,239	2	1	$48,000	$100	$0	$48,100
SENA (ADMINISTRADORAS: 1)				1	$32,000	$100	$0	$32,100
SENA	PASENA	899,999,034	1	1	$32,000	$100	$0	$32,100
TOTAL				9	$4,721,600	$5,400	$0	$4,727,000

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Resumen General de Pago

DATOS GENERALES DEL APORTANTE

Identificación	dv	Razon Social	Clase Aportante	Sucursal Principal	Direccion	Ciudad-Departamento	Teléfono	Exonerado SENA e ICBF
NIT 901370333	2	ECOLOGIC INGENIERIA SAS	B - MENOS DE 200 COTIZANTES	ECOLOGIC	CR 136 A 151 B 52 TO 6 OF 403	BOGOTA-BOGOTA D.E.	4607078	Si

DATOS GENERALES DE LA LIQUIDACION

Periodo		Clave		Tipo	Fecha		Pago		
Pensión	Salud	Pago	Planilla	Planilla	Limite	Pago	Banco	Dias Mora	Valor
2023-01	2023-02	1907208130	9446693139	E	2023/02/08	2023/02/08	BANCO DAVIVIENDA	0	$6,791,300

LIQUIDACION DETALLADA DE APORTES

EMPLEADO				PENSION				SALUD				CCF				RIESGOS				PARAFISCALES		
No.	Identificación		Nombres	Codigo	Dias	IBC	Aporte	Codigo	Dias	IBC	Aporte	Codigo	Dias	IBC	Aporte	Codigo	Dias	IBC	Aporte	Dias	IBC	Aporte
1	CC	11230183	CIFUENTES CARLOS	230301	30	$1,160,000	$185,600	EPS017	30	$1,160,000	$46,400	CCF24	30	$1,160,000	$46,400	14-25	30	$1,160,000	$80,800	30	$0	$0
2	CC	1071171300	CIFUENTES JHONY	230301	30	$1,750,000	$280,000	EPS005	30	$1,750,000	$70,000	CCF24	30	$1,750,000	$70,000	14-25	30	$1,750,000	$121,800	30	$0	$0
3	CC	11232369	CIFUENTES JOSE	230301	30	$3,750,000	$600,000	EPS008	30	$3,750,000	$150,000	CCF24	30	$3,750,000	$150,000	14-25	30	$3,750,000	$261,000	30	$0	$0
4	CC	1110487350	GIRALDO JOHN	230201	30	$1,383,750	$221,400	EPS005	30	$1,383,750	$55,400	CCF24	30	$1,383,750	$55,400	14-25	30	$1,383,750	$96,400	30	$0	$0
5	CC	1018408587	MARQUEZ MARIA	230301	30	$1,900,000	$304,000	EPS005	30	$1,900,000	$76,000	CCF24	30	$1,900,000	$76,000	14-25	30	$1,900,000	$132,300	30	$0	$0
6	CC	1007135035	MARTINEZ HERMENSON	230301	11	$425,334	$68,100	EPS017	11	$425,334	$17,100	CCF24	11	$425,334	$17,100	14-25	11	$425,334	$29,700	11	$0	$0
7	CC	1048850537	MELO LAURA	230301	30	$2,500,000	$400,000	EPS037	30	$2,500,000	$100,000	CCF24	30	$2,500,000	$100,000	14-25	30	$2,500,000	$174,000	30	$0	$0
8	CC	1110450458	PELAEZ LUIS	231001	30	$1,600,000	$256,000	EPS005	30	$1,600,000	$64,000	CCF24	30	$1,600,000	$64,000	14-25	30	$1,600,000	$111,400	30	$0	$0
9	CC	1030546888	SALAMANCA CAMILO	230201	30	$4,000,000	$640,000	EPS008	30	$4,000,000	$160,000	CCF24	30	$4,000,000	$160,000	14-25	30	$4,000,000	$278,400	30	$0	$0
10	CC	1014177023	VACA SALOMON	25-14	30	$3,000,000	$480,000	EPS008	30	$3,000,000	$120,000	CCF24	30	$3,000,000	$120,000	14-25	30	$3,000,000	$208,800	30	$0	$0
11	CC	1020793668	VARGAS DANILO	230301	12	$464,000	$74,300	EPS037	12	$464,000	$18,600	CCF24	12	$464,000	$18,600	14-25	12	$464,000	$32,300	12	$0	$0
Total			**Afiliados(11)**			$21,933,084	$3,509,400			$21,933,084	$877,500			$21,933,084	$877,500			$21,933,084	$1,526,900		$0	$0

RESUMEN DE PAGO

RIESGO	CODIGO	NIT	DV	AFILIADOS	VALOR LIQUIDADO	INTERESES MORA	SALDOS E INCAPACIDADES	VALOR A PAGAR
AFP (ADMINISTRADORAS: 4)				11	$3,509,400	$0	$0	$3,509,400
COLFONDOS	231001	800,227,940	6	1	$256,000	$0	$0	$256,000
COLPENSIONES	25-14	900,336,004	7	1	$480,000	$0	$0	$480,000
PORVENIR	230301	800,224,808	8	7	$1,912,000	$0	$0	$1,912,000
PROTECCION	230201	800,229,739	0	2	$861,400	$0	$0	$861,400
ARL (ADMINISTRADORAS: 1)				11	$1,526,900	$0	$0	$1,526,900
COLMENA	14-25	800,226,175	3	11	$1,526,900	$0	$0	$1,526,900
CCF (ADMINISTRADORAS: 1)				11	$877,500	$0	$0	$877,500
COMPENSAR	CCF24	860,066,942	7	11	$877,500	$0	$0	$877,500
EPS (ADMINISTRADORAS: 4)				11	$877,500	$0	$0	$877,500
COMPENSAR	EPS008	860,066,942	7	3	$430,000	$0	$0	$430,000
FAMISANAR	EPS017	830,003,564	7	2	$63,500	$0	$0	$63,500
NUEVA E.P.S.	EPS037	900,156,264	2	2	$118,600	$0	$0	$118,600
SANITAS	EPS005	800,251,440	6	4	$265,400	$0	$0	$265,400
TOTAL				11	$6,791,300	$0	$0	$6,791,300

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Resumen General de Pago

DATOS GENERALES DEL APORTANTE

Identificación	dv	Razon Social	Clase Aportante	Sucursal Principal	Direccion	Ciudad-Departamento	Teléfono	Exonerado SENA e ICBF
NIT 901370333	2	ECOLOGIC INGENIERIA SAS	B - MENOS DE 200 COTIZANTES	ECOLOGIC	CR 136 A 151 B 52 TO 6 OF 403	BOGOTA-BOGOTA D.E.	4607078	Si

DATOS GENERALES DE LA LIQUIDACION

Periodo		Clave		Tipo	Fecha		Pago		
Pensión	Salud	Pago	Planilla	Planilla	Limite	Pago	Banco	Dias Mora	Valor
2023-02	2023-03	1960852715	9448042221	E	2023/03/08	2023/03/09	BANCO DAVIVIENDA	1	$7,411,400

LIQUIDACION DETALLADA DE APORTES

EMPLEADO				PENSION				SALUD				CCF				RIESGOS				PARAFISCALES		
No.	Identificación		Nombres	Codigo	Dias	IBC	Aporte	Codigo	Dias	IBC	Aporte	Codigo	Dias	IBC	Aporte	Codigo	Dias	IBC	Aporte	Dias	IBC	Aporte
1	CC	11230183	CIFUENTES CARLOS	230301	30	$1,160,000	$185,600	EPS017	30	$1,160,000	$46,400	CCF24	30	$1,160,000	$46,400	14-25	30	$1,160,000	$80,800	30	$0	$0
2	CC	1071171300	CIFUENTES JHONY	230301	30	$1,750,000	$280,000	EPS005	30	$1,750,000	$70,000	CCF24	30	$1,750,000	$70,000	14-25	30	$1,750,000	$121,800	30	$0	$0
3	CC	11232369	CIFUENTES JOSE	230301	30	$3,750,000	$600,000	EPS008	30	$3,750,000	$150,000	CCF24	30	$3,750,000	$150,000	14-25	30	$3,750,000	$261,000	30	$0	$0
4	CE	5853978	DORANTE JOSE	230301	6	$232,000	$37,200	EPS037	6	$232,000	$9,300	CCF24	6	$232,000	$9,300	14-25	6	$232,000	$16,200	6	$0	$0
5	CC	1110487350	GIRALDO JOHN	230201	30	$1,383,750	$221,400	EPS005	30	$1,383,750	$55,400	CCF24	30	$1,383,750	$55,400	14-25	30	$1,383,750	$96,400	30	$0	$0
6	CC	1018406587	MARQUEZ MARIA	230301	30	$1,900,000	$304,000	EPS005	30	$1,900,000	$76,000	CCF24	30	$1,900,000	$76,000	14-25	30	$1,900,000	$132,300	30	$0	$0
7	CC	1007135035	MARTINEZ HERMENSON	230301	30	$1,160,000	$185,600	EPS017	30	$1,160,000	$46,400	CCF24	30	$1,160,000	$46,400	14-25	30	$1,160,000	$80,800	30	$0	$0
8	CC	1048850537	MELO LAURA	230301	30	$2,500,000	$400,000	EPS037	30	$2,500,000	$100,000	CCF24	30	$2,500,000	$100,000	14-25	30	$2,500,000	$174,000	30	$0	$0
9	CC	1006130677	MENDOZA JHON	230301	8	$309,334	$49,500	EPS037	8	$309,334	$12,400	CCF24	8	$309,334	$12,400	14-25	8	$309,334	$21,600	8	$0	$0
10	CC	1110450458	PELAEZ LUIS	231001	30	$1,600,000	$256,000	EPS005	30	$1,600,000	$64,000	CCF24	30	$1,600,000	$64,000	14-25	30	$1,600,000	$111,400	30	$0	$0
11	CC	1030546888	SALAMANCA CAMILO	230201	30	$4,000,000	$640,000	EPS008	30	$4,000,000	$160,000	CCF24	30	$4,000,000	$160,000	14-25	30	$4,000,000	$278,400	30	$0	$0
12	CC	1014177023	VACA SALOMON	25-14	30	$3,000,000	$480,000	EPS008	30	$3,000,000	$120,000	CCF24	30	$3,000,000	$120,000	14-25	30	$3,000,000	$208,800	30	$0	$0
13	CC	1020793668	VARGAS DANILO	230301	30	$1,160,000	$185,600	EPS037	30	$1,160,000	$46,400	CCF24	30	$1,160,000	$46,400	14-25	30	$1,160,000	$80,800	30	$0	$0
Total			**Afiliados(13)**			**$23,905,084**	**$3,824,900**			**$23,905,084**	**$956,300**			**$23,905,084**	**$956,300**			**$23,905,084**	**$1,664,300**		**$0**	**$0**

RESUMEN DE PAGO

RIESGO	CODIGO	NIT	DV	AFILIADOS	VALOR LIQUIDADO	INTERESES MORA	SALDOS E INCAPACIDADES	VALOR A PAGAR
AFP (ADMINISTRADORAS: 4)				13	$3,824,900	$4,800	$0	$3,829,700
COLFONDOS	231001	800,227,940	6	1	$256,000	$400	$0	$256,400
COLPENSIONES	25-14	900,336,004	7	1	$480,000	$600	$0	$480,600
PORVENIR	230301	800,224,808	8	9	$2,227,500	$2,700	$0	$2,230,200
PROTECCION	230201	800,229,739	0	2	$861,400	$1,100	$0	$862,500
ARL (ADMINISTRADORAS: 1)				13	$1,664,300	$2,100	$0	$1,666,400
COLMENA	14-25	800,226,175	3	13	$1,664,300	$2,100	$0	$1,666,400
CCF (ADMINISTRADORAS: 1)				13	$956,300	$1,200	$0	$957,500
COMPENSAR	CCF24	860,066,942	7	13	$956,300	$1,200	$0	$957,500
EPS (ADMINISTRADORAS: 4)				13	$956,300	$1,500	$0	$957,800
COMPENSAR	EPS008	860,066,942	7	3	$430,000	$600	$0	$430,600
FAMISANAR	EPS017	830,003,564	7	2	$92,800	$200	$0	$93,000
NUEVA E.P.S.	EPS037	900,156,264	2	4	$168,100	$300	$0	$168,400
SANITAS	EPS005	800,251,440	6	4	$265,400	$400	$0	$265,800
TOTAL				13	$7,401,800	$9,600	$0	$7,411,400

aportes en línea

Resumen General de Pago

DATOS GENERALES DEL APORTANTE

Identificación	dv	Razon Social	Clase Aportante	Sucursal Principal	Direccion	Ciudad-Departamento	Teléfono	Exonerado SENA e ICBF
NIT 901370333	2	ECOLOGIC INGENIERIA SAS	B - MENOS DE 200 COTIZANTES	ECOLOGIC	CR 136 A 151 B 52 TO 6 OF 403	BOGOTA-BOGOTA D.E.	4607078	SI

DATOS GENERALES DE LA LIQUIDACION

Periodo		Clave		Tipo	Fecha		Pago		
Pensión	Salud	Pago	Planilla	Planilla	Limite	Pago	Banco	Dias Mora	Valor
2023-03	2023-04	2021523030	9449513467	E	2023/04/12	2023/04/13	BANCO DAVIVIENDA	1	$7,685,400

LIQUIDACION DETALLADA DE APORTES

EMPLEADO				PENSION				SALUD				CCF				RIESGOS				PARAFISCALES		
No.	Identificación		Nombres	Codigo	Días	IBC	Aporte	Codigo	Días	IBC	Aporte	Codigo	Días	IBC	Aporte	Codigo	Días	IBC	Aporte	Días	IBC	Aporte
1	CC	11230183	CIFUENTES CARLOS	230301	30	$1,160,000	$185,600	EPS017	30	$1,160,000	$46,400	CCF24	30	$1,160,000	$46,400	14-25	30	$1,160,000	$80,800	30	$0	$0
2	CC	1071171300	CIFUENTES JHONY	230301	30	$1,750,000	$280,000	EPS005	30	$1,750,000	$70,000	CCF24	30	$1,750,000	$70,000	14-25	30	$1,750,000	$121,800	30	$0	$0
3	CC	11232369	CIFUENTES JOSE	230301	30	$3,750,000	$600,000	EPS008	30	$3,750,000	$150,000	CCF24	30	$3,750,000	$150,000	14-25	30	$3,750,000	$261,000	30	$0	$0
4	CE	5853978	DORANTE JOSE	230301	23	$889,334	$142,300	EPS037	23	$889,334	$35,600	CCF24	23	$889,334	$35,600	14-25	23	$889,334	$61,900	23	$0	$0
5	CC	1110487350	GIRALDO JOHN	230201	30	$1,383,750	$221,400	EPS005	30	$1,383,750	$55,400	CCF24	30	$1,383,750	$55,400	14-25	30	$1,383,750	$96,400	30	$0	$0
6	CC	1018408587	MARQUEZ MARIA	230301	30	$1,900,000	$304,000	EPS005	30	$1,900,000	$76,000	CCF24	30	$1,900,000	$76,000	14-25	30	$1,900,000	$132,300	30	$0	$0
7	CC	1007135035	MARTINEZ HERMENSON	230301	28	$1,082,667	$173,300	EPS017	28	$1,082,667	$43,400	CCF24	28	$1,082,667	$43,400	14-25	28	$1,082,667	$75,400	28	$0	$0
8	CC	1048850537	MELO LAURA	230301	25	$2,083,334	$333,400	EPS037	25	$2,083,334	$83,400	CCF24	25	$2,083,334	$83,400	14-25	25	$2,083,334	$145,100	25	$0	$0
9	CC	1048850537	MELO LAURA	230301	5	$416,667	$66,700	EPS037	5	$416,667	$0	CCF24	5	$416,667	$0	14-25	5	$416,667	$0	5	$0	$0
10	CC	1006130677	MENDOZA JHON	230301	23	$889,334	$142,300	EPS037	23	$889,334	$35,600	CCF24	23	$889,334	$35,600	14-25	23	$889,334	$61,900	23	$0	$0
11	CC	1110450458	PELAEZ LUIS	231001	30	$1,600,000	$256,000	EPS005	30	$1,600,000	$64,000	CCF24	30	$1,600,000	$64,000	14-25	30	$1,600,000	$111,400	30	$0	$0
12	CC	1030546888	SALAMANCA CAMILO	230201	30	$4,000,000	$640,000	EPS008	30	$4,000,000	$160,000	CCF24	30	$4,000,000	$160,000	14-25	30	$4,000,000	$278,400	30	$0	$0
13	CC	1014177023	VACA SALOMON	25-14	30	$3,000,000	$480,000	EPS008	30	$3,000,000	$120,000	CCF24	30	$3,000,000	$120,000	14-25	30	$3,000,000	$208,800	30	$0	$0
14	CC	1026793668	VARGAS DANILO	230301	28	$1,082,667	$173,300	EPS037	28	$1,082,667	$43,400	CCF24	28	$1,082,667	$43,400	14-25	28	$1,082,667	$75,400	28	$0	$0
Total	**Afiliados(13)**					**$24,987,753**	**$3,998,300**			**$24,987,753**	**$983,200**			**$24,987,753**	**$983,200**			**$24,987,753**	**$1,710,600**		**$0**	**$0**

RESUMEN DE PAGO

RIESGO	CODIGO	NIT	DV	AFILIADOS	VALOR LIQUIDADO	INTERESES MORA	SALDOS E INCAPACIDADES	VALOR A PAGAR
AFP (ADMINISTRADORAS: 4)				13	$3,998,300	$5,100	$0	$4,003,400
COLFONDOS	231001	800,227,940	6	1	$256,000	$400	$0	$256,400
COLPENSIONES	25-14	900,336,004	7	1	$480,000	$600	$0	$480,600
PORVENIR	230301	800,224,808	8	9	$2,400,900	$3,000	$0	$2,403,900
PROTECCION	230201	800,229,739	0	2	$861,400	$1,100	$0	$862,500
ARL (ADMINISTRADORAS: 1)				13	$1,710,600	$2,200	$0	$1,712,800
COLMENA	14-25	800,226,175	3	13	$1,710,600	$2,200	$0	$1,712,800
CCF (ADMINISTRADORAS: 1)				13	$983,200	$1,300	$0	$984,500
COMPENSAR	CCF24	860,066,942	7	13	$983,200	$1,300	$0	$984,500
EPS (ADMINISTRADORAS: 4)				13	$983,200	$1,500	$0	$984,700
COMPENSAR	EPS008	860,066,942	7	3	$430,000	$600	$0	$430,600
FAMISANAR	EPS017	830,003,564	7	2	$89,800	$200	$0	$90,000
NUEVA E.P.S.	EPS037	900,156,264	2	4	$198,000	$300	$0	$198,300
SANITAS	EPS005	800,251,440	6	4	$265,400	$400	$0	$265,800
TOTAL				13	$7,675,300	$10,100	$0	$7,685,400

2023/04/13 09:52 AM

REPUBLICA DE COLOMBIA
IDENTIFICACION PERSONAL
CEDULA DE CIUDADANIA

NUMERO 1.030.546.888
SALAMANCA FLOREZ

APELLIDOS
CAMILO ANDRES

NOMBRES



FIRMA

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FECHA DE NACIMIENTO 27-FEB-1988

BOGOTA D.C
(CUNDINAMARCA)
LUGAR DE NACIMIENTO

1.72 ESTATURA | O+ G.S. RH | M SEXO

11-JUL-2006 BOGOTA D.C
FECHA Y LUGAR DE EXPEDICION

REGISTRADOR NACIONAL
CARLOS ARIEL SÁNCHEZ TORRES

INDICE DERECHO

A-1500150-00360895-M-1030546888-20120214 0029206076A 1 1521703324

Scanned by CamScanner



República de Colombia
Ministerio de Comercio Industria y Turismo
JUNTA CENTRAL DE CONTADORES
TARJETA PROFESIONAL
DE CONTADOR PUBLICO

156342-T

LUZ HELENA
ORDOÑEZ CORONADO
C.C. 52414065
RESOLUCION INSCRIPCION 058 FECHA 10/02/2011
UNIVERSIDAD C. U. DE CIENCIA Y DESARROLLO

PRESIDENTE

MAURICIO ESPAÑOL LEON 166712



FIRMA DEL TITULAR 82096

Esta tarjeta es el único documento que lo acredita como CONTADOR PUBLICO de acuerdo con lo establecido en la Ley 43 de 1990.
Agradecemos a quien encuentre esta tarjeta devolverla al Ministerio de Comercio Industria y Turismo - Junta Central de Contadores.

UNIDAD ADMINISTRATIVA ESPECIAL **JUNTA CENTRAL DE CONTADORES**

Certificado No:

7B4B78FE54B701F2

LA REPUBLICA DE COLOMBIA

MINISTERIO DE COMERCIO, INDUSTRIA Y TURISMO

UNIDAD ADMINISTRATIVA ESPECIAL

JUNTA CENTRAL DE CONTADORES

CERTIFICA A:
QUIEN INTERESE

Que el contador público **LUZ HELENA ORDOÑEZ CORONADO** identificado con CÉDULA DE CIUDADANÍA No 52414085 de BOGOTA, D.C. (BOGOTA D.C) Y Tarjeta Profesional No 156342-T SI tiene vigente su inscripción en la Junta Central de Contadores y desde los últimos 5 años.

NO REGISTRA ANTECEDENTES DISCIPLINARIOS **********
****
****

EL CONTADOR PUBLICO NO HA CUMPLIDO CON LA OBLIGACION DE ACTUALIZAR EL REGISTRO

Dado en BOGOTA a los 15 días del mes de Marzo de 2023 con vigencia de (3) Meses, contados a partir de la fecha de su expedición.

DIRECTOR GENERAL

ESTE CERTIFICADO DIGITAL TIENE PLENA VALIDEZ DE CONFORMIDAD CON LO ESTABLECIDO EN EL ARTICULO 2 DE LA LEY 527 DE 1999, DECRETO UNICO REGLAMENTARIO 1074 DE 2015 Y ARTICULO 6 PARAGRAFO 3 DE LA LEY 962 DEL 2005

Para confirmar los datos y veracidad de este certificado, lo puede consultar en la página web www.jcc.gov.co digitando el número del certificado

UNIDAD ADMINISTRATIVA ESPECIAL **JUNTA CENTRAL DE CONTADORES**

Certificado No:

9AAB7CCCE6879CDB

LA REPUBLICA DE COLOMBIA

MINISTERIO DE COMERCIO, INDUSTRIA Y TURISMO

UNIDAD ADMINISTRATIVA ESPECIAL

JUNTA CENTRAL DE CONTADORES

CERTIFICA A:
QUIEN INTERESE

Que el contador público **LUZ HELENA ORDOÑEZ CORONADO** identificado con CÉDULA DE CIUDADANÍA No 52414085 de BOGOTA, D.C. (BOGOTA D.C) Y Tarjeta Profesional No 156342-T SI tiene vigente su inscripción en la Junta Central de Contadores y desde la fecha de Inscripción.

NO REGISTRA ANTECEDENTES DISCIPLINARIOS **********
****
****

Dado en BOGOTA a los 19 días del mes de Mayo de 2023 con vigencia de (3) Meses, contados a partir de la fecha de su expedición.

DIRECTOR GENERAL

ESTE CERTIFICADO DIGITAL TIENE PLENA VALIDEZ DE CONFORMIDAD CON LO ESTABLECIDO EN EL ARTICULO 2 DE LA LEY 527 DE 1999, DECRETO UNICO REGLAMENTARIO 1074 DE 2015 Y ARTICULO 6 PARAGRAFO 3 DE LA LEY 962 DEL 2005

Para confirmar los datos y veracidad de este certificado, lo puede consultar en la página web www.jcc.gov.co digitando el número del certificado



REPUBLICA DE COLOMBIA
IDENTIFICACION PERSONAL
CEDULA DE CIUDADANIA
NUMERO 52.414.085
ORDOÑEZ CORONADO
APELLIDOS
LUZ HELENA
NOMBRES



FECHA DE NACIMIENTO 12-JUN-1976
BOGOTA D.C.
(CUNDINAMARCA)
LUGAR DE NACIMIENTO
1.60 ESTATURA
O+ G.S. RH
F SEXO
31-OCT-1994 BOGOTA D.C.
FECHA Y LUGAR DE EXPEDICION
REGISTRADOR NACIONAL
INDICE DERECHO
A-1528000-39147783-F-0052414085-20090512 03071 06132A 02 158138061

Ecologic Ingeniería S.A.S.
NIT | 901370333-2

INFORME TÉCNICO SUMINISTRO E INSTALACIÓN DE TRES ESTACIONES METEOROLÓGICAS PARQUE DEPORTIVO, BOCATOMA LA POLA Y BOCATOMA CHEMBE

Ecologic Ingeniería

Ecologic Ingeniería S.A.S.
NIT | 901370333-2
PBX +57(1) 875 7683
Carrera 4° No. 36-65 / Interior 1
La Calera, Cundinamarca, Colombia

INFORME TÉCNICO SUMINISTRO E INSTALACION DE TRES ESTACIONES METEOROLÓGICAS PARQUE DEPORTIVO, BOCATOMA LA POLA Y BOCATOMA CHEMBE.

Cliente: INSTITUTO MUNICIPAL PARA EL DEPORTE Y LA RECREACION DE IBAGUÉ- IMDRI
Contrato No. 221 del 18 de Julio de 2022

Ecologic Ingeniería S.A.S.
NIT | 901370333-2

CONTENIDO

1. OBJETIVOS 3
2. ANTECEDENTES 4
3. ESTACIONES METEOROLOGICAS – ACTIVIDADES REALIZADAS 5
4. CONCLUSIONES Y SUGERENCIAS 15

1 OBJETIVOS

1. Construir las obras civiles, cerramientos, estructuras de fijación y protección para la instalación y puesta en marcha de las estaciones meteorológicas.

2. Suministrar e instalar los equipos meteorológicos en los sitios que defina el supervisor del contrato

3. Realizar las pruebas de funcionamiento, almacenamiento y transmisión de datos al software Datasphere.

4. Realizar Informe técnico de instalación las estaciones instaladas, en el que se indique las actividades realizadas y las recomendaciones a seguir para el buen funcionamiento de las estaciones.

2 ANTECEDENTES

Según la resolución 1627 del 18 de mayo de 2021 expedida por CORTOLIMA, se acepta una alternativa para cumplimiento de la medida compensatoria y se dictan otras disposiciones, en su artículo 4. "Ordenar al instituto municipal para el deporte y la recreación de Ibagué – IMDRI (...), como medida compensatoria con ocasión del otorgamiento del permiso de ocupación de cauce la instalación por un periodo no inferior a veinte años, de una estación meteorológica automática con transmisión de datos vía GPRS o satelital, en el municipio de Ibagué..." Además, en el artículo 5. Se ordena "como medida compensatoria con ocasión del otorgamiento del permiso de ocupación de cauce la instalación de dos estaciones meteorológicas automáticas adicionales a las requeridas en el artículo 4°, **para un total de tres."**

En cumplimiento de lo anterior, IMDRI a través del proceso de selección abreviada de menor cuantía No. IMDRI-SAMC-216-2022, adjudica y suscribe con Ecologic Ingeniería SAS el contrato No. 0221 del 18 de julio de 2022, cuyo objeto es "Realizar el suministro e instalación de tres estaciones meteorológicas en cumplimiento de la resolución No. 1627 del 28 de mayo de 2021 expedida por CORTOLIMA".

3 SUMINISTRO E INSTALACION ESTACIONES METEOROLOGICAS.

A continuación, se plasma cada una de las actividades ejecutadas para el suministro e instalación de tres (3) estaciones meteorológicas en los sitios definidos por el Instituto Municipal para el Deporte y la Recreación de Ibagué - IMDRI, en el marco del contrato No. 0221 del 18 de julio de 2022, para dar cumplimiento al objeto y obligaciones contractuales pactadas entre las partes, con el fin de atender lo dispuesto en la resolución No. 1627 del 28 de mayo de 2021 expedida por CORTOLIMA.

Ecologic Ingeniería S.A.S.
NIT | 901370333-2

ESTACIÓN METEOROLÓGICA SECTOR PARQUE DEPORTIVO - IBAGUÉ.



De acuerdo con el sitio previamente aprobado por la supervisión del contrato, la estación meteorológica se instaló en las coordenadas 4°25'35.23"N, 75°10'58.17"O, dentro de las instalaciones del parque deportivo de la ciudad de Ibagué.



Imagen. Localización estación meteorológica dentro de instalaciones parque deportivo – Imagen tomada de Google Earth

A continuación, se mencionan y se describen las actividades adelantadas para la construcción de las obras civiles necesarias para la instalación de la estación meteorológica, con su respectivo registro fotográfico:

- **LOCALIZACION Y REPLANTEO:**

En esta actividad se realizó la ubicación, nivelación y control permanente del sitio de instalación de la estación meteorológica, en la posición geográfica indicada, tomada en campo, por medio de coordenadas previamente definidas.

Se demarcó la zona de trabajo, delimitando el área con un cerramiento provisional en poli sombra, dejando al espacio suficiente al interior y poder ejecutar las obras civiles necesarias para la instalación de la estación meteorológica.



Foto 1 y 2. Delimitacion y cerramiento provisional en tela, área de trabajo.

- **ADECUACION DEL TERRENO EN EL PUNTO DE INSTALACIÓN**

Esta actividad comprendió en el desmonte, descapote y limpieza del área de instalación de la estación, incluye retiro y disposición final. Comprendió en el suministro de toda la mano de obra, equipo y materiales necesarios para ejecutar las operaciones de desmonte, descapote y limpieza de las áreas que se encontraban cubiertas de rastrojo, maleza y pastos incluyendo el retiro de escombro y basuras, limpieza del área contemplada en el proyecto, de tal forma que el terreno quedó totalmente limpio y libre de obstáculos que pudieran interferir con el proyecto y toda vegetación y escombros para iniciar los trabajos.

Los trabajos de desmonte, descapote y limpieza se efectuó en toda el área con maleza y vegetación, que iba a ser ocupada por la estación meteorológica, tomando las precauciones necesarias para lograr condiciones de seguridad satisfactorias.

Consistió además de la limpieza general de obstáculos presentes, la nivelación del área de trabajo.



Foto 3 a 5. Adecuación del terreno zona de trabajo

- **CIMENTACIÓN**

Esta actividad consistió en dos fases, la primera en la instalación del acero de refuerzo, incluyendo suministro, almacenamiento, figurado y colocación, tamaño, forma, calidad y cantidad de acuerdo con lo indicado en los planos, la segunda fase corresponde a la instalación del concreto, el cual contempló el suministro de materiales, equipos, fabricación, transporte, colocación, vibrado, curado y acabados del concreto mezclado para la construcción de la viga perimetral y de los pedestales de soporte para la instalación de mástiles donde se ubicaron los equipos que van a monitorear los parámetros ambientales.

Para el figurado las varillas ser doblaron en frío, de acuerdo con lo definido en los planos. Las varillas estaban libres de óxido y cualquier material extraño. Los aceros de refuerzo se colocaron en su posición de acuerdo con los planos y se fijaron adecuadamente para que no sufran desplazamientos durante la colocación del concreto.

Las distancias especificadas entre varillas, o, entre varillas y formaletas se mantuvieron por medio de tirantes.

Para el concreto se implementó los materiales teniendo en cuenta las siguientes especificaciones: el cemento utilizado fue tipo Portland, los agregados cumplían con lo especificado referente a la granulometría; el agua empleada en las mezclas de concreto estaba limpia y libre de impurezas perjudiciales, tales como aceite, ácidos, álcalis y materia orgánica, las formaletas de madera se ensamblaron firmemente y tuvieron la resistencia para contener la mezcla de concreto, sin que se presentaran deflexiones ni escape del concreto.

Para la cimentación del mástil principal y el de soporte para pluviómetro, se construyeron dos dados en concreto de 3000 psi, de dimensiones 0,40 x 0,40 x 0,60 (con acero de refuerzo de 1/2", con flejes de 1/4") para fijación de base principal del mástil y de 0,30m x 0,30 m x 0,50m de profundidad, para fijación del mástil soporte del pluviómetro, con acero de refuerzo de 1/2" con flejes de 1/4".

Para la cimentación del cerramiento se construyó una viga perimetral en concreto de 3000 psi de 0.20 x 0.30 (ancho x alto), con varilla de ½", con flejes de ¼".



Foto 6 y 7. Instalacion acero de refuerzo cimentación.



Foto 8 y 9. Vaciado concreto viga de cimentacion y dados de soporte.



Foto 10 y 11. Dados en concreto soporte de mastil principal y de pluviometro.

- **SUMINISTRO E INSTALACION DE CERRAMIENTO:**

Este trabajo consistió en el suministro e instalación de los postes esquineros con sus respectivos postes diagonales y galvanizados intermedios, malla eslabonada galvanizada enmarcada en ángulo 3/16 x 1 ½; y de la puerta metálica construida con ángulo metálico, malla y porta candado.

Para la ejecución de estas actividades, se limpió la zona para la correcta instalación de cada uno los postes empotrados en las vigas de cimentación y sobre los cuales se instaló la malla eslabonada galvanizada, como se indica en los planos.

Se dispuso de los equipos y herramientas necesarias para asegurar que la instalación de los postes galvanizados, los diagonales, la malla eslabonada, galvanizada, la puerta metálica y los alambres de púas queden instalados con la calidad exigida, garantizando su buen funcionamiento.







Foto 12 a 15. Suministro e instalacion cerramiento en malla eslabonada.

INSTALACION Y PUESTA EN FUNCIONAMIENTO ESTACION METEOROLOGICA PARQUE DEPORTIVO:

- Iniciamos el montaje de la estación meteorológica Parque deportivo, desplazándonos al lugar de instalación. Comenzamos por instalar los sensores que conforman la estación meteorológica como son: piranómetro, pluviómetro, panel solar, gabinete y anemómetro. Luego, procedimos al abatimiento del mástil de la estación para instalar en la parte superior de dicho mástil el sensor de dirección y velocidad del viento, ubicándolo hacia el norte con el fin de garantizar su correcto funcionamiento en la toma de datos.



Foto 16. *Instalación anemómetro*

- Continuamos con la instalación de la estación meteorológica parque deportivo. Procedimos a instalar el panel solar, ajustándolo al grado de inclinación del soporte previamente instalado en el mástil. Para asegurarlo, lo fijamos con el marco metálico correspondiente. Posteriormente, realizamos las conexiones eléctricas del panel y bajamos el cable por el tubo para conectarlo a las borneras correspondientes dentro del gabinete de la estación. De esta forma, aseguramos el correcto funcionamiento de la estación.



Foto 17. *Instalación de panel Solar.*

- Una vez asegurado el panel solar, procedimos a izar el mástil a su posición vertical. Luego, instalamos el sensor de radiación solar a una altura de cuatro metros sobre el nivel del suelo. Para fijarlo al mástil, utilizamos un soporte tipo brazo. Además, nivelamos el sensor para garantizar una mayor precisión en la toma de datos.



Foto 18. *Instalación de piranómetro.*

- procedimos a instalar el sensor de humedad y temperatura a una altura de dos metros sobre el nivel del suelo. Para fijar el sensor al mástil, utilizamos dos amarres metálicos tipo cremallera, asegurándonos de que quedara firme y estable. Además, nivelamos el sensor para garantizar una mayor precisión en la toma de datos.



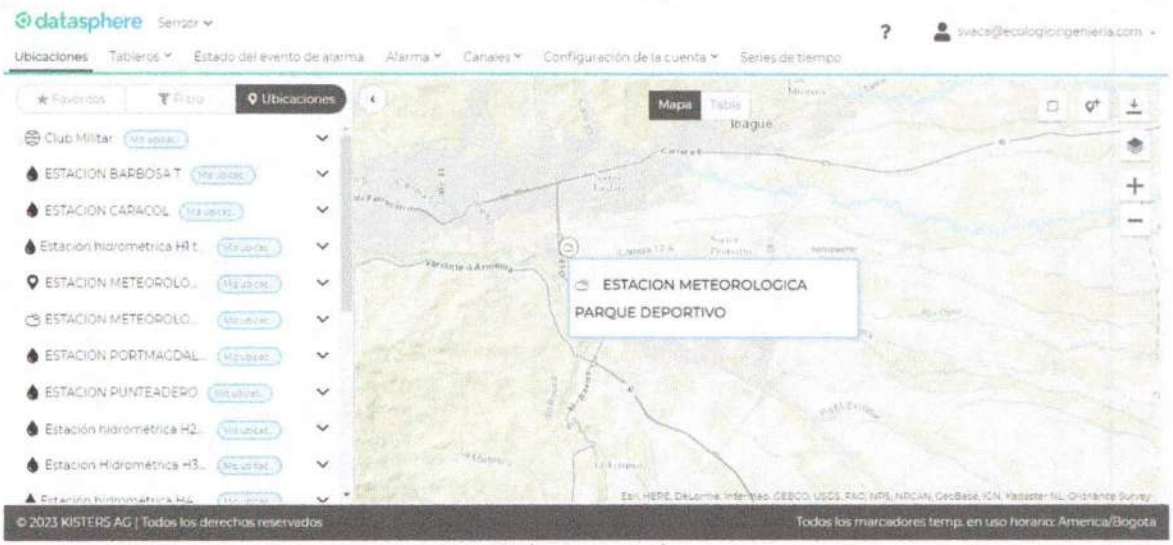
Foto 19. *Instalación Sensor humedad y temperatura.*

- Procedimos a instalar el pluviómetro en el soporte previamente instalado. Para fijarlo, utilizamos tres tornillos pasantes metálicos que garantizan su estabilidad. Luego, nivelamos el pluviómetro para asegurar la captación precisa de las aguas lluvias.



Foto 20. *Instalación de Pluviómetro.*

- Finalmente, procedimos a fijar el gabinete al mástil de la estación meteorológica parque deportivo, utilizando dos abrazaderas en "U". Organizamos cuidadosamente el cableado de los sensores y los conectamos a sus respectivas borneras. Luego, confirmamos su correcto funcionamiento midiendo el voltaje de salida, el cual registró un valor de 17,06 VDC. Para obtener un nivel de tensión nominal de 13,21 VDC. Además, instalamos una tarjeta SIM de datos GPRS del proveedor de servicios Movistar en el interior del datalogger. Por último, tomamos un registro fotográfico de los números de serie de los equipos y realizamos pruebas de funcionamiento en los equipos previamente instalados.
- Se realizaron pruebas exitosas de señal y transmisión de datos de todas las variables de la estación meteorológica Parque deportivo al visualizador de datos en línea Datasphere, así como en formato .mis, los cuales se enviaron satisfactoriamente al FTP de Ecologic Ingeniería. Estos datos serán procesados posteriormente en el software de visualización de datos Hydras 3.



- ***Foto 21.*** *Datasphere Estación meteorológica Parque deportivo*



Foto 22. *Gabinete de conexiones.*



Foto 23. *S/N. Anemómetro.*

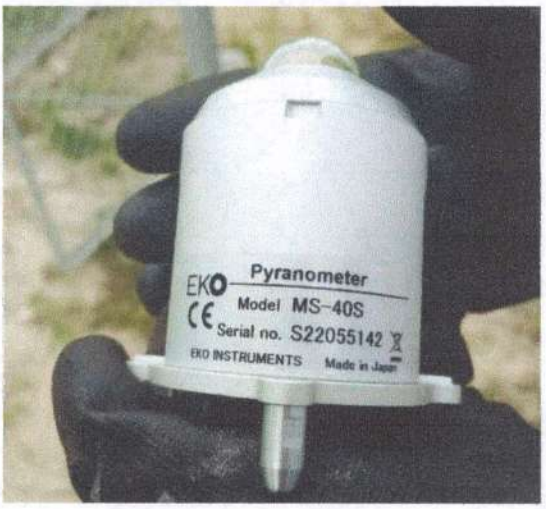


Foto 24. S/N. *Piranómetro.*



Foto 25. *S/N. Panel Solar.*



Foto 26. *S/N. Sensor humedad y temperatura.*



Foto 27. *S/N. Pluviómetro*



Foto 28. S/N Batería.



Foto 29. S/N. Iris Undercover.



Foto 30. S/N. Gabinete.

Ítem	*Descripción*	*Cantidad*	*Marca*	*Número de serie modelo*
1	Datalogger	1	Hy Quest Solutions	S/N: AG5-0147 Modelo. Iris Undercover
2	Panel solar	1	Estarsolar	S/N: RTM040M-2022101300113 Mod. PNML16
3	Anemómetro	1	Hy Quest Solutions	S/N: 223049 Modelo: AR-200
4	Pluviómetro	1	Hy Quest Solutions	S/N: 22-301 Modelo: TB7-0,2
5	Piranómetro	1	Eko Instruments	S/N: S22055142 Modelo:MS-40S
6	Gabinete	1	Rittal	S/N: E-22X-103521110917 Modelo: AX 1446.000
7	Batería	1	Netion	S/N: N/A Modelo: NDP12-26AH 12V26AH
8	Humedad y temperatura	1	Barani desing	S/N: B22059023 Modelo: Rh+T
9	SIMCARD	1	MOVISTAR	IMEI: 893407510026206685 5



Foto 31. *Estación Meteorológica Parque Deportivo*

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ESTACIÓN METEOROLÓGICA IBAL SECTOR LA POLA - IBAGUÉ



De acuerdo con el sitio previamente aprobado por la supervisión del contrato, la estación meteorológica se instaló en las coordenadas 4°27'5.43"N, 75°14'58.36"O, localizada dentro de las instalaciones de La Empresa Ibaguereña de Acueducto y Alcantarillado – IBAL, barrio La Pola de la ciudad de Ibagué.



Imagen. Localización estación meteorológica dentro de instalaciones IBAL Sector La Pola – Imagen tomada de Google Earth.

A continuación, se mencionan y se describen las actividades adelantadas para la construcción de las obras civiles necesarias para la instalación de la estación meteorológica, con su respectivo registro fotográfico:

- **LOCALIZACION Y REPLANTEO:**

En esta actividad se realizó la ubicación, nivelación y control permanente del sitio de instalación de la estación meteorológica, en la posición geográfica indicada, tomada en campo, por medio de coordenadas previamente definidas.

Para la localización y el replanteo de esta estación se delimitó por medio de cinta métrica y jalones, localizando cada uno de sus lados por medio de estacas e hilos. Para trazar los lados se templaron hilos de tal forma que demarque el área de trabajo necesaria para la instalación de la estación meteorológica.



Foto 32 a 34. Delimitacion del area de trabajo.

- **ADECUACION DEL TERRENO EN EL PUNTO DE INSTALACIÓN**

Esta actividad comprendió en el desmonte, descapote y limpieza del área de instalación de la estación, incluye retiro y disposición final. Comprendió en el suministro de toda la mano de obra, equipo y materiales necesarios para ejecutar las operaciones de desmonte, descapote y limpieza de las áreas que se encontraban cubiertas de rastrojo, maleza y pastos incluyendo el retiro de escombro y basuras, limpieza del área contemplada en el proyecto, de tal forma que el terreno quedó totalmente limpio y libre de obstáculos que pudieran interferir con el proyecto y toda vegetación y escombros para iniciar los trabajos.

Los trabajos de desmonte, descapote y limpieza se efectuó en toda el área con maleza y vegetación, que iba a ser ocupada por la estación meteorológica, tomando las precauciones necesarias para lograr condiciones de seguridad satisfactorias.

Consistió además de la limpieza general de obstáculos presentes, la nivelación del área de trabajo.



Foto 35 y 36. Adecuacion del terreno zona de trabajo

- **CIMENTACIÓN**

Esta actividad consistió en dos fases, la primera en la instalación del acero de refuerzo, incluyendo suministro, almacenamiento, figurado y colocación, tamaño, forma, calidad y cantidad de acuerdo con lo indicado en los planos, la segunda fase corresponde a la instalación del concreto, el cual contempló el suministro de materiales, equipos, fabricación, transporte, colocación, vibrado, curado y acabados del concreto mezclado para la construcción de la viga perimetral y de los pedestales de soporte para la instalación de mástiles donde se ubicaron los equipos que van a monitorear los parámetros ambientales.

Para el figurado las varillas ser doblaron en frío, de acuerdo con lo definido en los planos.

Las varillas estaban libres de óxido y cualquier material extraño. Los aceros de refuerzo se colocaron en su posición de acuerdo con los planos y se fijaron adecuadamente para que no sufran desplazamientos durante la colocación del concreto.

Las distancias especificadas entre varillas, o, entre varillas y formaletas se mantuvieron por medio de tirantes.

Para el concreto se implementó los materiales teniendo en cuenta las siguientes especificaciones: el cemento utilizado fue tipo Portland, los agregados cumplían con lo especificado referente a la granulometría; el agua empleada en las mezclas de concreto estaba limpia y libre de impurezas perjudiciales, tales como aceite, ácidos, álcalis y materia orgánica, las formaletas de madera se ensamblaron firmemente y tuvieron la resistencia para contener la mezcla de concreto. sin que se presentaran deflexiones ni escape del concreto.

Para la cimentación del mástil principal y el de soporte para pluviómetro, se construyeron dos dados en concreto de 3000 psi, de dimensiones 0,40 x 0,40 x 0,60 (con acero de refuerzo de 1/2", con flejes de 1/4") para fijación de base principal del mástil y de 0,30m x 0,30 m x 0,50m de profundidad, para fijación del mástil soporte del pluviómetro, con acero de refuerzo de 1/2" con flejes de 1/4".

Para la cimentación del cerramiento se construyó una viga perimetral en concreto de 3000 psi de 0.20 x 0.30 (ancho x alto), con varilla de ½", con flejes de ¼".



Foto 37 a 39. Instalacion acero derefuerzo viga y pedestales de cimentación.



Foto 40 y 42. Viga de cimentación cerramiento y Dados en concreto soporte de mastil principal y de pluviometro.

SUMINISTRO E INSTALACION DE CERRAMIENTO:

Este trabajo consistió en el suministro e instalación de los postes esquineros con sus respectivos postes diagonales y galvanizados intermedios, malla eslabonada galvanizada enmarcada en ángulo 3/16 x 1 ½; y de la puerta metálica construida con ángulo metálico, malla y porta candado.

Para la ejecución de estas actividades, se limpió la zona para la correcta instalación de cada uno los postes empotrados en las vigas de cimentación y sobre los cuales se instaló la malla eslabonada galvanizada, como se indica en los planos.

Se dispuso de los equipos y herramientas necesarias para asegurar que la instalación de los postes galvanizados, los diagonales, la malla eslabonada, galvanizada, la puerta metálica y los alambres de púas queden instalados con la calidad exigida, garantizando su buen funcionamiento.







Foto 43 a 45. Suministro e instalacion cerramiento en malla eslabonada.

INSTALACION Y PUESTA EN FUNCIONAMIENTO ESTACION METEOROLOGICA BOCATOMA LA POLA:

- Iniciamos el montaje de la estación meteorológica Bocatoma la pola, desplazándonos al lugar de instalación. Comenzamos por instalar los sensores que conforman la estación meteorológica como son: piranómetro, pluviómetro, panel solar, gabinete y anemómetro. Luego, procedimos al abatimiento del mástil de la estación para instalar en la parte superior de dicho mástil el sensor de dirección y velocidad del viento, ubicándolo hacia el norte con el fin de garantizar su correcto funcionamiento en la toma de datos.



Foto 46. *Instalación anemómetro*

- Continuamos con la instalación de la estación meteorológica Bocatoma la pola. Procedimos a instalar el panel solar, ajustándolo al grado de inclinación del soporte previamente instalado en el mástil. Para asegurarlo, lo fijamos con el marco metálico correspondiente. Posteriormente, realizamos las conexiones eléctricas del panel y bajamos el cable por el tubo para conectarlo a las borneras correspondientes dentro del gabinete de la estación. De esta forma, aseguramos el correcto funcionamiento de la estación.



Foto 47. *Instalación de panel Solar.*

- Una vez asegurado el panel solar, procedimos a izar el mástil a su posición vertical. Luego, instalamos el sensor de radiación solar a una altura de cuatro metros sobre el nivel del suelo. Para fijarlo al mástil, utilizamos un soporte tipo brazo. Además, nivelamos el sensor para garantizar una mayor precisión en la toma de datos.



Foto 48. *Instalación de piranómetro.*

- procedimos a instalar el sensor de humedad y temperatura a una altura de dos metros sobre el nivel del suelo. Para fijar el sensor al mástil, utilizamos dos amarres metálicos tipo cremallera, asegurándonos de que quedara firme y estable. Además, nivelamos el sensor para garantizar una mayor precisión en la toma de datos.



Foto 49. *Instalación Sensor humedad y temperatura.*

- Procedimos a instalar el pluviómetro en el soporte previamente instalado. Para fijarlo, utilizamos tres tornillos pasantes metálicos que garantizan su estabilidad. Luego, nivelamos el pluviómetro para asegurar la captación precisa de las aguas lluvias.



Foto 50. *Instalación de Pluviómetro.*

- Finalmente, procedimos a fijar el gabinete al mástil de la estación meteorológica parque deportivo, utilizando dos abrazaderas en "U". Organizamos cuidadosamente el cableado de los sensores y los conectamos a sus respectivas borneras. Luego, confirmamos su correcto funcionamiento midiendo el voltaje de salida, el cual registró un valor de 19,1 VDC. Para obtener un nivel de tensión nominal de 13,28 VDC.

Además, instalamos una tarjeta SIM de datos GPRS del proveedor de servicios Movistar en el interior del datalogger. Por último, tomamos un registro fotográfico de los números de serie de los equipos y realizamos pruebas de funcionamiento en los equipos previamente instalados.

- Se realizaron pruebas exitosas de señal y transmisión de datos de todas las variables de la estación meteorológica Bocatoma La Pola al visualizador de datos en línea Datasphere, así como en formato .mis, los cuales se enviaron satisfactoriamente al FTP de Ecologic Ingeniería. Estos datos serán procesados posteriormente en el software de visualización de datos Hydras 3.

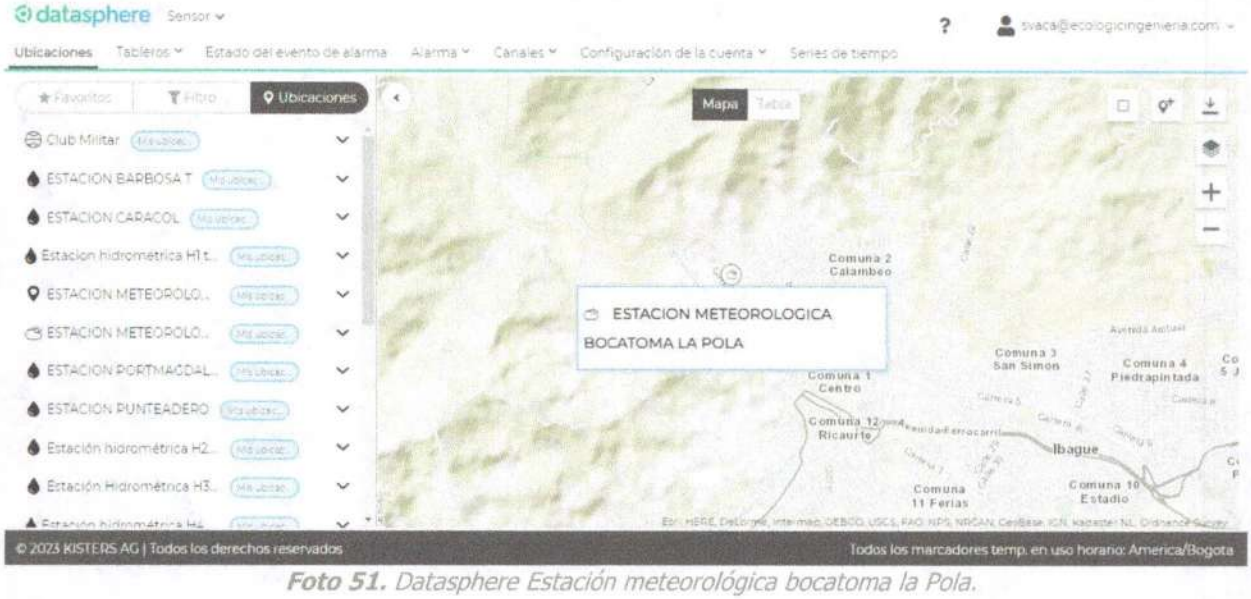


Foto 51. *Datasphere Estación meteorológica bocatoma la Pola.*



Foto 52. *Gabinete de conexiones.*



Foto 53. *S/N. Anemómetro.*



Foto 54. S/N. *Piranómetro*



Foto 55. *S/N. Panel Solar.*



Foto 56. *S/N. Sensor humedad y temperatura.*



Foto 57. *S/N. Pluviómetro.*



Foto 58. *S/N Batería.*

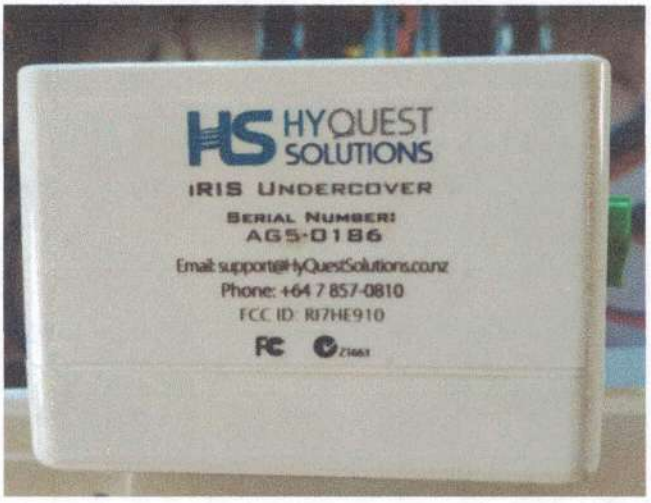


Foto 59. S/N. Iris Undercover.



Foto 60. *S/N. Gabinete.*

Ítem	*Descripción*	*Cantidad*	*Marca*	*Número de serie modelo*
1	Datalogger	1	Hy Quest Solutions	S/N: AG5-0186 Modelo. Iris Undercover
2	Panel solar	1	Estarsolar	S/N: RTM040M-2022101300183 Mod. PNML16
3	Anemómetro	1	Hy Quest Solutions	S/N: 223057 Modelo: AR-200
4	Pluviómetro	1	Hy Quest Solutions	S/N: 22-305 Modelo: TB7-0,2
5	Piranómetro	1	Eko Instruments	S/N: S22055143 Modelo:MS-40S
6	Gabinete	1	Rittal	S/N: E-22X-10298150852 Modelo: AX 1446.000
7	Batería	1	Netion	S/N: N/A Modelo: NDP12-26AH 12V26AH
8	Humedad y temperatura	1	Barani desing	S/N: B22059028 Modelo: Rh+T
9	SIMCARD	1	MOVISTAR	IMEI: 893407510026207413 1



Foto 61. *Estación Meteorológica Bocatoma La Pola.*

ESTACIÓN METEOROLÓGICA PTAP IBAL SECTOR CHEMBE – IBAGUÉ



De acuerdo con el sitio previamente aprobado por la supervisión del contrato, la estación meteorológica se instaló en las coordenadas 4°28'33.14"N, 75° 9'55.61"O, localizado dentro de las instalaciones de la planta de tratamiento de agua potable PTAP- IBAL sector Chembe de la ciudad de Ibagué.



Imagen. Localización estación meteorológica dentro de instalaciones PTAP IBAL Sector Chembe – Imagen tomada de Google Earth

A continuación, se mencionan y se describen las actividades adelantadas para la construcción de las obras civiles necesarias para la instalación de la estación meteorológica, con su respectivo registro fotográfico:

- **LOCALIZACION Y REPLANTEO:**

En esta actividad se realizó la ubicación, nivelación y control permanente del sitio de instalación de la estación meteorológica, en la posición geográfica indicada, tomada en campo, por medio de coordenadas previamente definidas.

Para la localización y el replanteo de esta estación se delimitó por medio de cinta métrica y jalones, localizando cada uno de sus lados por medio de estacas e hilos. Para trazar los lados se templaron hilos de tal forma que demarque el área de trabajo necesaria para la instalación de la estación meteorológica.



Foto 62 y 63. Delimitacion del area de trabajo.

- **ADECUACION DEL TERRENO EN EL PUNTO DE INSTALACIÓN**

Esta actividad comprendió en el desmonte, descapote y limpieza del área de instalación de la estación, incluye retiro y disposición final. Comprendió en el suministro de toda la mano de obra, equipo y materiales necesarios para ejecutar las operaciones de desmonte, descapote y limpieza de las áreas que se encontraban cubiertas de rastrojo, maleza y pastos incluyendo el retiro de escombro y basuras, limpieza del área contemplada en el proyecto, de tal forma que el terreno quedó totalmente limpio y libre de obstáculos que pudieran interferir con el proyecto y toda vegetación y escombros para iniciar los trabajos.

Los trabajos de desmonte, descapote y limpieza se efectuó en toda el área con maleza y vegetación, que iba a ser ocupada por la estación meteorológica, tomando las precauciones necesarias para lograr condiciones de seguridad satisfactorias.

Consistió además de la limpieza general de obstáculos presentes, la nivelación del área de trabajo.



Foto 64 y 65. Adecuacion del terreno zona de trabajo

- **CIMENTACIÓN**

Esta actividad consistió en dos fases, la primera en la instalación del acero de refuerzo, incluyendo suministro, almacenamiento, figurado y colocación, tamaño, forma, calidad y cantidad de acuerdo con lo indicado en los planos, la segunda fase corresponde a la instalación del concreto, el cual contempló el suministro de materiales, equipos, fabricación, transporte, colocación, vibrado, curado y acabados del concreto mezclado para la construcción de la viga perimetral y de los pedestales de soporte para la instalación de mástiles donde se ubicaron los equipos que van a monitorear los parámetros ambientales.

Para el figurado las varillas ser doblaron en frío, de acuerdo con lo definido en los planos. Las varillas estaban libres de óxido y cualquier material extraño. Los aceros de refuerzo se colocaron en su posición de acuerdo con los planos y se fijaron adecuadamente para que no sufran desplazamientos durante la colocación del concreto.

Las distancias especificadas entre varillas, o, entre varillas y formaletas se mantuvieron por medio de tirantes.

Para el concreto se implementó los materiales teniendo en cuenta las siguientes especificaciones: el cemento utilizado fue tipo Portland, los agregados cumplían con lo especificado referente a la granulometría; el agua empleada en las mezclas de concreto estaba limpia y libre de impurezas perjudiciales, tales como aceite, ácidos, álcalis y materia orgánica, las formaletas de madera se ensamblaron firmemente y tuvieron la resistencia para contener la mezcla de concreto, sin que se presentaran deflexiones ni escape del concreto.

Para la cimentación del mástil principal y el de soporte para pluviómetro, se construyeron dos dados en concreto de 3000 psi, de dimensiones 0,40 x 0,40 x 0,60 (con acero de refuerzo de 1/2", con flejes de 1/4") para fijación de base principal del mástil y de 0,30m x

0,30 m x 0,50m de profundidad, para fijación del mástil soporte del pluviómetro, con acero de refuerzo de 1/2" con flejes de 1/4".

Para la cimentación del cerramiento se construyó una viga perimetral en concreto de 3000 psi de 0.20 x 0.30 (ancho x alto), con varilla de ½", con flejes de ¼".



Foto 66 a 68. Instalacion acero de refuerzo cimentación.



Foto 69. concreto viga de cimentacion del cerramiento.



Foto 70 a 72. Concreto dados mástil principal y mástil de soporte pluviómetro.

SUMINISTRO E INSTALACION DE CERRAMIENTO:

Este trabajo consistió en el suministro e instalación de los postes esquineros con sus respectivos postes diagonales y galvanizados intermedios, malla eslabonada galvanizada enmarcada en ángulo 3/16 x 1 ½; y de la puerta metálica construida con ángulo metálico, malla y porta candado.

Para la ejecución de estas actividades, se limpió la zona para la correcta instalación de cada uno los postes empotrados en las vigas de cimentación y sobre los cuales se instaló la malla eslabonada galvanizada, como se indica en los planos.

Se dispuso de los equipos y herramientas necesarias para asegurar que la instalación de los postes galvanizados, los diagonales, la malla eslabonada, la puerta metálica y los alambres de púas queden instalados con la calidad exigida, garantizando su buen funcionamiento.



Foto 73 a 75. Suministro e instalacion cerramiento en malla eslabonada.

INSTALACION Y PUESTA EN FUNCIONAMIENTO ESTACION METEOROLOGICA BOCATOMA CHEMBE:

- Iniciamos el montaje de la estación meteorológica Bocatoma Chembe, desplazándonos al lugar de instalación. Comenzamos por instalar los sensores que conforman la estación meteorológica como son: piranómetro, pluviómetro, panel solar, gabinete y anemómetro. Luego, procedimos al abatimiento del mástil de la estación para instalar en la parte superior de dicho mástil el sensor de dirección y velocidad del viento, ubicándolo hacia el norte con el fin de garantizar su correcto funcionamiento en la toma de datos.



Foto 76. *Instalación anemómetro*

- Continuamos con la instalación de la estación meteorológica Bocatoma la pola. Procedimos a instalar el panel solar, ajustándolo al grado de inclinación del soporte previamente instalado en el mástil. Para asegurarlo, lo fijamos con el marco metálico correspondiente. Posteriormente, realizamos las conexiones eléctricas del panel y bajamos el cable por el tubo para conectarlo a las borneras correspondientes dentro del gabinete de la estación. De esta forma, aseguramos el correcto funcionamiento de la estación.



Foto 77. *Instalación de panel Solar.*

- Una vez asegurado el panel solar, procedimos a izar el mástil a su posición vertical. Luego, instalamos el sensor de radiación solar a una altura de cuatro metros sobre el nivel del suelo. Para fijarlo al mástil, utilizamos un soporte tipo brazo. Además, nivelamos el sensor para garantizar una mayor precisión en la toma de datos.



Foto 78. *Instalación de piranómetro.*

- procedimos a instalar el sensor de humedad y temperatura a una altura de dos metros sobre el nivel del suelo. Para fijar el sensor al mástil, utilizamos dos amarres metálicos tipo cremallera, asegurándonos de que quedara firme y estable. Además, nivelamos el sensor para garantizar una mayor precisión en la toma de datos.



Foto 79. *Instalación Sensor humedad y temperatura.*

- Procedimos a instalar el pluviómetro en el soporte previamente instalado. Para fijarlo, utilizamos tres tornillos pasantes metálicos que garantizan su estabilidad. Luego, nivelamos el pluviómetro para asegurar la captación precisa de las aguas lluvias.



Foto 80. *Instalación de Pluviómetro.*

- Finalmente, procedimos a fijar el gabinete al mástil de la estación meteorológica parque deportivo, utilizando dos abrazaderas en "U". Organizamos cuidadosamente el cableado de los sensores y los conectamos a sus respectivas borneras. Luego, confirmamos su correcto funcionamiento midiendo el voltaje de salida, el cual registró un valor de 19,1 VDC. Para obtener un nivel de tensión nominal de 13,28 VDC. Además, instalamos una tarjeta SIM de datos GPRS del proveedor de servicios Movistar en el interior del datalogger. Por último, tomamos un registro fotográfico de los números de serie de los equipos y realizamos pruebas de funcionamiento en los equipos previamente instalados.

- Se realizaron pruebas exitosas de señal y transmisión de datos de todas las variables de la estación meteorológica Bocatoma Chembe al visualizador de datos en línea Datasphere, así como en formato .mis, los cuales se enviaron satisfactoriamente al FTP de Ecologic Ingeniería. Estos datos serán procesados posteriormente en el software de visualización de datos Hydras 3.



Foto 81.



Foto 82. *Gabinete de conexiones.*



Foto 83. *S/N. Anemómetro.*



Foto 84. S/N. *Piranómetro.*



Foto 85. *S/N. Panel Solar.*



Foto 86. *S/N. B22039043 Sensor humedad y temperatura*



Foto 87. *S/N. Pluviómetro.*



Foto 88. S/N Batería.



Foto 89. S/N. Iris Undercover.



Foto 90. S/N. Gabinete.

Ítem	*Descripción*	*Cantidad*	*Marca*	*Número de serie modelo*
1	Datalogger	1	Hy Quest Solutions	S/N: AG5-0187 Modelo. Iris Undercover
2	Panel solar	1	Estarsolar	S/N: RTM040M-2022101300061 Mod. PNML16
3	Anemómetro	1	Hy Quest Solutions	S/N: 223029 Modelo: AR-200
4	Pluviómetro	1	Hy Quest Solutions	S/N: 22-302 Modelo: TB7-0,2
5	Piranómetro	1	Eko Instruments	S/N: S22055141 Modelo:MS-40S
6	Gabinete	1	Rittal	S/N: E-22X-10352110906 Modelo: AX 1446.000
7	Batería	1	Netion	S/N: N/A Modelo: NDP12-26AH 12V26AH
8	Humedad y temperatura	1	Barani desing	S/N: B22039043 Modelo: Rh+T POWER: DC 5-15V
9	SIMCARD	1	MOVISTAR	IMEI: 893407510026207412 3



Foto 91. Estación Meteorológica Bocatoma Chembe

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NIT | 901370333-2

4 RECOMENDACIONES:

- La red de estaciones meteorológicas PARQUE DEPORTIVO, BOCATOMA LA POLA y BOCATOMA CHEMBE, pertenecientes al IMDRI, se deja almacenando datos localmente y transmitiendo al servidor ftp de ECOLOGIC INGENIERIA y al visualizador de datos Datasphere de Hyquest Solutions, sin novedad.

- Se recomienda el mantenimiento preventivo periódicamente, para evitar fallas en los equipos y perdida de datos de las variables de las estaciones meteorológicas.

Cordialmente,

Camilo Salamanca

Camilo Salamanca
Representante Legal
ECOLOGIC INGENIERIA SAS

Ecologic Ingeniería S.A.S.
NIT | 901370333-2

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Cordialmente,

Camilo Salamanca
Representante Legal
ECOLOGIC INGENIERIA SAS

Ecologic Ingeniería

Ecologic Ingeniería S.A.S.
NIT | 901370333-2

MANUAL DE OPERACIÓN Y MANTENIMIENTO

Ecologic Ingeniería S.A.S.
NIT | 901370333-2

MANUAL DE OPERACIÓN Y MANTENIMIENTO PARA LOS EQUIPOS DE LAS ESTACIONES METEOROLÓGICAS



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INTRODUCCIÓN

Este manual, ofrece al usuario información que se debe tener en cuenta al momento de realizar el mantenimiento preventivo y posterior funcionamiento de una Estación Meteorológica.

Es importante y recomendable que el usuario realice la lectura completa de este manual, como también las recomendaciones por parte del fabricante de cada uno de los equipos antes de realizar el mantenimiento de la estación meteorológica, con el fin de garantizar el correcto funcionamiento de todos y cada uno de los sensores que componen la estación.

MANTENIMIENTO

1. GABINETE.

Se inicia con la verificación y estado del gabinete al interior para descartar humedad en el mismo.

Se procede con la descarga de datos de las diferentes variables de la estación meteorológica y posteriormente, la verificación de voltaje de batería, panel solar y salida hacia el datalogger, es recomendable que mientras está realizando el mantenimiento de los sensores, desconecte la fuente de alimentación general de la Estación Meteorológica en las respectivas borneras.



Fig. 1. Descarga de información de la estación meteorológica.



Fig. 2. Voltaje batería.

2. ANEMOMETRO

Para realizar el mantenimiento preventivo de los sensores de dirección y velocidad del viento se procede a el abatimiento del mástil para dar inicio con la limpieza del soporte y de la parte de los sensores de viento, se debe realizar la limpieza con un paño suave y con un detergente no abrasivo sin cloro.

Nota: El sensor de velocidad del viento no requiere una posición u orientación determinada. El sensor de dirección del viento (veleta) se debe ubicar en dirección Norte magnético.

Los anemómetros por ultrasonido deben ir orientados como se indica en el sensor.



Fig. 3. Sensor de dirección del viento.

3. PIRANÓMETROS

Para el mantenimiento de los piranómetros se debe desarmar las partes de la carcasa donde se encuentra soportado dicho equipo, y posteriormente la cúpula de vidrio debe ser limpiada utilizando agua desmineralizada y limpiando con un paño suave, seco y limpio.. Para garantizar una medición de radiación precisa, el piranómetro debe ser nivelado sobre la base con la ayuda de los tornillos niveladores y la burbuja de nivel, la cual debe quedar centrada dentro del círculo marcado. Se debe realizar limpieza semanalmente a la cúpula de los piranómetros para evitar cambios en la medición del parámetro de radiación global, recomienda que el cable de señal apunte hacia el polo más cercano, con el fin de minimizar el calentamiento de las conexiones eléctricas.



Fig. 5 Instalación Piranómetro.



Fig. 6 Instalación Piranómetro.

4. PANEL SOLAR

Para el mantenimiento preventivo del panel solar se debe desmontar del soporte anteriormente instalado para su posterior limpieza con un cepillo de cerdas suaves para evitar daño en sus celdas solares, posteriormente, el panel solar se debe ubicar en el soporte y asegurarlo al mástil con la ayuda de tornillos en U. En este caso y teniendo en cuenta los planos de diseño, el panel solar se instalará a la misma altura del soporte del piranómetro, pero en sentido opuesto como se muestra en la figura, con el fin de garantizar que el panel

no provoque sombra sobre el piranómetro, y finalmente se debe realizar la verificación del voltaje de dicho panel para corroborar su funcionamiento.



Fig. 7. Panel Solar.

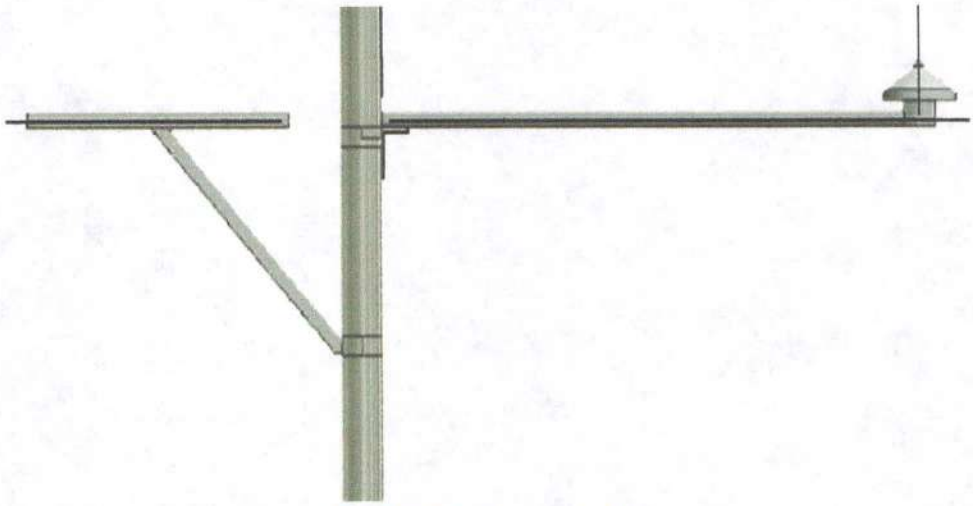


Fig. 8. Instalación panel solar.

5. SENSOR DE HUMEDAD Y TEMPERATURA

Para el mantenimiento del sensor de temperatura y humedad relativa se debe desmontar del mástil y posteriormente se realiza el desarme de la carcasa y su limpieza con agua y cepillos de cerdas suaves, una vez terminada la limpieza de dicho sensor se debe instalar nuevamente a los 2 m de altura, garantizando que no refleje o provoque ningún tipo de sombra sobre los piranómetros. Se debe asegurar al mástil con 2 abrazaderas tipo cremallera.



Fig. 9. Mantenimiento sensor de humedad y temperatura



Fig. 10. Mantenimiento e instalación de sensor de humedad y temperatura.

6. PLUVIÓMETRO

El único mantenimiento rutinario requerido es la limpieza. Los siguientes elementos deben ser revisados regularmente para mantenerlos limpios:

* Filtro de captura

* Boquilla recta (ver diagrama 5)

* Interior del cubo
* Superficie superior de los tornillos de ajuste
* Tornillos de bloqueo del recinto: lubricar ligeramente después de la limpieza.
* Todas las pantallas para insectos

Detalles para desmontar

a. Empuje el filtro hacia adentro y tire de la boquilla recta hacia afuera.

b. Limpie el filtro.

c. Limpie la boquilla recta.

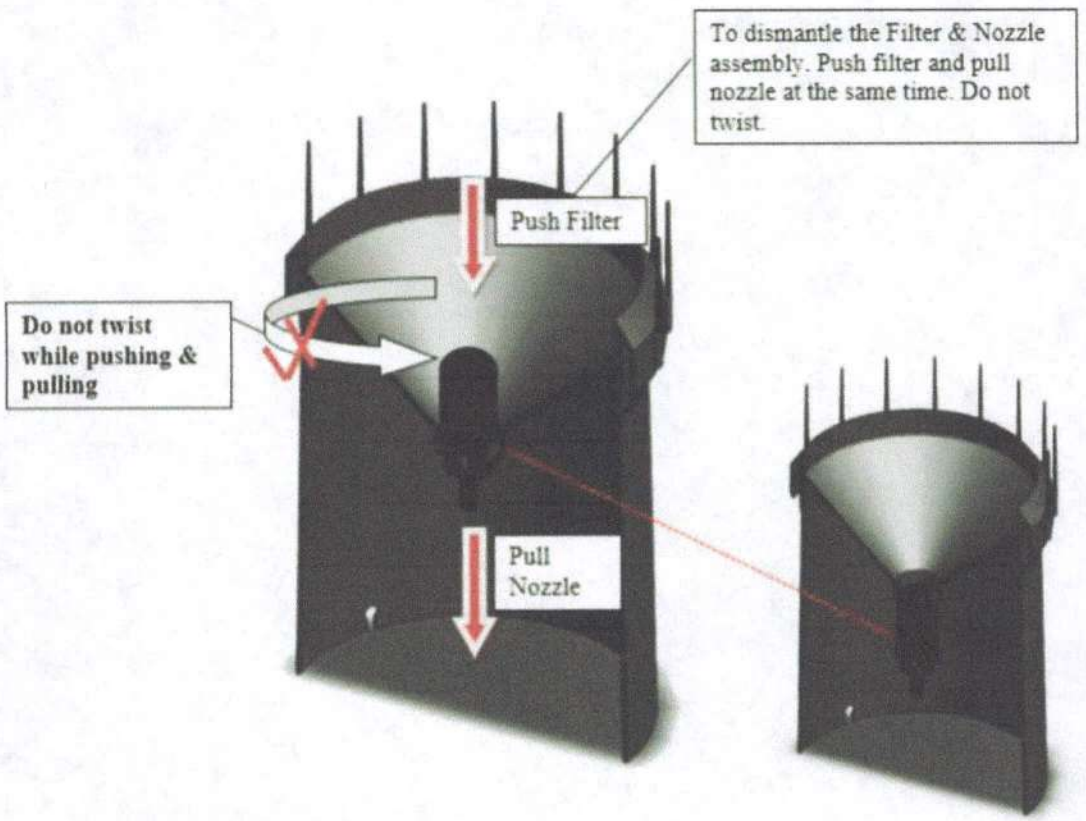


Diagram 4

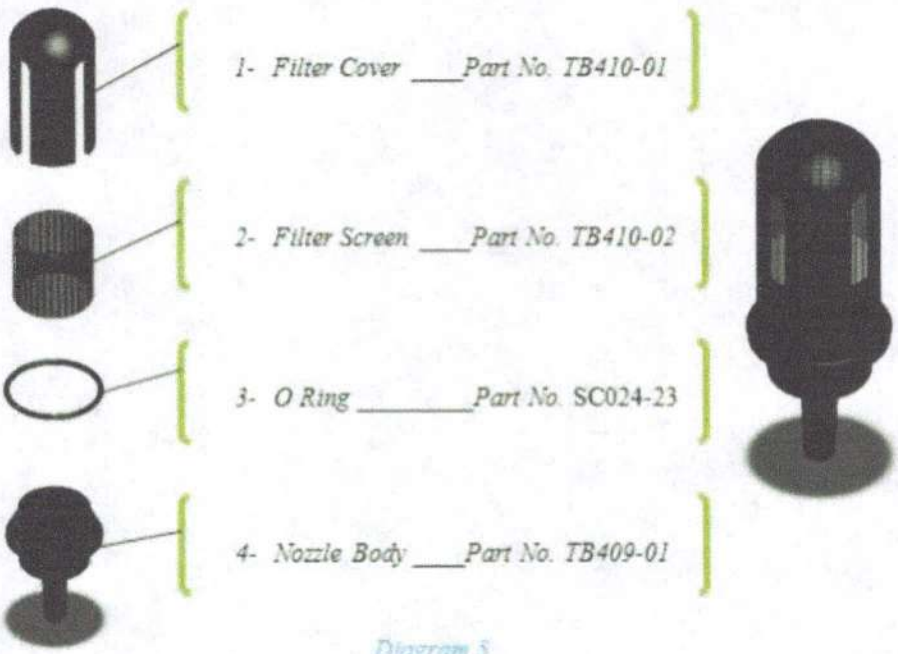


Diagram 5



Fig. 14. Ejemplo mantenimiento pluviómetro.

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CONCLUSIONES Y SUGERENCIAS

1. Una vez realizado el mantenimiento preventivo se sugiere nuevamente conectar la estación meteorológica y verificar todas las variables y almacenamiento de los datos en el datalogger y transmisión de los mismos al servidor.
2. Se recomienda para mayor durabilidad de los sensores y precisión en la medición de las varíales los mantenimientos preventivos se deben realizar como mínimo cada 6 meses.

Jhon Eyder Giraldo Muñoz.
Asesor técnico.

HYQUEST SOLUTIONS

iRIS Under Cover Datalogger

Reference Manual

For Firmware
Version: 1.5.23



Telarc. Registered
Quality
ISO 9001

Revision History			
Issue 1	Version 1.0.0	24th October 2018	Initial release
Issue 2	Version 1.2.0	31st October 2018	Instructions and Screenshots for the use of iLink Mobile Details about new features • Cellular FTP • Serial Board
Issue 3	Version 1.3.0	30th January 2019	Details about real-time diagnostics and SDI-12 Command mode Added Certification conformity
Issue 4	Version 1.5.0	8th October 2019	• Added table regarding product version details and section on how to unlock Pro features. • Clarified warning text in section 4.2.1 External (Charger) Power Supply • Added section to aid in modem type on cellular communications modules. • Added note about meaning of inverted text for sensor values as per iBETS case 2287 • Added section 5.3 describe how to turn off Wi-Fi access point • Added section 13.3 regarding new indication of partial upgrade status. • Added section on how to unlock the Pro features 15. • Updated SDI-12 device configuration to reflect recently implemented manual poll (section 5.5.5)
Issue 7	Version 1.5.5	19th December 2019	Add note to section 6.5.2 File Contents Format, regarding implementation of sample formatting.
Issue 8	Version 1.5.23	3rd September 2020	• Added description of active v's passive mode for FTP (section 6.5.3). • Added new SMS commands (INT, AINT, OUT) (see section 6.4.1) • Updated SMS RQ command section. • Added section describing auxiliary methods of logging (section 6.6)

Disclaimer

Under no circumstances will HyQuest Solutions (NZ) Ltd be liable or responsible for any consequential damage or loss that may arise from the use of this product.

All examples and diagrams shown in this manual and any supplied software examples are intended as a guide to understanding this product, not to guarantee operation. HyQuest Solutions (NZ) Ltd accepts no responsibility for use of this product based on this information or these examples.

Owing to the wide variety of possible applications of this product, you must satisfy yourself as to its suitability to your specific application.

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1 Declaration of Conformity

We, HyQuest Solutions
of Waikato Innovation Park
Ruakura Road, Hamilton 3214
New Zealand
Ph: +64 7 857-0810

CE RoHS

FC

in accordance with the following Directives:

Article 3.1(b) of Directive 2014/53/EU
Article 6 of Directive 2014/30/EU

Standards met:

EN 301 489-1 V2.2.0 – 2017-03
ElectroMagnetic Compatibility (EMC) standard for radio equipment and services
Part 1: Common Technical requirements
Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU

AS/NZS CISPR-32:2015
Electromagnetic compatibility of multimedia equipment – Emissions requirements

FCC Code of Federal Regulations 47: Telecommunication

Part 15 – Radio Frequency Devices
Sub Part A – General
Sub Part B – Unintentional Radiators

I hereby declare that the equipment named above has been designed to comply with the relevant sections of the above referenced standards and all products supplied under this Declaration will be identical to the sample tested.

Signed:

Name: Phil White
Position: Managing Director
Place: Hamilton
Date: 31/01/2019

Telarc. Registered
Quality ISO 9001

2 Introduction

2.1 About this Manual

This manual is intended as a detailed guide for iRIS Under Cover installation, configuration and operation.

This manual is also available online in at www.hyquestsolutions.co.nz

Throughout this document, small icons are used to identify additional information. These are as follows:



NOTE ***Indicates extra detail to expand the current discussion.***



WARNING ***Describes something that may cause problems if not heeded.***

NOTE: The term "iRIS" is used throughout this manual in all references to the iRIS Under Cover.

2.2 Support

Technical support for the iRIS Under Cover is available by contacting:

HyQuest Solutions (NZ) Ltd
P.O Box 9466
Hamilton
NEW ZEALAND

Tel: +64 7 857-0810
Email: support@hyquestsolutions.co.nz

For latest information and software updates, visit the HyQuest Solutions (NZ) Ltd web site at www.hyquestsolutions.co.nz

3 Overview

3.1 Introduction

The iRIS (iQuest Remote Information Source) datalogger range has been designed as cost effective, low power, self-contained information source for use in a wide range of data gathering and logging applications.

3.2 Typical Applications

The iRIS can be used for a wide range of diverse applications, including but not limited to:

- Rainfall measurement
- River level monitoring
- Water / power / gas metering
- Remote control
- Wind measurement
- Mobile temperature monitoring
- Irrigation monitoring / control
- IP ←→ RS232 communications gateway

3.3 Key Features

3.3.1 Product Versions

iRIS Under Cover's Pro version enhances the standard version by an additional digital I/O, an additional analogue output, Modbus, and a SDI-12 bus for versatile applications.

An iRIS Undercover Basic can be upgrade in the field to a Pro, see section 15. To add a modem to an iRIS No Modem, the logger needs to be sent back to HyQuest Solutions for the module to be fitted.

Table 1 – feature list describing those available in each version

iRIS Under Cover Version	4G modem	SDI-12	Digital Input	Digital I/O	Digital O	Analog Input 16 bit	Analog Output	Modbus	FTP	Virtual Sensors	Configurable Alarms	WiFi Configuration	Diagnostics	Logging of system inputs
No Modem			2	0	1	2	1		0	10	20	●	●	●
Basic	●		2	0	1	2	1		2	10	20	●	●	●
Pro	●	●	2	1	1	2	1	●	2	20	40	●	●	●

3.3.2 Telemetry and SDI-12 Diagnostics

Monitoring operation of the communications modules and SDI-12 bus is possible from the iLink software. The Architecture allow for remote monitoring, monitoring over open channels (Radio) even monitoring of the operation of the channel being used. The information obtained is time stamped real time log with three levels (information, warning/error, trace), which this can be filtered and captured for later analysis.

3.3.3 Power Management

TBD

3.3.4 Data Logging

The iRIS supports the logging of data from up to twenty virtual sensors. Each of the virtual sensors can obtain information from one of the following data sources:

- Analogue input on AIN1 – AIN2
- Pulse counter attached to DI1, DI2 or DIO
- Simulated pulse counter enabled by DI1, DI2 or DIO
- Frequency counter attached to DI1, DI2 or DIO
- Up/down counter attached to DI1, DI2 or DIO simultaneously
- SDI-12 instrument channel [1]
- Change of status on charger input (dc supply)
- Battery voltage
- Supply (charger) voltage
- Logger temperature
- Received Signal Strength Indication (RSSI)
- Change Of State on digital I/O channels DI1, DI2 or DIO
- Serial instrument (using the Modbus protocol)[1]

Each sensor can be set up to scale the raw data source into engineering units through the application of a multiplier and offset (slope and constant). The scaled value can be logged to non-volatile memory at rates between once per minute to once per hour or immediately in true event mode for pulse inputs.

It is also possible to configure a sensor to also log associated values such as minimum, maximum, standard deviation (for all source types) or a calculated flow rate or volume (pulse type sources only). See the next section for further details on configuring these extended logging features as part of the Sensor Cfg menus.

3.3.5 Logged Data Array Identification

Each sensor's logged data is identified by an array ID number. For the primary logged data, the ID is the sensor number itself. For the optional supplementary data (min, max, deviation, flow/vol), the array ID has an offset added to the sensor number that it is associated with. These ID offsets are as follows:

Minimum:	+20
Maximum:	+40
Deviation:	+80
Flow/Volume	+100
Check Count	+120

For example, Sensor 4 has been configured to log the average value, plus the maximum and standard deviation. Three data arrays will be logged for this sensor at each logging interval with IDs of 4, 44 and 84 respectively. In HydroTel™ these require point identifiers of 4, 44 and 84 respectively.



Array 0 (zero) is a special array identifier and is used as a system event log. Currently this is only used to log a restart (either at the initial connection of power, on a watchdog reset or a user program start after an upgrade). The logged value in this case contains a value that can be decoded to determine the cause of the restart. In HydroTel the identifier for this item is 0.

[1] Only available on iRIS Under Cover Pro Version

3.3.6 Alarm Processing

There is a "pool" of up to 40 free-format alarms. These can be assigned to any virtual sensor. So it is possible to have two alarms on every sensor or else more on some sensors and less or none on others. Each alarm has separate trigger and reset levels, an activation delay or accumulation period depending upon the data type, comms interval, enable call-in and an option to send a customised SMS text to a specified number when the alarm is triggered.

Each sensor has an associated flag that is set if any alarm on the sensor is active. This can be used to vary the logging rate for the sensor. For example, taking more frequent logs when water level is high compared to a less frequent "routine" log in normal conditions.

The iRIS also maintains a global "alarms active" flag that is set if any alarm on any sensor in the device is active. This is used to trigger a call-in or data transfer to the designated host. As well as the call-in, this flag can also control the digital outputs.

3.3.7 Real Time Clock & Calendar

The iRIS has a non-volatile real time clock that can be read and/or synchronised using HydroTel™ or iLink 2012.

4 Installation

4.1 Opening / Closing the Housing

The front of the iRIS enclosure is secured by four quarter turn locking pins with Phillips® heads.

To Open: Undo all four locking pins by pressing down with screwdriver and rotate a quarter turn in the anti-clockwise direction. The pin has a spring, which eject the pin to the open state. The pins are retained in the lid. The front cover should then be lifted away from the base, note there not any hinges so care should be taken not to place any stress on the ribbon cable between the base and lid.

To Close: Place the lid on the base, ensuring the ribbon cable does not pinch. In turn, apply pressure to each pin so that the spring is completely pressed, then turn clockwise a quarter turn until locked.

4.2 I/O Connector

All I/O and power supply terminations are via 5mm (0.2") pitch screw terminals provided on a 12-way and 10-way pluggable connector. The I/O connectors are positioned externally on each side of the logger enclosure to allow easy unplugging of the logger. The function of each I/O termination is shown in the diagrams below.

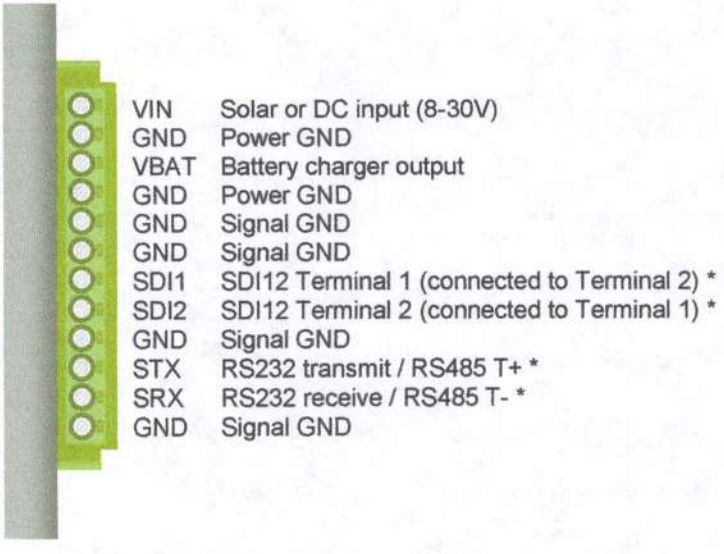


Figure 1 – Right hand side I/O Connector

* Only available with pro version.

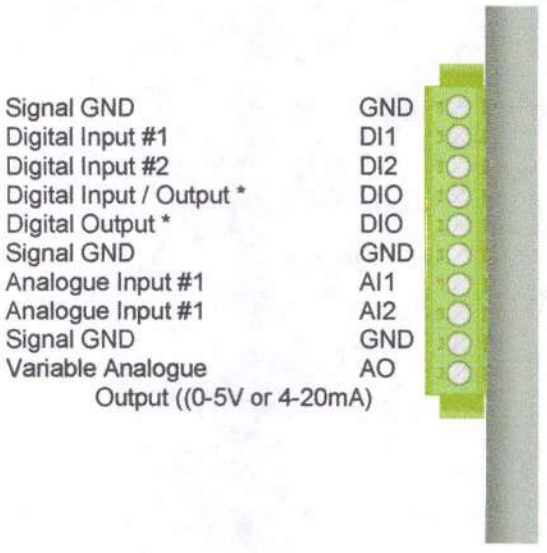


Figure 2 – Left hand side I/O Connector

* Only available with pro version.

4.2.1 External (Charger) Power Supply

The iRIS can operate solely from the external battery which is charged externally, or you can connect any external dc power source ranging from 8 – 30Vdc, including a solar panel, without requiring an additional solar regulator.

The battery charging circuitry utilises a switch mode regulator, employing Maximum Power Point Tracking (MPPT) for maximum efficiency. The external power supply is protected against over-voltage by ultra-fast acting protection devices and a self-resetting semiconductor fuse.

The regulator can be configured to change different types of battery chemistry:

- Sealed lead acid (SLA)
- Lithium Ion / Lithium Polymer Batteries
- Custom (user defined)

See section 6.3 for more information on configuration of the internal solar regulator.

WARNING ***A cable length of lesser than 3m is required on the VIN port***

WARNING ***When using the charger feature of the logger an external battery needs to be attached. The input supply must be connected to VIN and the battery connected to VBAT. When an external charger or DC source is used this must be connected to VBAT and NOT VIN. In this case VIN should be left disconnected.***
Failure to follow these instructions will cause the power to logger to drop out irregularly and it will reboot.

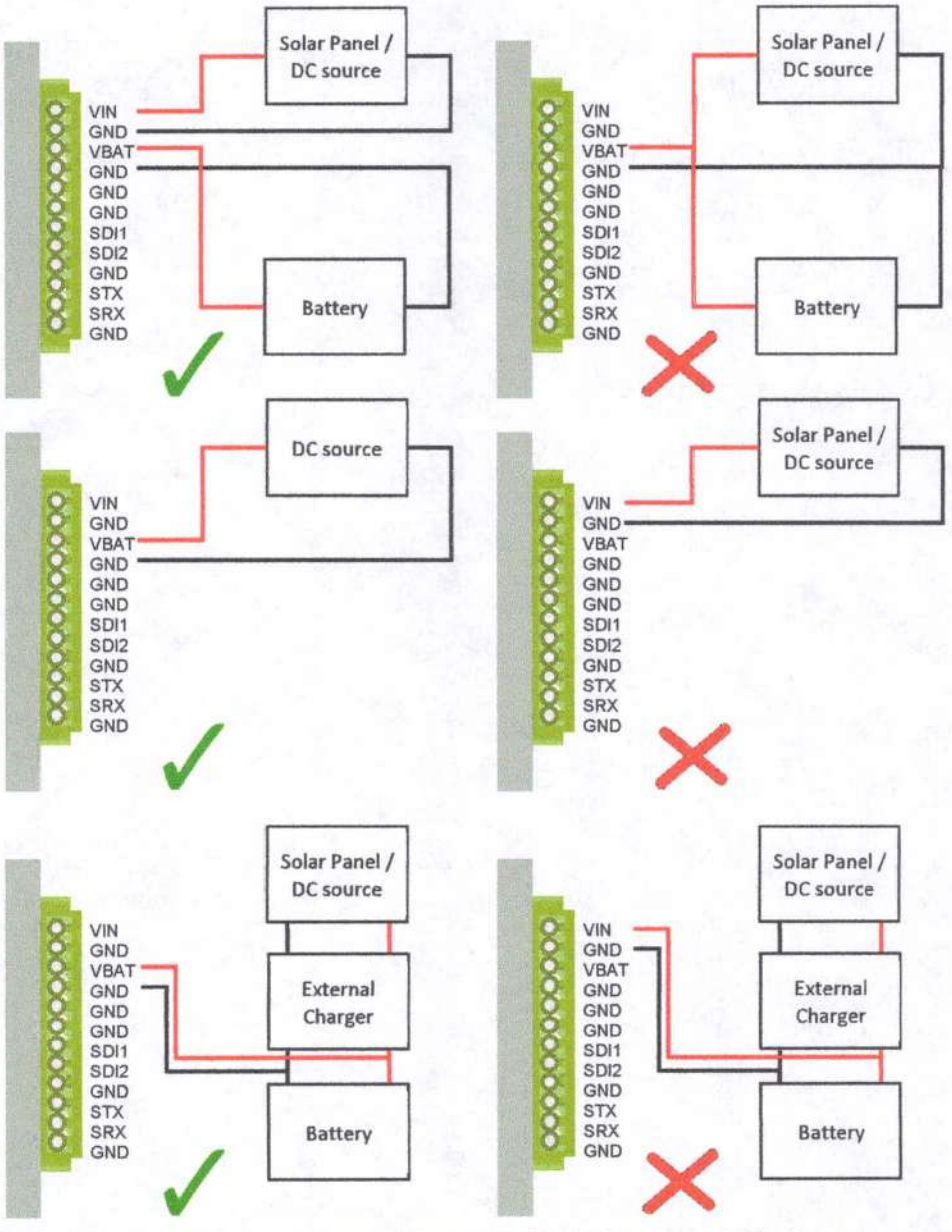


Figure 3 – Shows examples of the correct and incorrect methods of connecting the logger to power source and an external battery

4.2.2 Analogue I/O

4.2.2.1 Analogue Inputs

The two analogue inputs are uni-polar 0-100mVdc, 0-5Vdc or 0-30Vdc with 16-bit resolution. Each input presents a load impedance of 123.74KΩ to the input signal.

Scaling factors should be chosen to convert from a raw value of, e.g. 0.0000 – 5.0000, which reflects the input signal range of 0-5V. When current sources such as 0-20mA or 4-20mA are connected, an internal sink resistor (100Ω) is enabled by an internal user-settable link. In this mode the measured voltage range is 0-2V for a 0-20mA input and the scaling factor should take this into account.

As the analogue inputs have an input impedance of 123.74KΩ, the actual sink resistor impedance will be slightly lower than the value fitted. When, for example, the current mode link is fitted, a sink resistor of 100 ohms is installed. The actual impedance will theoretically be 99.92Ω; therefore, the voltage measured by the iRIS will also be slightly lower than expected.

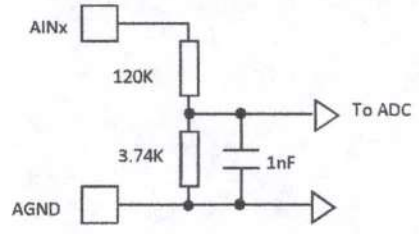


Figure 4 – Simplified Analogue Input Circuit

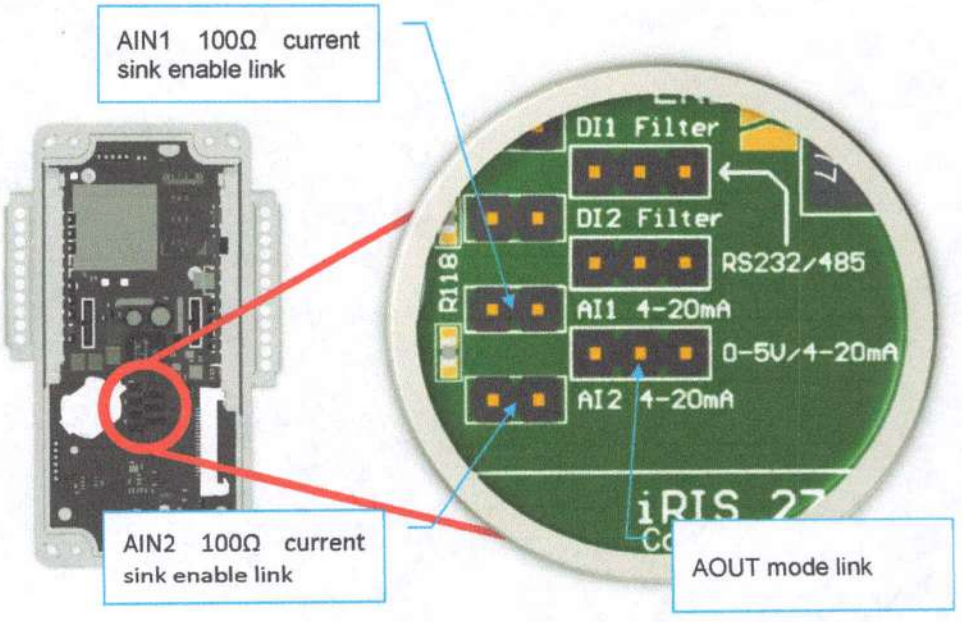


Figure 5 – Analogue Input / Output Links

It is possible to use an external resistor such as a 250 Ω to raise the voltage range measured. I.e. 100Ω will give a working range of 0.4V to 2V, 250Ω will give a range of 1V to 5V. In this case, ensure the internal sink enable link is open. The resistor value in the analogue scaling calculator in iLink will need to be changed to the value actually used. Also a voltage measurement range for the analogue input range needs chosen instead of current.

4.2.2.2 Analogue Output

The iRIS has a single variable analogue output. This may be configured to deliver either a voltage output ranging between 0-5V or a current output ranging from 4-20mA. The output's electrical signal (voltage or current) is link selectable. See Section 5.3.3.1 for details on configuring the analogue output.

4.2.3 Digital I/O

The iRIS has four digital I/O channels which can each be configured as either an input or output. When set as an output, the channel can either supply switched 12V or else act as a pull-down switch for loads with a different supply voltage. If the digital output configuration is set to 0 (Disabled) the channel is by default an input. See Section 5.3.3.1 for details on configuring the digital outputs.

4.2.3.1 Digital Channels as Inputs

The digital inputs are selectable for either mechanical or electronic operation. In either case it is necessary to pull the input down to 0Vdc to activate it. Inputs will handle up to 30Vdc in the off state for parallel connection across existing equipment. The "debounce" is enabled by a jumper link, which if fitted enables a longer time constant circuit to eliminate multiple pulses caused by contact bounce. The debounce jumpers are positioned in the centre of the PCB. The picture below shows the links in their default positions.

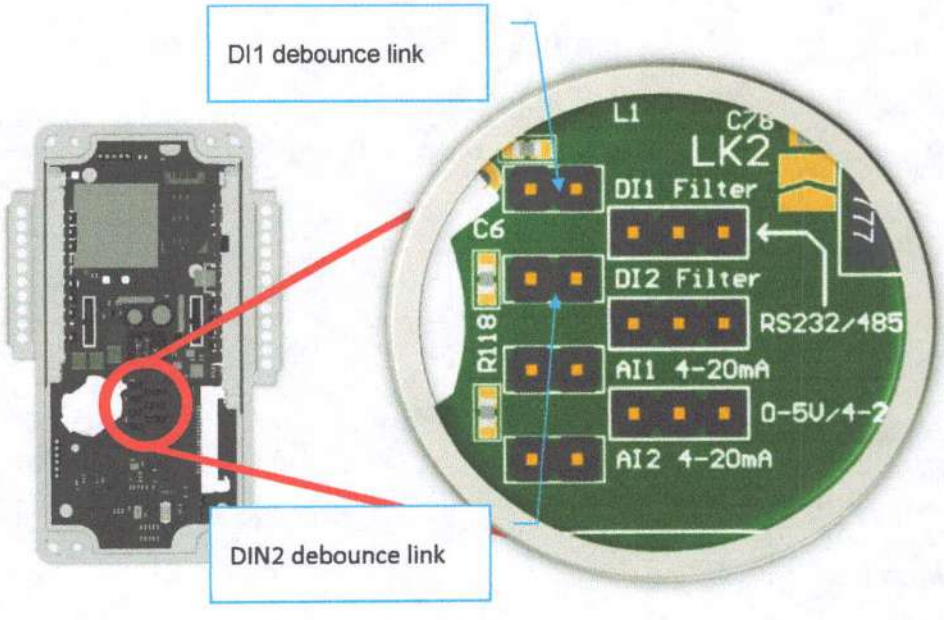


Figure 6 - Digital Input Debounce Links

Fit the jumper for mechanical switching at up to 20Hz. In this mode the input is normally pulled up to 12V through a 10KΩ resistor providing a wetting current of approximately 1.2mA. A 100nF capacitor is also fitted across the input to provide limited hardware debounce, preventing false triggering due to contact bounce.

Remove the appropriate jumper for electronic switching at up to 5kHz. In this mode the input is normally pulled up to 5V through a 57KΩ resistance, providing a wetting current of approximately 100μA. When DIO is used as an input the debouce circuit is permanently connected to the input pin.

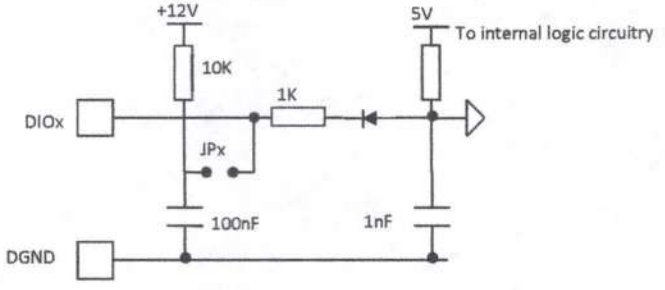


Figure 7 – Digital Input Circuit

IMPORTANT NOTE!

In almost all installations where an iRIS is connected in parallel with other equipment to share a common pulse input (e.g. from a flow meter), there has not been a detrimental effect, as the iRIS inputs present a relatively high impedance to the circuit. However, in the event that connecting an iRIS does cause pulse failure, HyQuest Solutions recommend removing the debounce selection link for the appropriate input. This sets the input to electronic switching mode, even if the actual pulse source is a clean contact (reed switch or similar).

The debounce jumpers are located in the center of the PCB and can be accessed once the front cover is opened. See Figure 6 - Digital Input Debounce Links above.

Hint: When removing a jumper, simply fit it to only one pin of the connector to avoid it being lost.

4.2.3.2 Digital Output[2]

When the iRIS digital I/O channel is configured as an output it can be operated electrically in one of two ways. Either:

Open-drain Pull-down which is capable of sinking up to 100mA at 30Vdc. An integral diode provides transient protection. Typically this output mode can be used to drive a relay or lamp powered by an auxiliary d.c supply (e.g. 12V). In this mode, the negative of the load supply must be connected to one of the iRIS GND terminals.

Although it may appear possible to directly control sensors by switching the sensor negative supply lead using a digital output, this will introduce measurement errors and may possibly damage the sensor. Always use a digital output configured as a switched 12V output to power sensors.

Or:

Switched 12V output which is capable of sourcing up to 100mA. Typically this output mode will be used to drive a sensor, relay or lamp powered by the iRIS's 12V supply.

[2] Only available on iRIS Under Cover Pro Version

Care should be taken to avoid the load discharging the internal and/or external 12V battery. Ensure adequate power supply charging capacity is available to cater for the demands of both the logger and load.

The digital outputs may also be programmed to follow the state of the IP connection so that they will be active when a wireless IP session has been established. This mode can be used to control power to an external data radio when using the iRIS as a radio based gateway.
Typically, an output is configured to follow a schedule for use in powering loads. There is a similar mode termed "Schedule Plus".

In "Schedule Plus" mode, the relevant output(s) will be activated when a user is logged on to allow sensor calibration or radio communication testing.

Alternatively they can be selected for remote control directly from a HydroTel™ base station, activation if any alarm is active in the iRIS or to operate in response to absolute set points against the current sensor value on Sensor #1 for applications such as triggering sediment samplers.
See Section 5.3.3.1 for details on the digital output modes.

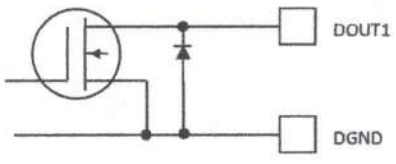


Figure 8 – Pull-Down Mode Circuit

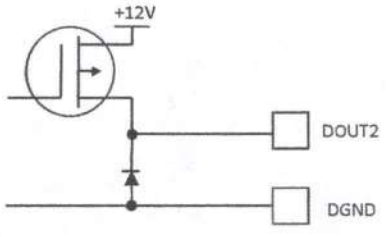


Figure 9 – Switched 12V Mode Circuit

4.2.4 Serial Sensor Interface (SSI)[3]

The sensor serial interface is a three wire serial port intended to be used with serial based sensors.
It can operate as either RS-232 or RS-485 signalling.

Table 2 – SSI terminal definition

Terminal Label	RS-232	RS-485
STX	RS232 transmit	RS485 T+
SRX	RS232 receive	RS485 T-
GND	Signal GND	N/A

4.2.4.1 Selecting Serial Mode

The choice of RS-232 or RS-485 modes must be made in both physic jumper selection and firmware configuration selection. Please see section Serial Sensor Interface (SSI)5.5.4.3 for more details on configuring the firmware mode.

The RS-232 and RS485 connections cannot be used at the same time. Which is currently being used is selected by logger configuration via iLink.

[3] Only available on iRIS Under Cover Pro Version

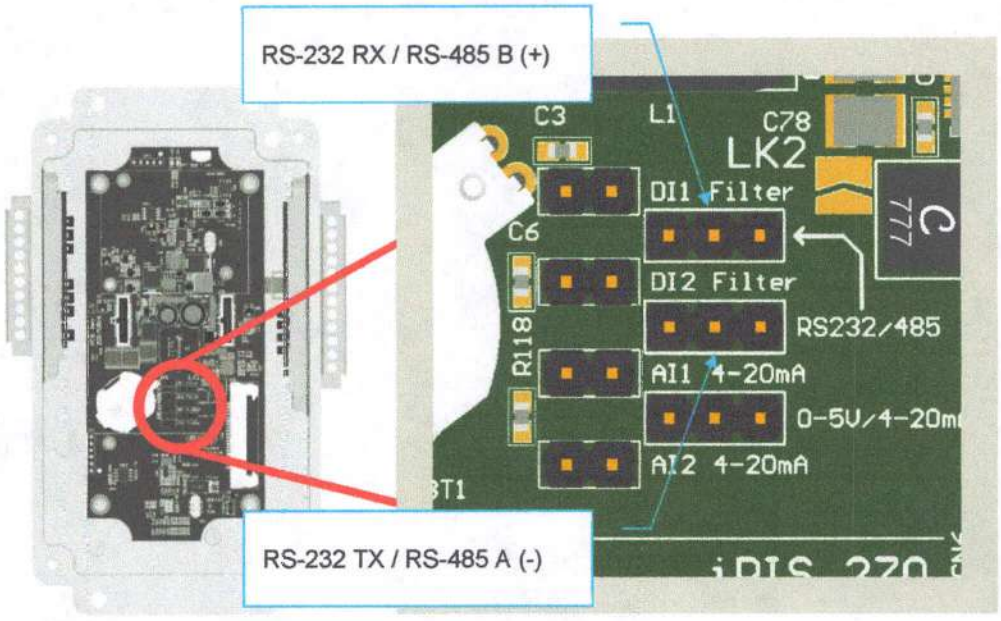
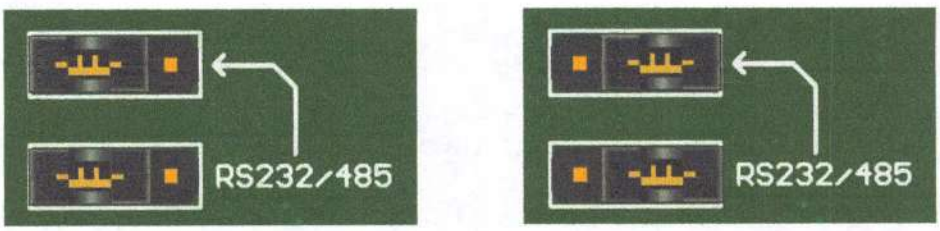


Figure 10 - location of serial mode selection jumpers



RS-232 Position
(Both to the left)

RS-485 Position
(Both to the right)

Figure 11 - detail depiction of RS-232 / RS-485 jumper positions

4.3 Telemetry Module

Unlike the iRIS 270 the iRIS Under Cover can be fitted with only a single module and this is the cellular module

4.3.1 Cellular

4.3.1.1 Removing / fitting the SIM card

Important! Ensure the iRIS is depowered before attempting to remove or fit the SIM card. Exercise care when inserting or removing the SIM card, as the carrier is fragile.

Open the front cover as described above.
Using a finger nail or small screwdriver inserted into one of the two oval holes on the sliding holder, gently lower the slide downwards to unlock it. The slide can now be swung forwards from its top end to enable the SIM card to be inserted or removed. Reverse the procedure to close and lock the card into place.

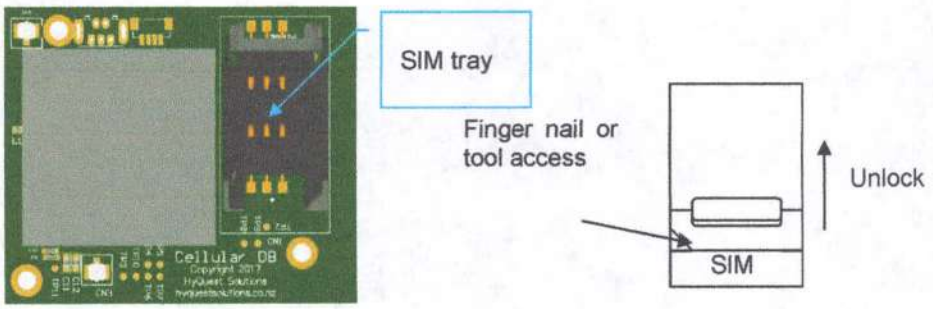
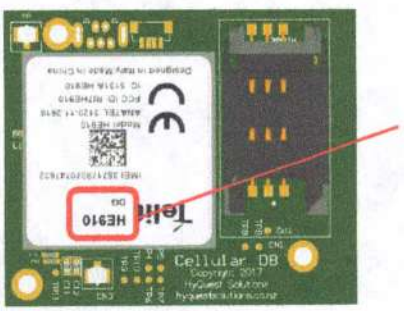


Figure 12 – SIM Carrier

4.3.1.2 Cellular Modem Type Identification

The cellular generation employed by the modem fitted to the logger can be determined by reading the label on the modem. Open the logger and locate the communications module (Module A is in the top half; Module B is located in the bottom half of the logger enclosure). The location of the label is shown below:



Location of module model number

Model Number	Technology
HE910	3G
LE910	4G LTE CAT-1
ME910	4G LTE CATM-1 and 4G LTE CAT-NBIoT

Figure 13 – Location of cellular modem model number and table of modem technologies

4.3.1.3 Antenna Connectors

The iRIS has an industry standard SMA connector which protrudes through the bottom edge of the enclosure base.

In areas of good signal strength, a small "stubby" or omni-directional type antenna will suffice. In areas of more marginal coverage, the antenna should an external high gain type such as a Yagi, via appropriate low-loss high frequency coaxial cable and male SMA connector.

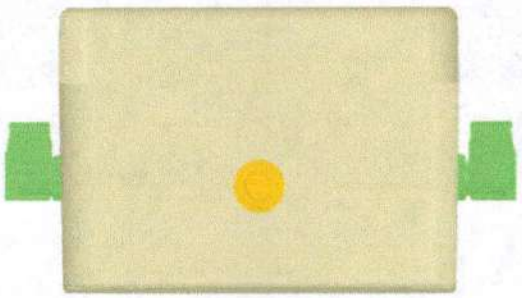


Figure 14 – antenna connector view

5 Configuration

The iRIS configuration is done by iLink 2012 or HydroTel. This description assumes a computer running the Microsoft® Windows® operating system is being used and all examples relate to the configuration tool in iLink 2012. iLink 2012 Mobile version can also be used to configure the iRIS,

5.1 Connecting to the iRIS 270 with iLink Desktop software via Wi-Fi (Windows 10)

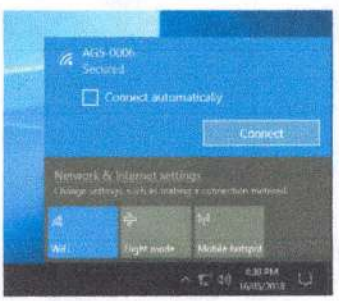
The first step is to establish a Wi-Fi connection between the PC/laptop/Tablet and the iRIS.



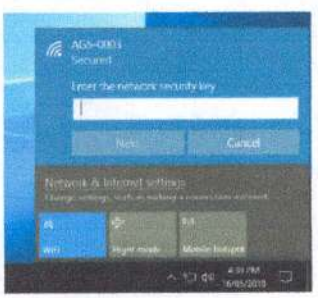
On the iRIS press and hold the Wi-Fi/Enter button for 3 seconds until a beep, then release.



Wait for second longer beep to indicate the iRIS Wi-Fi access point is operating.



On PC/Laptop/Tablet/Phone[4] select the SSID and that matches the iRIS you are connecting to.



When prompted enter password Wi-Fi Password. The default password is **HyQuestSolutions**

And follow any other prompts to complete Wi-Fi pairing.

[4] Refer to connecting devices documentation on how to establish a Wi-Fi connection to an access point. Example shown here is for windows 10.



Open iLink 2012.



Click the **Quick Connect** button on the **Home** ribbon.



Select **Connection type: Wi-Fi** and click **Finish** button to establish a connection with the data logger

5.2 Connecting to the iRIS 270 with iLink Mobile software via Wi-Fi (Android)

The first step is to establish a Wi-Fi connection between the Android tablet and the iRIS.



On the iRIS press and hold the Wi-Fi/Enter button for 3 seconds until a beep, then release.



Wait for second longer beep to indicate the iRIS Wi-Fi access point is operating.



On the tablet[5] select the SSID and that matches the iRIS you are connecting to.



When prompted enter password Wi-Fi Password. The default password is **HyQuestSolutions**

And follow any other prompts to complete Wi-Fi pairing.



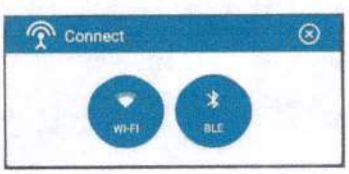
Open iLink 2012.



Tap on the menu button in the top left hand corner.



Tap the Connect Menu option.



Tap the **Wi-Fi** button to establish a connection with the data logger

[5] Refer to connecting devices documentation on how to establish a Wi-Fi connection to an access point. Example shown here is for Samsung Galaxy Tablet.

5.3 Turn off Wi-Fi Access Point

The Wi-Fi access point will turn itself off after a predetermined time (see section 5.5.4.1) or it can be turned off on demand via SMS command (see section 6.4.1) or via the Keypad by following the instructions:



On the iRIS press and hold the Wi-Fi/Enter button for 3 seconds until a beep, then release.



Wait for second longer beep to indicate the iRIS Wi-Fi access point has shutdown. Also the Wi-Fi LED should have turned off.

5.4 Changing the Wi-Fi password with iLink Desktop software via Wi-Fi (Windows 10)

For added security the Wi-Fi password can be changed from the default to either an organisation wide or per site password. Connect to the logger via Wi-Fi using the steps in section 5.1.

See section 5.1.

Connect to the logger via Wi-Fi using the steps in section 5.1.



OR



From the overview screen click the shortcut button **General** on the right side of the **Home** ribbon or;
Select the **Configuration** ribbon and click on the **General** button.



Expand the **Comms** branch of the tree and select the **Wi-Fi (WLAN)** Node.



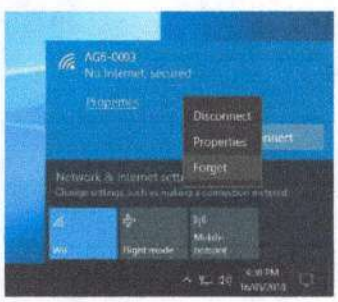
Change the Wi-Fi Password, ensure it is between 8 and 63 characters long.



Click on the **Send Config** button to commit the change to the logger. Please note the password change will not take effect until the Wi-Fi AP has been reinitialised.



Click on the **Disconnect** button in the **Home** ribbon.



On PC/Laptop/Tablet/Phone[6] right click on the Wi-Fi network connection and click on Forget. This tells the operating system to prompt for a new password next time you connect.

See section 5.1.

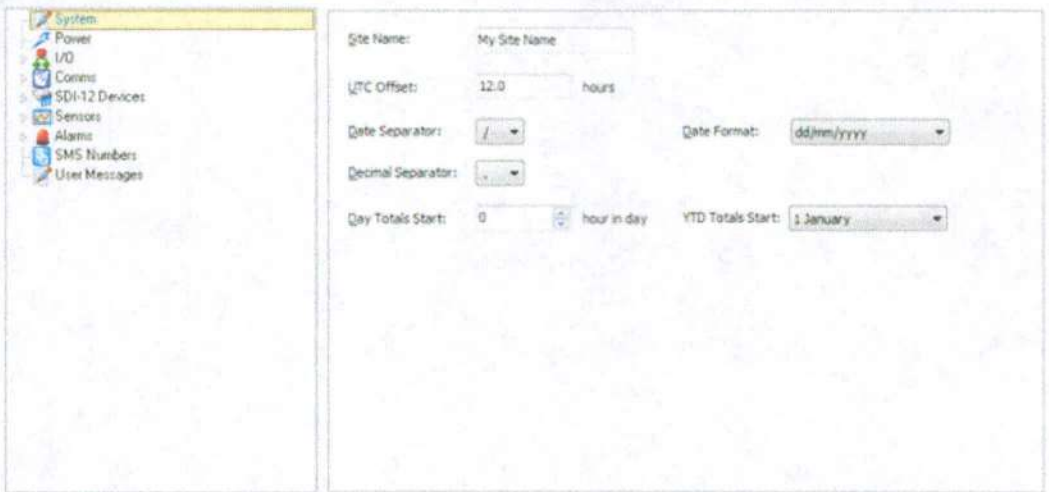
Now Repeat the steps in section 5.1. to re connect to the logger this time using the new password.

[6] Refer to connecting devices documentation on how change the saved password used for the logger access point. Example shown here is for windows 10.

5.5 Configuration Menus

All the configuration can be done by connecting the device using iLink 2012. Once the iRIS is connected to your computer, as per section 5.1, click on the General option under the Configuration tab to see the configuration settings for the device. Please note that the images shown in this section are for the Pro version, for those features not available in the basic and No Modem product version, the configuration options will not be visible.

5.5.1 System



Site Name:
This setting is used to enter a name for the site. Note that the maximum length of the site name is fixed at 19 characters.

UTC Offset:
Enter the offset from UTC in hours for the logger's time zone in this field.

Date Separator:
This option is used to select the date format as displayed throughout the iRIS (configuration menus and file exports).

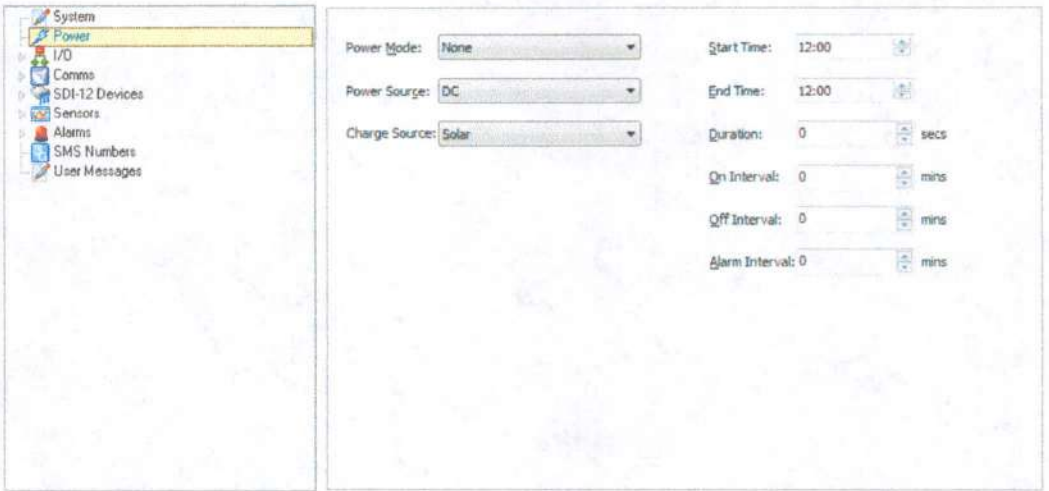
Date Format:
This setting is used to select the format of the date field, for example dd/mm/yyyy.

Decimal Separator:
This option is used to select the separator between whole and decimal numbers. For example 1.234 or 1,234 are the same number.

Day Totals Start:
Enter the hour of the day to start calculating Day to Now totals. Default 0 (midnight).

YTD Totals Start:
Enter the month of the year to start calculating Year to Date totals. Default 1 (January)

5.5.2 Power



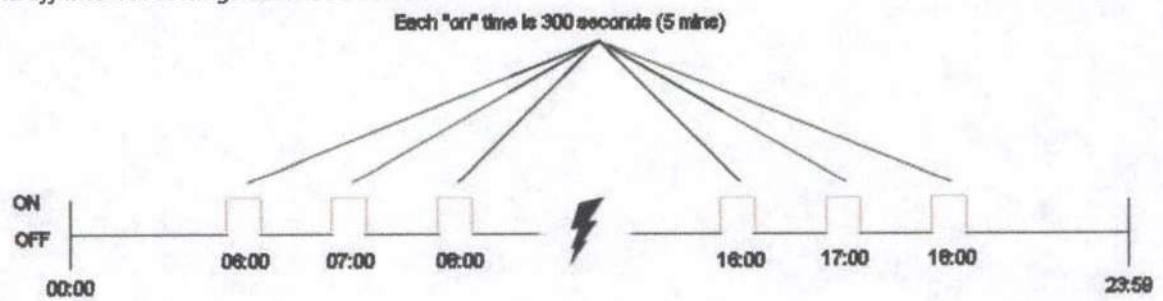
Power Mode:
This option allows you to choose the Power Mode from the available options – None, Partial, Full.

Power Source:
Enter the power source for the charger – DC power supply or solar. This selects the battery charging profile the iRIS will use. Only select "Solar" if the iRIS charger is being used to charge the battery. If there an external solar charger, set the mode to "DC".

Start Time:
This is the time at which the iRIS will switch from a forced "Full Save" power mode to the selected power mode as defined in the above Power Mode option.

End Time:
This is the time at which the iRIS will cease switching out of "Full Save" power mode.
In the example below, the iRIS is enabled to go to the "No Save" level once per hour (on interval = 60 minutes), for a time of 5 minutes (duration = 300 seconds) starting at 6.00 am and ceasing after 6pm. Set the start time to 00:00 (0000) and end time to 23:59 (2359) for the on/off cycle to apply regularly throughout the complete day.

NOTE: In the example, the "on" time is from 6am to 6pm. The "off" time is from midnight to 6am and then from 6pm to midnight. Activation during these two times may be configured differently using the on interval and off interval settings described below.



Duration:

Enter the length of time in seconds that you want the iRIS to maintain the modem in the selected power mode. The minimum value for this setting is 60 seconds.

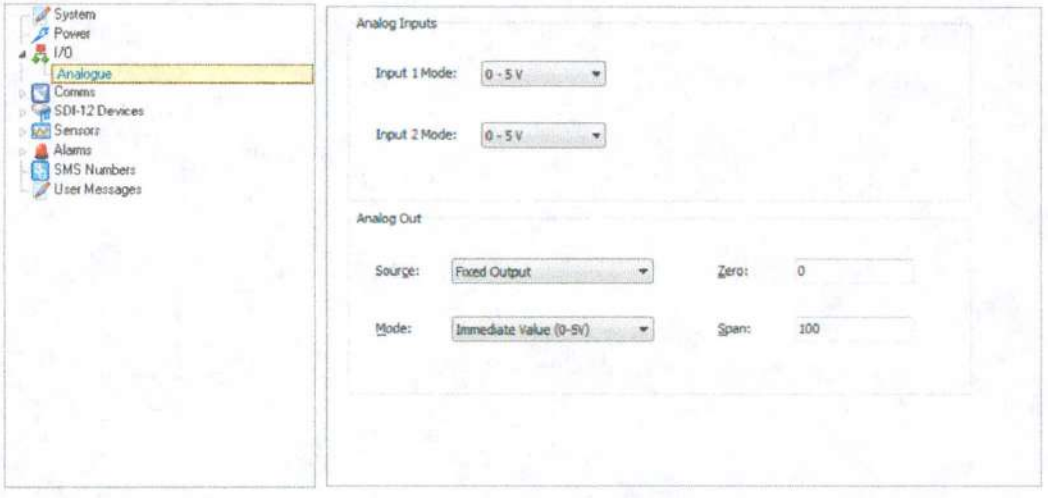
On Interval:
This is the length of time in minutes between each successive power mode change when the time is in the "on" period. i.e. between the start and end times.

Off Interval
This is the length of time in minutes between each successive power mode change when the time is in "off" period. i.e. before the start time or after the end time. This setting will normally be 0 (no activity in the off period), but this option does allow a different activation rate to be configured if required.

Alarm Interval:
Enter the length of time in minutes between each successive power mode change – when there are one or more active alarms in the iRIS.

5.5.3 I/O Configuration

5.5.3.1 Analogue I/O



Analogue Inputs

Input 1 Mode & Input 2 Mode:
This option allows you to select the analogue input range to be used by the iRIS, the options are 0 – 20mA, 4 – 20mA, 0 – 100mV, 0 – 5V and 0 – 30V.

Analogue Output

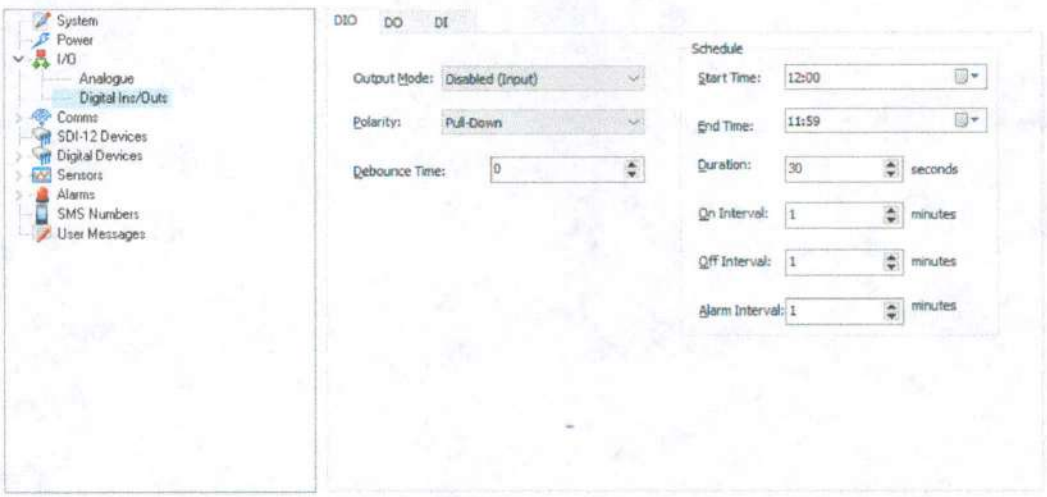
Source:
This option allows you to either configure the output mode to run in a fixed mode or to use the measured value from one of the 20 sensors to generate the output. If the source is set to Fixed, the actual output voltage or current is defined by the Span setting as a percentage of full-scale (5V or 20mA)

Mode:
When the output is controlled by a sensor, this sets the actual value to use. This is either the current value which will be updated regularly every time a measurement is taken. Or else it will use the last logged value which only changes when a processed value is logged. The mode is ignored when the source is set to Fixed.

Zero:
Sets the actual value representing the minimum signal output (0V or 0mA). The Zero setting is ignored when the source is Fixed.

Span:
Sets the actual value representing the maximum signal output (5V or 20mA). The Span setting is used to set the output as a percentage when the source is Fixed.

5.5.3.2 Digital I/O[7]



Output Mode:
Choose the operating mode of the output from the available options. Valid digital output modes are:

Mode	Description
Disabled	The Digital I/O channel will operate as a digital input.
Schedule	Follows the schedule as defined by the settings.
Schedule Plus	Follows the schedule as defined by the settings. Also activate the output when a user is logged in or an RS232 Telemetry mode call-in is in progress. If a user is logged on via the LCD/keypad interface OR the power mode is set to RS232 Telemetry and an alarm requiring transmission to a base station is pending, the output will be on.
Alarm	The output is on if any sensor alarm is active. Turns off when all alarms are inactive.
Remote	Remote Control from HydroTel or via a custom script. DIO1 is controlled by bit 0 of d1000, DIO2 by bit 1 of d1000, DIO3 by bit 2 of d1000 and DIO4 by bit 3 of d1000.
Online (DBA)	Follow wireless link state i.e. the output is on if the wireless modem is on-line (for Daughter board in slot A).
Online (DBB)	Follow wireless link state i.e. the output is on if the wireless modem is on-line (for Daughter board in slot A).
On	Always on.
Off	Always off (as opposed to tristate).

Table 3 - Digital Output Modes

[7] Only available in Pro version

Polarity:
Select the switching polarity of the output. This relates to the output's electrical state with respect to its logical on/off state. It also defines whether the output type is a pull-down (switch to GND) or pull-up (switch 12V). Please refer to the table below.

Polarity	Output Logical State	Output Electrical State
Normal Pull-Down	Off	Open-circuit (Input)
	On	Pulled down to 0V (GND)
Inverted Pull-Down	Off	Pulled down to 0V (GND)
	On	Open-circuit (Input)
Normal Pull-Up	Off	Open-circuit (Input)
	On	Pulled up to +12V
Inverted Pull-Up	Off	Pulled up to +12V
	On	Open-circuit (Input)

Table 4 - Digital Output Polarity

- If the polarity setting is Normal, the output will be electrically on when the output logical state is on and be high impedance (open-circuit) when the output is logically off.
- If the polarity setting is Inverted, the output will be high impedance (open-circuit) when the output logical state is on and be electrically on when the output is logically off.
- If the polarity setting is Pull-Down, the output will short the output terminal to GND. A maximum of 100mA can be sunk in this mode from an external load.
- If the polarity setting is Pull-Up, the output will supply 12V to an external load at up to 100mA.

Debounce Time:
For DIO, DI1 & DI2 only. The amount of time to wait for the input signal to be stable to consider it active. This setting is in seconds.

Start Time:
This is the time at which the iRIS is allowed to start controlling the output if the mode is set to Schedule.

End Time:
This is the time at which the iRIS must stop controlling the output if the mode is set to Schedule.

Duration:
Enter the length of time in seconds that you want the iRIS to keep the output energised for if the mode is set to Schedule or Schedule Plus.

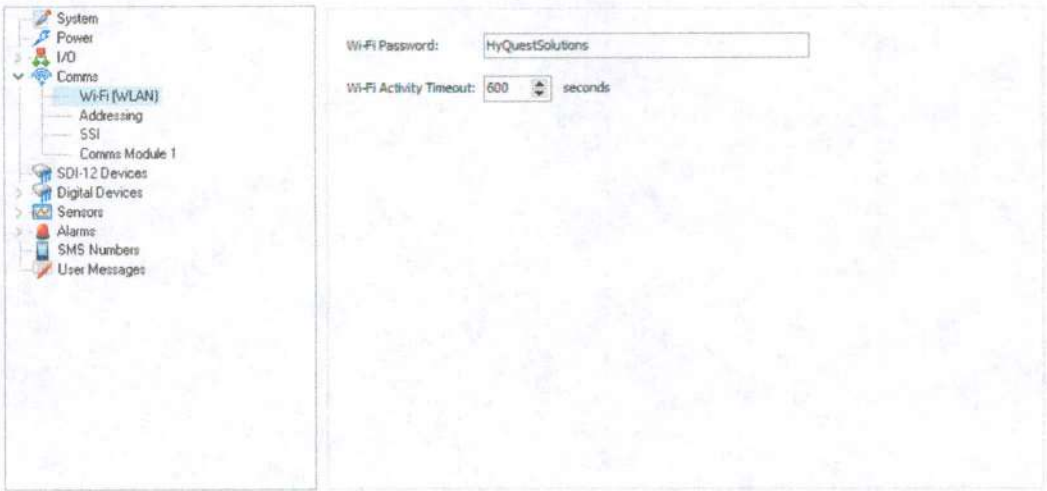
Interval:
Enter the length of time in minutes between the successive operations of the output if the mode is set to Schedule.

Alarm Interval:
Enter the length of time in minutes between the successive operations of the output if the mode is set to Schedule - when there are one or more active alarms in the iRIS.

5.5.4 Comms

The comms configuration menu is the starting point for configuring all iRIS communication settings:

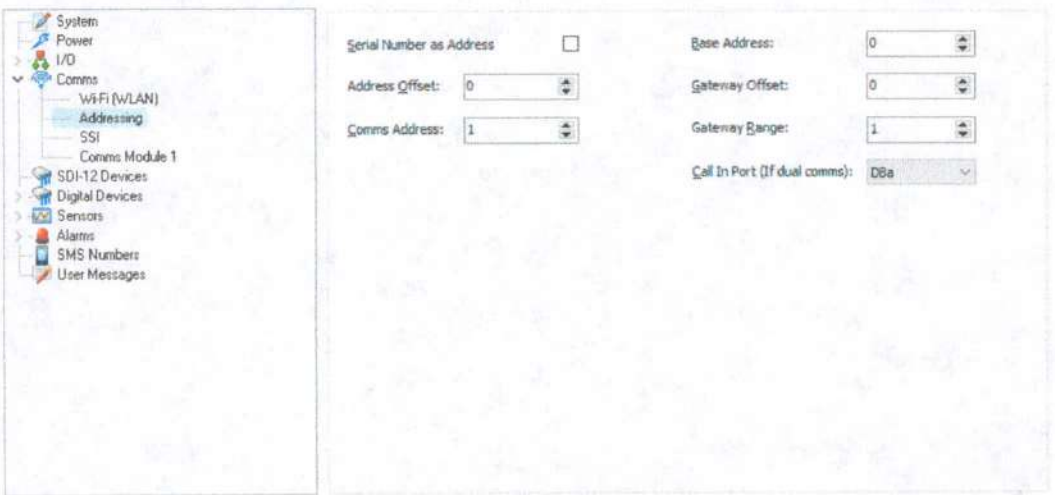
5.5.4.1 Wi-Fi



Wi-Fi Password:
Allows you to change the password for accessing the Wi-Fi access point on the iRIS. A change in password will not take effect until the Wi-Fi session has be reinitialized.

Wi-Fi Activity Timeout:
This is the time in seconds that the iRIS will maintain an active access point, the default is 10 minutes.

5.5.4.2 Addressing



Serial Number as Address:
Tick this checkbox if you want the address to be obtained automatically from the device's serial number.

Address Offset:
If the 'Use Serial number as Address' check box is enabled, then an optional offset can be entered which can be used to categorise units into regions. **NOTE: The address obtained by adding the serial number and offset must not exceed 32767.**

Comms address:
If the automatic serial number mode is not enabled, enter the communication address for the device (the factory default is 1). This address is used to identify the unit in all HyQuest protocol communication and must be unique on a HydroTel™ communications interface.

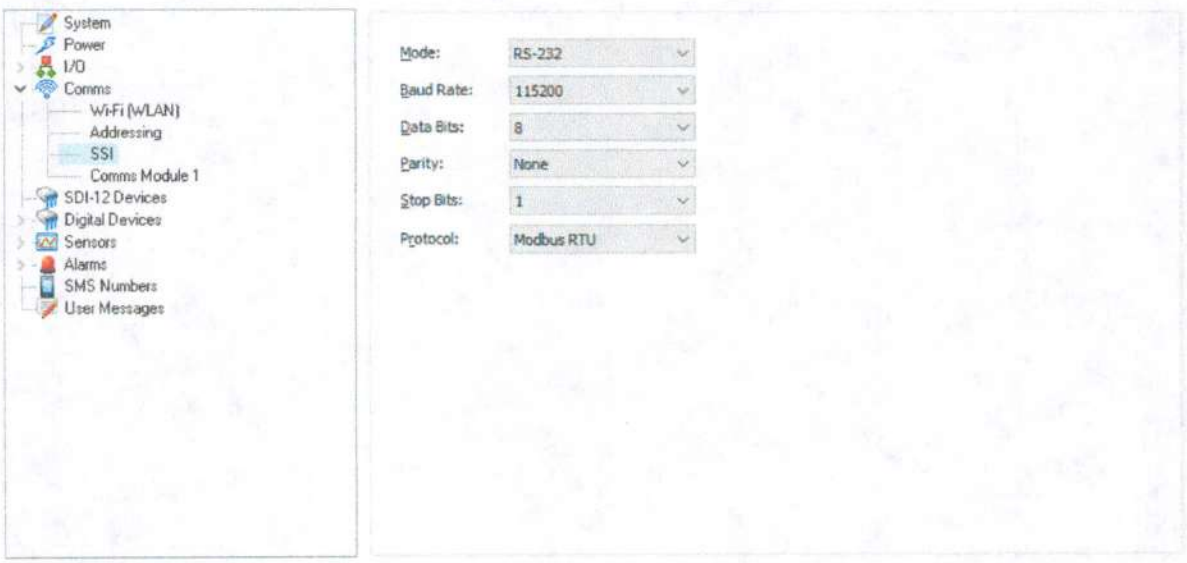
Base Address:
Address of the base station to use when calling back using the RS232 telemetry mode. The base address is normally set to zero.

If the unit will be expected to call back to HydroTel via a gateway site elsewhere, the base address must be set to a suitable value (normally the gateway offset setting in the gateway logger). If the base address is left set to zero in this situation, call-backs will fail.

Gateway Offset:
Use 0 to disable gateway communication. If this is not zero, then addresses within a gateway range defined by the Gateway Range setting will be forwarded. E.g. If the Gateway Offset is set to 1000 and the Gateway Range is set to 50, then communications to devices with addresses from 1000 to 1049 will be forwarded.

Gateway Range:
This sets the number of contiguous addresses starting from the Gateway Offset that will be included in the communications gateway check.

5.5.4.3 Serial Sensor Interface (SSI)[8]



Mode:
Serial mode to be used on the SSI port, possible options are RS-232 and RS-485.

In addition to this setting a jumper pair needs to be in the matching position on the PCB see section 4.2.4.1

[8] Only available in Pro version

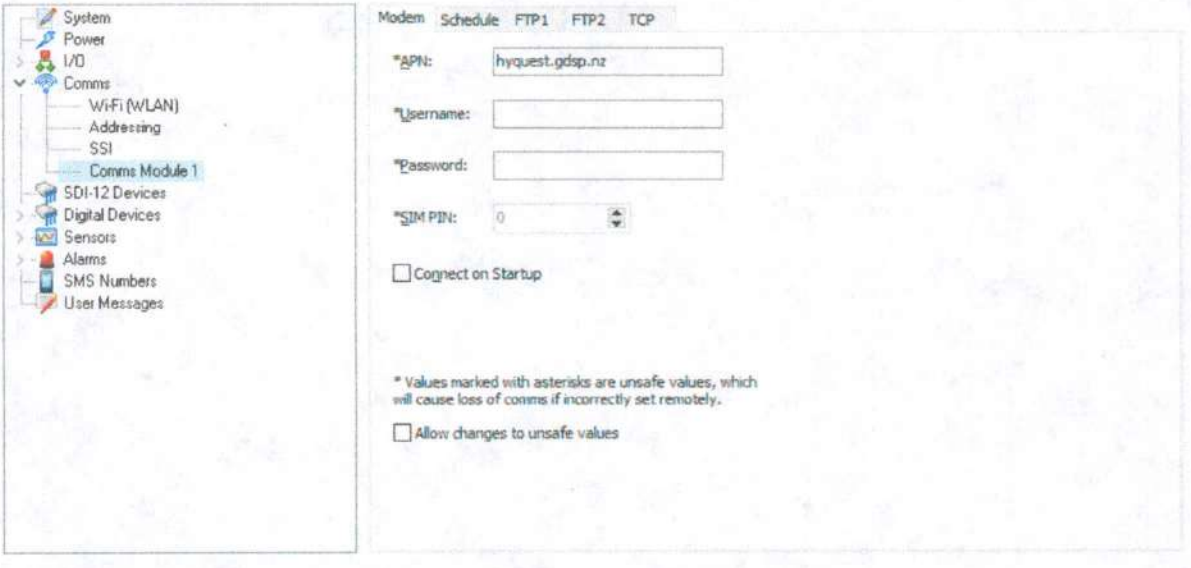
Baud Rate:
The baud rate setting, possible options are 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200. Default is 1200.

Data Bits:
This option configures the number of data bits in each serial frame, possible options are 7, 8, and 9. The default is 8

Parity:
This option configures the type of parity check bits in each serial frame, possible options are None, Even and Odd. The default is None.

Stop Bits:
This option configures the number of stop bits in each serial frame, possible options are 1 and 2. The default is 1.

5.5.4.4 Modem



APN:
Enter the name of the APN (Access Point Name) allocated by your network provider (e.g.: hyquest.gdsp.nz).

User Name:
Enter the user name required by your network provider. Note: Many providers do not require any login credentials, in which case this and the password parameter below should be empty.

Password:
Enter the password required by your network provider. Note: Many providers do not require any login credentials, in which case this and the user name above parameter should be empty.

Connect on Startup:
This option will cause the device to initiated a connection as soon as it has initialised after a start up.

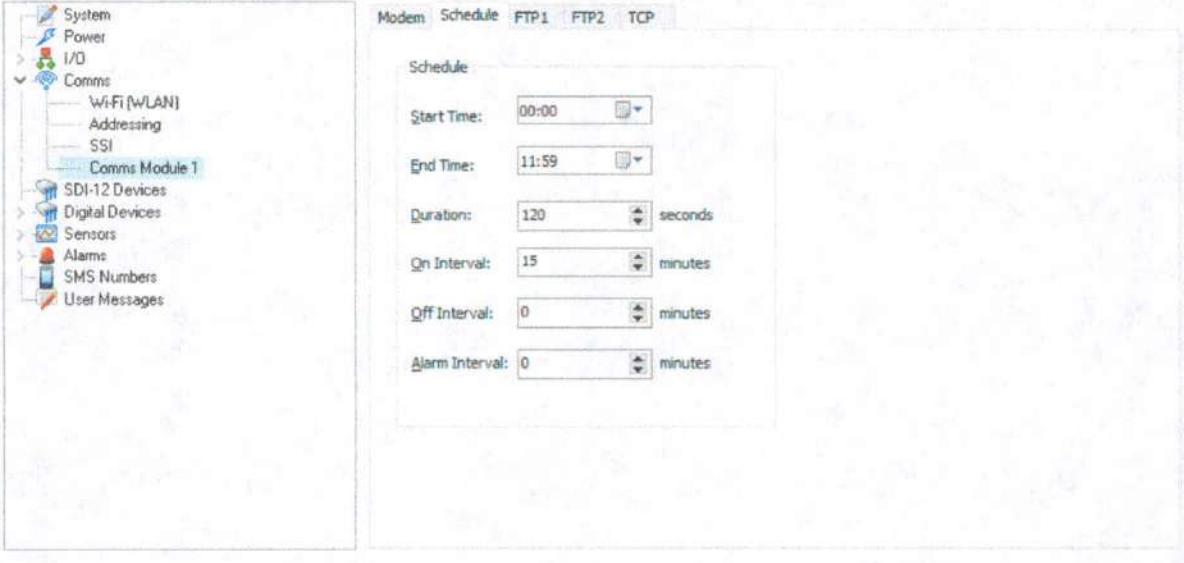
SIM PIN:
If the SIM card installed has a PIN code enabled for security purposes, use this option to define it. If a PIN code is not required, enter zero (0) for this setting.

If a SIM PIN is required and an incorrect PIN is entered, the unit will not operate correctly. Also, if the SIM PIN is set incorrectly, repeated attempts by the iRIS to log-on may result in the SIM card becoming locked out. This situation will require knowledge of the SIM's PIN Unlock Key (PUK) and/or contacting the SIM provider for unlock details.

Allow Changes to Unsafe Values:
The APN, Username and Password are marked as unsafe values, which may cause loss of comms if incorrectly set remotely. If you want to edit these columns, the option "Allow changes to unsafe values" should be enabled.

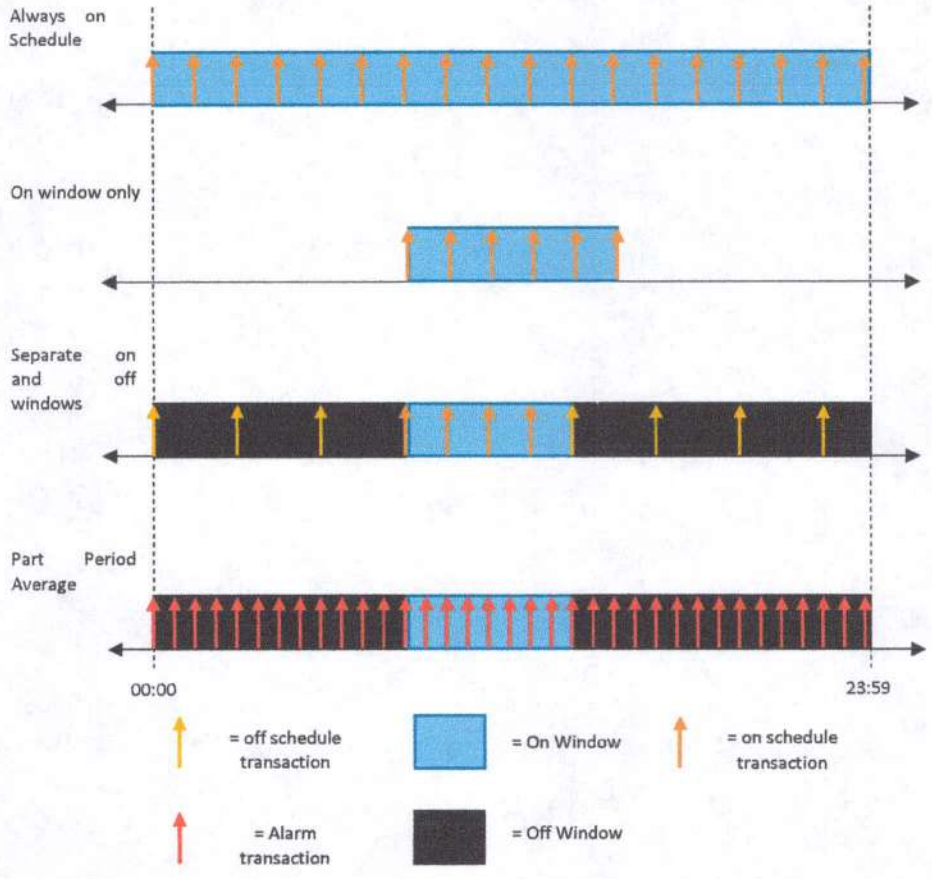
5.5.4.5 Schedule

The schedule configuration menu is provided to manage the wireless communication schedule. Normally this is used for wireless IP connections but can alternatively be used to send regular SMS messages to the phone number(s) in the SMS numbers list. See section 5.3.8



Start Time:
Enter the time at which the iRIS is allowed to start establishing wireless IP sessions or sending SMS messages.

End Time:
Enter the time after which the iRIS must stop establishing wireless IP sessions.



Duration:
This is the length of time in seconds that you want the iRIS to keep each wireless IP session active.

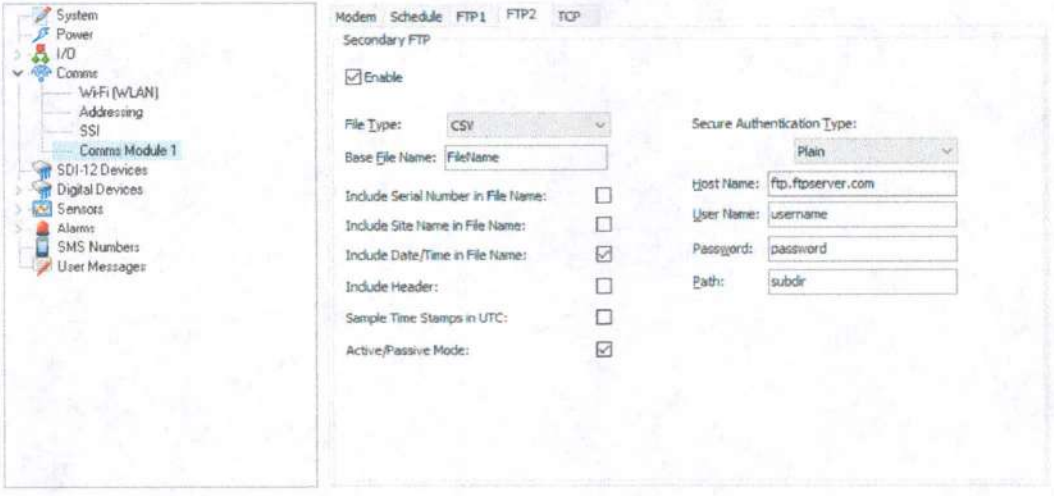
On Interval:
Enter the length of time in minutes between each successive wireless IP session being established or an SMS message being sent when the time is in the "on" period (i.e. between the start and end times).

Off Interval:
Enter the length of time in minutes between each successive wireless IP session being established or an SMS message being sent when the time is in the "off" period (i.e. before the start time or after the end time). This setting will normally be 0 (no activity), but this option allow a different connection rate to be configured if required.

Alarm Interval:
Enter the length of time in minutes between each successive wireless IP session being established or an SMS message being sent – when there are one or more active alarms in the iRIS.

5.5.4.6 Cellular Modem - FTP 1 & FTP 2

The iRIS allows the push of data to up to two FTP servers and this is done in the FTP1 an FTP2 configuration tabs, both are identical in format and operation so only one is shown below. If one or both are not needed simply remove the check from the enable box.



Enable:
If checked a call-in will include an FTP transaction (both scheduled and user initiated).

File Type:
This allows the selection of file type or extension of the file created by the logger, this is either CSV or TXT. The contents in both cases is the same.

Include Serial Number in File Name:
If checked the serial number of the logger will be included in the file name generated on the server (see section 6.5.1).

Include Site Name in File Name:
If checked the site name of the logger (see section 6.5.1) will be included in the file name generated on the server (see section 6.5.1 for more details on file name convention).

Include Date/Time in File Name:
If checked the date and time of the upload will be included in the file name generated on the server (see section 6.5.1 for more details on file name convention).

Include Header:
If checked a header is place on the first row or line of the file generated on the server (see section 6.5.2).

Sample Time Stamps in UTC:
If checked the sample in the file generated on the server will have time stamps in UTC (UTC+0), otherwise the time stamps will include the loggers UTC offset as configured in section 6.5.1 (see section 6.5.2 for more details on file contents). This also applies to the time element of the file name, i.e. UTC offset is applied to file name and contents or neither.

Active/Passive Mode:
If checked the FTP transaction will use Passive mode otherwise Passive mode is used. Passive Mode is recommended for most cases.

Secure Authentication Type:
This option selects the FTP transaction type authentication type, there are three options:

- Plain – the FTP transaction is in plain text, including user name and password.
- FTPS – uses a secure TLS (Transport Layer Security) to encrypt the FTP transaction, including user name and password.
- FTPS with pain fall back – the logger will attempt to make an FTPS connection with the server, if the server does not support FTPS or there is a problem it will fall back to plain mode.

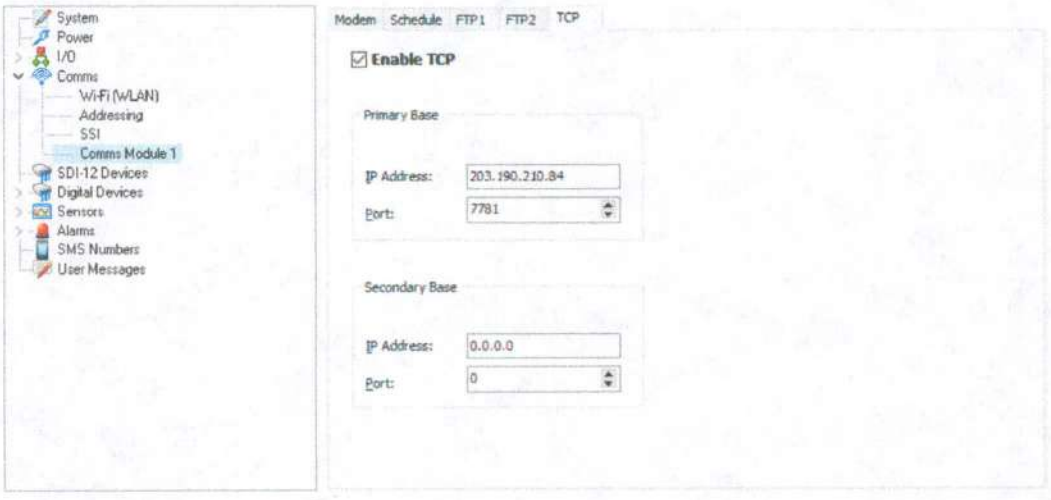
Host Name
Enter the host name of the FTP server to upload files to, this can be a URL or IP address.

User Name
Enter the user name required to login to the FTP server.

Password
Enter the password required to login to the FTP server.

Path
Enter the sub-folder path (if required) on the FTP server.

5.5.4.7 TCP



Enable:
If checked a call-in will include a TCP transaction (both scheduled and user initiated).

Primary Base IP:
Enter the remote IP address you want to have the iRIS connect to as its primary base (host server).

Primary Base Port:
Enter a non-zero port number to use for the IP socket.

Secondary Base IP:
Enter the optional secondary base remote IP address that you will connect to.
NOTE: to disable this feature set the IP address to zero

Secondary Base Port:
Enter the remote port number for the optional secondary base.
NOTE: to disable this feature set the IP address to zero

5.5.5 SDI-12 Devices

This menu option is only applicable for iRIS Under Cover Pro devices and will only appear when one or more sensors are connected. An auto detection process happens at power up. At this stage there are no configuration options for the SDI-12 sensors. Please note SDI-12 operation is only available when Pro version is enabled.



Device Name:
Device name obtained from sensor during device seek process.

SDI-12 Address:
The address SDI-12 sensor device and is obtained automatically, see section 8.4 Address Scan.

First Measurement at:
This is the time that the first poll will happen (relative to logger local time). Allowing the polling interval to be offset. If this setting and Measurement Interval are set to 00:00:00 then the automatic poll regime will be employed.

Measurement Interval:
The interval at which the device will be polled. Actual poll time can be offset by using a non-zero First Measurement at setting. If this setting and Measurement Interval are set to 00:00:00 then the automatic poll regime will be employed.

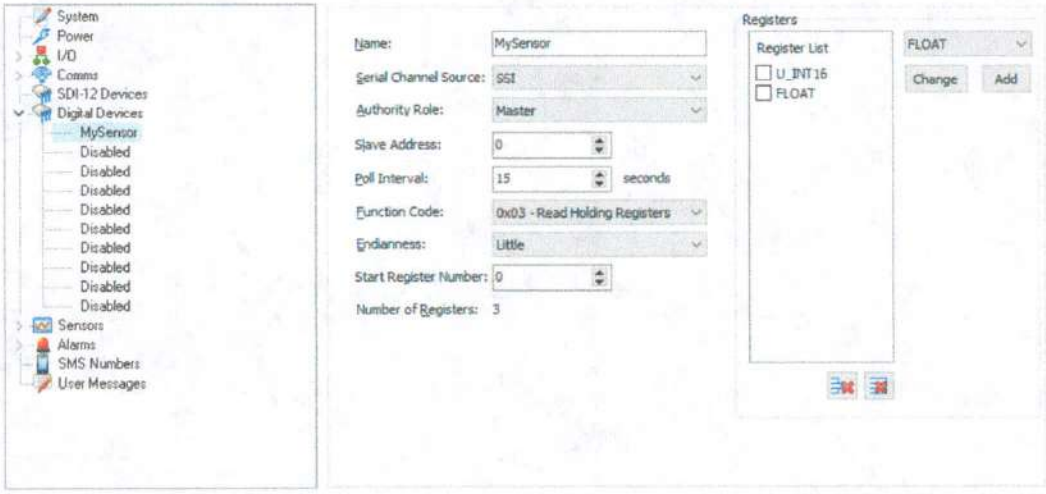
Custom Command:
This is an optional command that can be issued on a separate schedule to the poll for measurements schedule. The command can be any SDI-12 command, without the address or closing exclamation mark (!), these are automatically added by the logger. Example of use of this function are, to perform a wipe of the sensor lens or reset a running total. If this command is blank then the associated schedule will not have an effect.

First Command at:
This is the time that the first custom command will be issued (relative to logger local time). Allowing the custom command issuing interval to be offset. If this setting and Command Interval are set to 00:00:00 then the custom commands will not be issued.

Command Interval:
The interval at which the custom command will be issued. Actual command issue time can be offset by using a non-zero First Measurement at setting. If this setting is set to 00:00:00 and the First Command at setting is not 00:00:00, the custom command will be issued once at the time defined by the First Measurement at setting.

5.5.6 Digital Devices[9]

The Digital Devices branch is used to configure devices that communicate via RS232/RS485 are connected to either of the Communication modules or the SSI port. A device can be a sensor (acting as a slave) or the iRIS itself (when it is acting as a slave).



Name:
Enter a name for the Device (maximum 10 characters). This name will be displayed is used in sensor configuration.

Serial Channel Source:
This is the channel or physical interface that the device is attached, options are DBA, DBB and SSI.

Authority Role:
This is the Modbus Authority, when set to Master the iRIS will interrogate the devices. When set to Slave the iRIS responds to the master device requests

[9] Only available in Pro version

Only one Slave device can be configured, all others are set to Master.

Slave Address:
This is the address of the Modbus slave, when the Authority Role is set to Master, this address is for the device connected to the iRIS. When the Authority Roll is set to Slave, this address is the Modbus address of the iRIS.

Poll Interval:
Only Applies to Authority Roll Master: this is the interval that the iRIS will make requests to the given device.

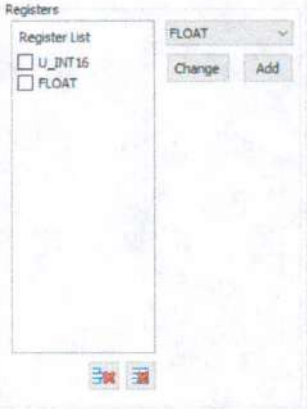
Function Code:
Only Applies to Authority Roll Master: This is the Modbus Function code see section 11 for more details.

Endianness:
This is the Endianness of the data contained in the Modbus registers, see section 11 for more details.

Start Register number:
This is the Modbus registers start address, see section 11 for more details.

Registers List

The Registers list defines the data types for the registers in the device. A datatype can be chosen with the dropdown box and then click **Add** button to add to the list.



To change an item(s) in the list simply check the incorrect item(s), select a new data type and click the change button.

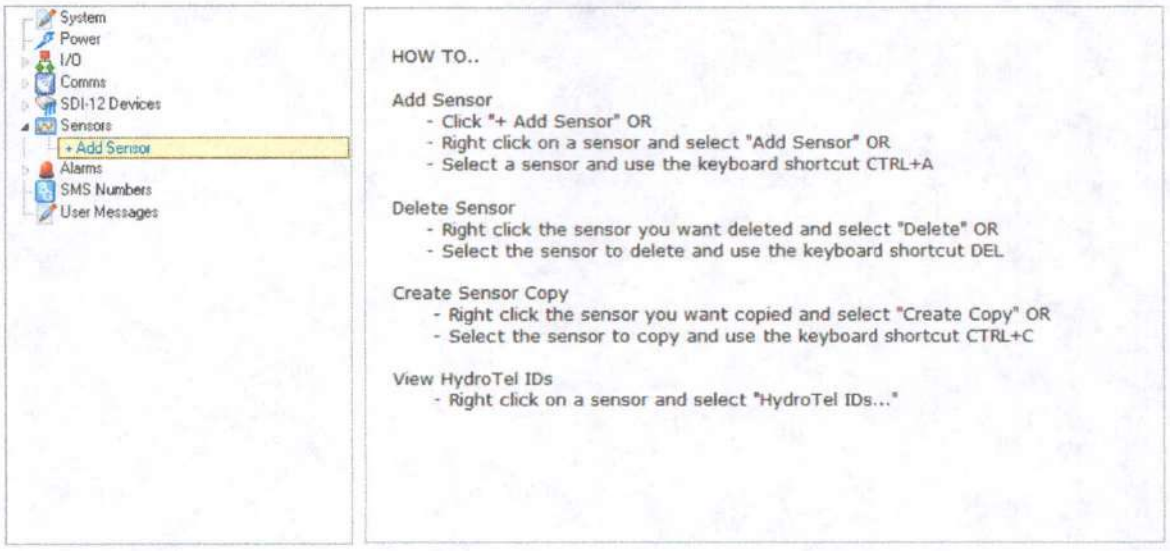
This button is used to delete items in the list that are checked.

This button is used to delete ALL of the items in the list.

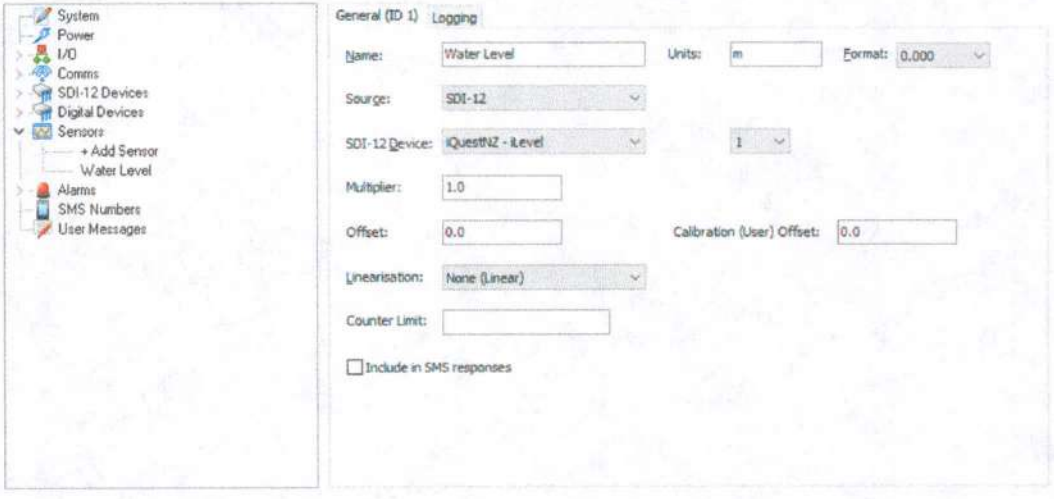
5.5.7 Sensor Configuration

The Sensor Cfg menu is used to configure each of the twenty virtual sensors. Refer to the data logging features (Section 3.3.4) of this document for a discussion on data logging and virtual sensors.

To minimise clutter due to a large number of potential sensors, iLink implements a dynamic virtual sensor management system for the iRIS Under Cover. Clicking on the Sensors Branch of the tree displays the instructions on how to use this feature.



5.5.7.1 General



Name:
Enter a name for the sensor (maximum 10 characters). This name will be displayed on the iRIS LCD sensor screens.

Units:
Enter the engineering units of the selected sensor.

Format:

This is the display format to use for the selected sensor. This is used on the LCD screen of the logger to display the sensor readings. Please note if the number to be displayed has more most significant figures than the format configuration allows for then the text on the LCD will be inverted and truncated. For example, when the format is configured as 0.000 and the value to be displayed is 12.2, the value displayed on the LCD will be 2.200.

Source:

Choose the source from which the virtual sensor should acquire its data. Use option 0 to disable the sensor. Valid data sources are shown in the table below.

Description	Raw Range
Unused / disabled	N/A
Supply Voltage	
Battery Voltage (External)	
Battery Voltage (Internal)	
Supply Current	
Battery Current (External)	
Analogue Input 1	Configurable[10]
Analogue Input 2	Configurable[10]
Internal Temperature	
Change of State on DI1	0 to 1
Change of State on DI2	0 to 1
Change of State on DIO	0 to 1
Pulse Counter on Digital Input 1	0 to 1
Pulse Counter on Digital Input 2	0 to 1
Pulse Counter on Digital Input 3	0 to 1
Auto Pulse Counter on Digital Input 1	0 to 1
Auto Pulse Counter on Digital Input 2	0 to 1
Auto Pulse Counter on Digital Input 3	0 to 1
Frequency Counter on Digital In 1	0 to 400Hz
Frequency Counter on Digital In 2	0 to 400Hz
Frequency Counter on Digital In 3	0 to 400Hz
Change of State on DI1	0 to 1
Change of State on DI2	0 to 1
Change of State on DIO	0 to 1
Day to Now on Digital Input 1	
Day to Now on Digital Input 2	
Day to Now on Digital Input 3	
Day to Now on Digital Input 4	
Year to Date on Digital Input 1	
Year to Date on Digital Input 2	
Year to Date on Digital Input 3	
Year to Date on Digital Input 4	
Running Total on Digital Input 1	
Running Total on Digital Input 2	

[10] Range can be configured by user, see section 5.5.3.1

Description	Raw Range
Running Total on Digital Input 3	
Running Total on Digital Input 4	
Received Signal Strength DBA	-113 to 0 dBm
Received Signal Strength DBB	-113 to 0 dBm
SDI-12[11]	
Digital Device[11]	

Table 5 – Standard Sensor Sources

Multiplier:
This option is used to enter a scalar multiplier. This multiplier is used to convert the raw input into engineering units. It is the "m" variable in the *y=mx+c* scaling equation.

Offset:
Enter a scaling offset in this column. This offset is added to the scaled engineering value. It is the "c" variable in the *y=mx+c* scaling equation.

Calibration (User) Offset:
This is the offset to shift the scaled value's datum.

SDI-12 Device[12]:
Select which SDI-12 device the virtual sensor will use as a source.

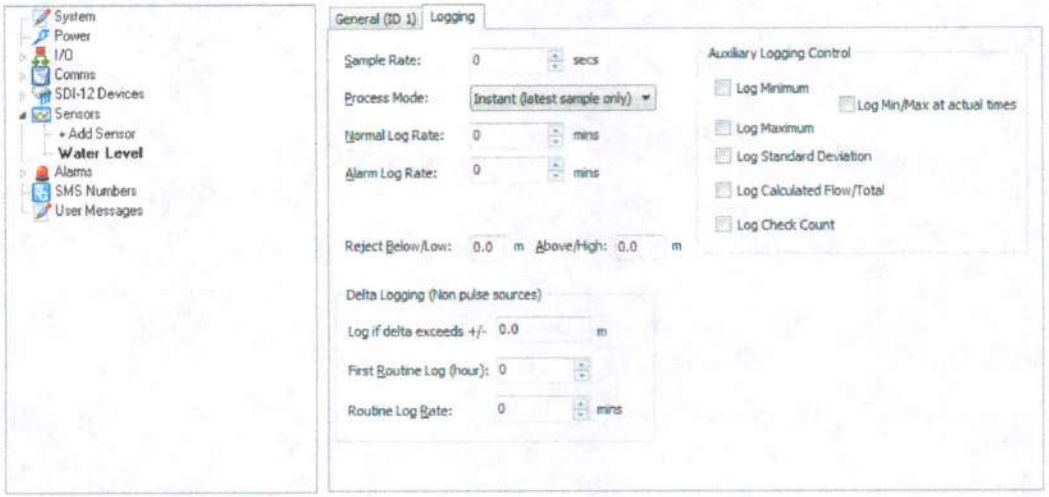
Digital Device[13]:
Select which digital device the virtual sensor will use as a source (see section 0).

Variable[14]:
Select the variable index of the output string from the SDI-12 device selected above, as the raw source.

Include in SMS Message:
When this option is enabled the given sensors reading is included in the SMS command responses (see section 6.4 for more information).

[11] Only available in Pro version
[12] Only available for iRIS Under Cover Pro devices and when **SDI-12** is chosen as the source
[13] Only available when **Digital Device** is chosen as the source
[14] Only available when **SDI-12** or **Digital Device** is chosen as the source

5.5.7.2 Logging



Sample Rate:
The sample rate is the rate (in secs) at which the source is sampled.

Process Mode:
Choose the process mode to apply to the measurements. The available modes are:

Name	Description
Instant	Logs only the most recent sample
Period Average	Logs the average of all samples taken over logging period
Event	(Only valid for pulse input sources) Logs non-zero samples. If the logging rate is 0, then any pulse is logged immediately. If the logging rate is > 0, then the total accumulated in the period is logged only if it is not zero. In this mode, if there was no sample logged at the last log time, a zero sample is also logged, time stamped with last log time/date. This is required for time series management purposes.
Scalar Average (for Wind Direction)	Logs the average of all samples taken over logging period, but uses scalar calculations to calculate the average.
One Minute Average	Logs the average of all samples taken over the last one minute period prior to the data being logged. This is useful for sensors that are powered on a timed basis using a digital output and some averaging is still required. In this case, using the Full Period Average would give an incorrect value.
Vector Average (for Wind Direction & Speed)	Logs the average of all samples taken over logging period, but uses vector calculations to calculate the average direction using associated wind speed.

Log Rate:
This is the logging rate (in mins) when the sensor is not in alarm. If you wish to log digital data on change of state you can enter a value of 0. If this parameter is left at 0 for analogue sources, they will not be logged.

Alarm Log Rate:
This is the logging rate (in mins) when the sensor is in alarm.

Reject Below (Low):
This option is used to enter a simple rejection value. Any value equal to or below this will be ignored and the last "good" value retained.

Reject Above (High):
Any value equal to or above this will be ignored and the last "good" value retained.

Log if delta exceeds +/-:
This is the amount the latest processed value (in actual engineering units of the sensor) must differ from the last logged value in order to be logged.
The delta logging (if enabled by having a non-zero set-point) is done at the time the logging would normally occur for the sensor as configured. All the delta decision does look at the last value that was actually logged and compare it to the newly processed sample value. If the difference is greater than the configured delta value, then the sample is actually logged.

First Routine Log (hour):
This is the hour in the day when the first routine log will occur.

Routine Log Rate:
The routine log rate is the interval at which a routine log is taken after the first hour is reached.

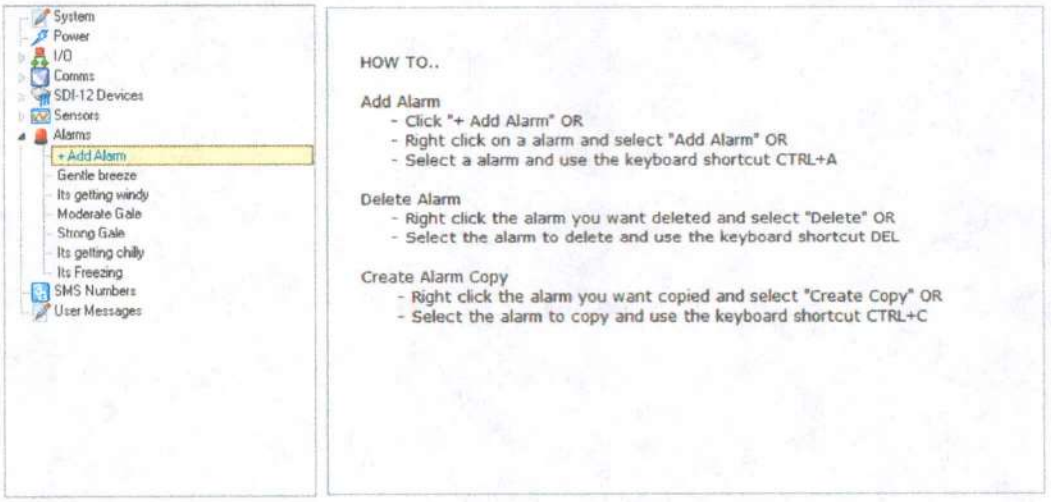
Auxiliary Logging Control:
You can also configure the extended datalogging options using the logging flags. The list of the available flags is given below.

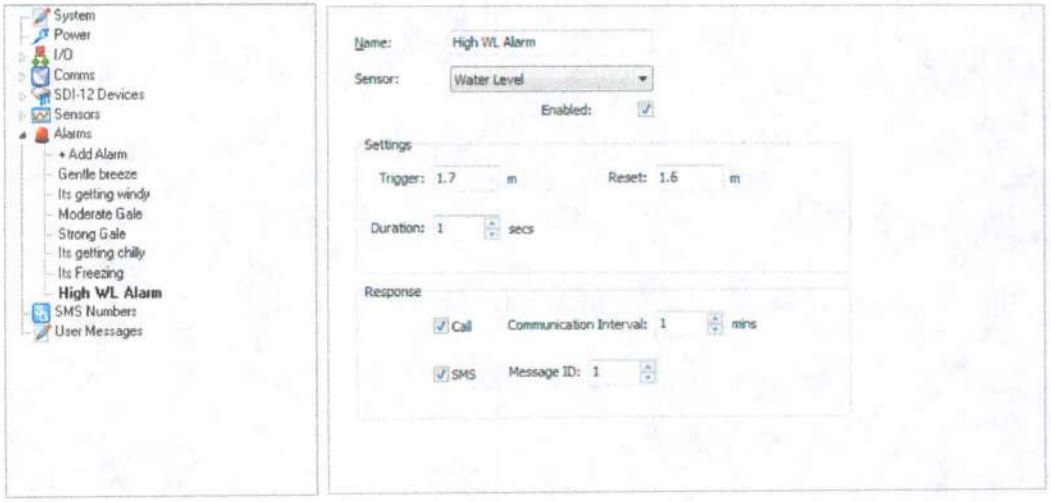
1. Log Minimum value sampled in the log period.
2. Log Maximum value sampled in the log period.
3. Log Standard Deviation of samples in log period.
4. Log Calculated Flow Rate (in l/s) over log period or Log Accumulated Volume for sensors with an analogue or frequency source.
5. Log Check Count. This optionally logs the background incrementing counter.

5.5.8 Alarm Configuration

The Alarm configuration menu is used to configure each of the 40 alarms. These can be attached to any of the 20 virtual sensors (see section 0 for details on Sensor configuration).

To minimise clutter due to a large number of potential alarms, iLink implements a dynamic alarm management system for the iRIS Under Cover. Clicking on the Alarms Branch of the tree displays the instructions on how to use this feature





Name:
User friendly name of the alarm.

Enable:
Tick the box in the Enable column to enable an alarm.

Sensor:
Choose the sensor which you want to activate the alarm for from the list.

Trigger:
Enter a value in engineering units that you want to use as the trigger point for the alarm. When the scaled value crosses this threshold, the alarm will become active. The trigger direction is determined by the reset level and whether it is less than the trigger (rising alarms such as water level) or greater than the trigger (falling alarms such as battery voltage).

Reset:
Enter a value in engineering units that you want to use as the reset point for the alarm. When the scaled value crosses this threshold when the alarm is active, it will be reset.

Duration:
This is the time in seconds to delay alarm activation. This can be used to implement alarm hysteresis for analogue data sources that vary. If the data source is one of the internal counters, then this time is used to totalise individual sample values. If the total over the given alarm duration is above the trigger level then an alarm is generated. Typically this feature is used for rainfall alarms.

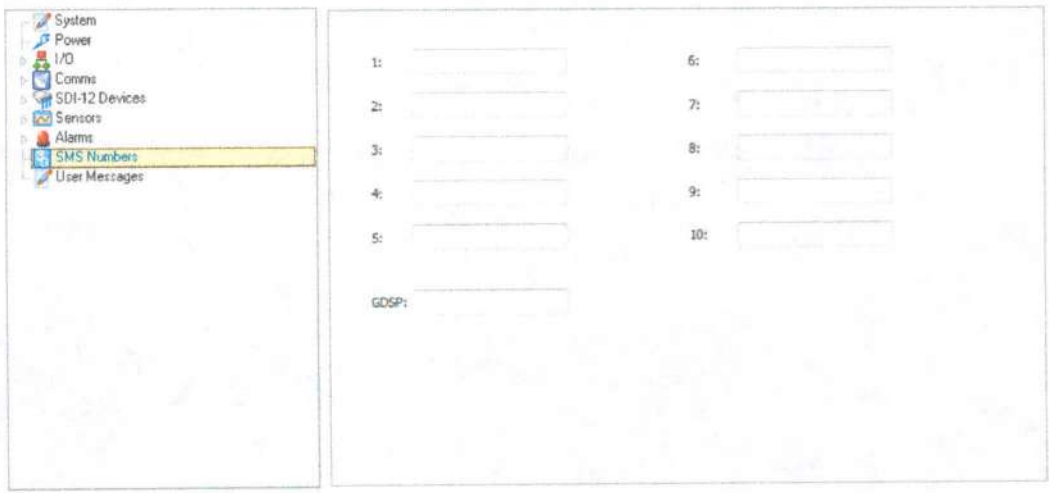
Comms:
If this value is non-zero it can be used to increase the rate at which call-ins occur on scheduled communication by over-riding the comms scheduler's preconfigured normal and alarm intervals. The comms scheduler will use the smallest non-zero interval value from its own or those of any currently active alarms. This is useful for reporting data more often during an event.

Call:
If this is checked (on by default) a call-in via the configured communications method will be initiated as soon as the alarm becomes active.

SMS:
For cellular models, the alarm becoming active will initiate the sending of an SMS alarm message to any mobile phones defined in the SMS Numbers list. See Section 5.3.8

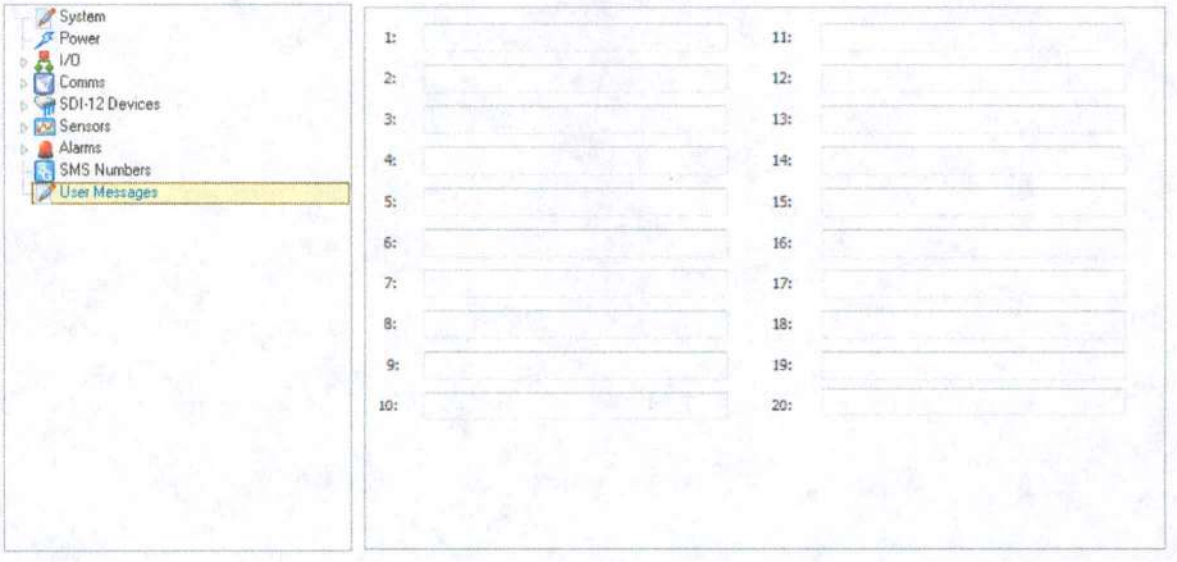
Msg Id (User Message Id):
This enables a custom text string to be appended to the SMS message sent on alarm. A zero value disables any appended text. Otherwise the number associates one of the User Messages and it is this message that will be appended. See Section 5.5.10

5.5.9 SMS Numbers



This is the place to configure the phone numbers for SMS text messaging initiated by the iRIS. These numbers are only applicable when the connection mode is set to SMS. See the description of the connection mode in Section 5.5.4.4

5.5.10 User Messages



This form displays the user messages that can be included in SMS alarm messages. A maximum of 20 free format messages is supported. Each message may be up to 39 characters in length.

6 Operation

6.1 LED Indicators

The iRIS has several LED indicators. The main status LED and two diagnostic LEDs are visible from the front of the enclosure. There are an additional two LED located with the logger enclosure.

6.1.1 Status LED

The status LED is a colour device that is used to indicate the unit status.

6.1.2 Front panel Diagnostic LEDs

The iRIS has two other LED indicators that are useful for diagnostic purposes. These are visible through the front of the enclosure.

WiFi Illuminated red when Wi-Fi (WLAN) access point is active.
Comms 1 Flashes red to indicate status of coms module in the primary slot, see Table 6.

Table 6 – Shows the front panel Comms status LED sequence for cellular module[15]

State	One Second	One Second	One Second	One Second
Powered down				
Initialisation	Actual time will vary			
Ready				
Ready (zero signal)				
Connecting				
Connected				

6.2 Keypad Button

Wifi Button **Press and held:** for more than 3 seconds will enable the Wi-Fi access point



[15] Measured in 100mS slices

6.3 Solar Regulator

This is a 3 stage battery charger where you can specify the battery type as either 'SLA' or 'LiIon' (3-cell) with a single parameter – these both have predefined charging stages and thresholds – or alternatively you can select "Custom" charging with all charging stages and thresholds selectable. This will allow this charger to be used with any battery chemistry that is developed in the future.

6.3.1 Charging Batteries cycles

Different chemistry batteries need to be charged in different ways, to obtain an optimum life from the battery. The following section depict charge cycles

6.3.1.1 Sealed Lead Acid Batteries

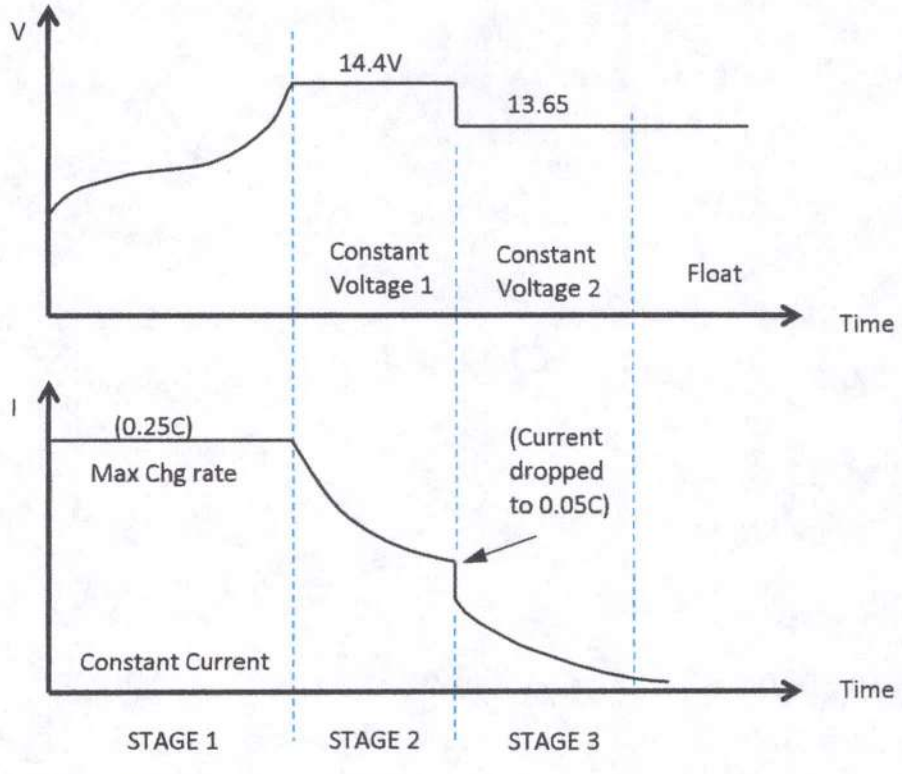


Figure 15 – (Ideal charging of an SLA battery)

SLA Battery Type (Pre-set values):
Stage 1:CC @ 0.45A – stop when V reaches 14.4V (+ 5hr time limit)
Stage 2:CV @ 14.4V – stop when I falls to 0.12A (+ 3hr time limit)
Stage 3:CV @ 13.65V – stop when I falls to 0.0A (that is never) (+ no time limit)
LV Control: Disconnect if Battery V < 10.0V : Reconnect if Battery V > 11.0V

6.3.1.2 Lithium Ion / Lithium Polymer Batteries

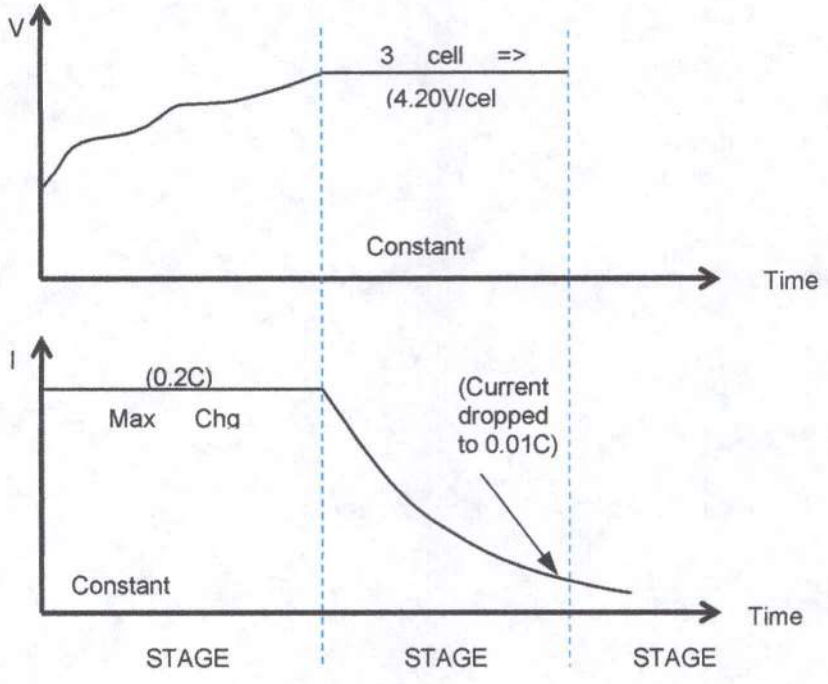


Figure 16 – Ideal charging of a LiIon battery pack

LiIon Battery Type (Pre-set values):
Stage 1:CC @ 0.45A – stop when V reaches 12.6V (+ 5hr time limit)
Stage 2:CV @ 12.6V – stop when I falls to 0.12A (+ 3hr time limit)
Stage 3:Force no charge – stays not charging for 1 hour – then back to Stage 1
LV Control: Disconnect if Battery V < 9.0V : Reconnect if Battery V > 10.5V

6.3.2 Operation

6.3.2.1 Charging Source

The solar charger can be supplied from a constant DC source or solar panel, to optimize battery changing and maintain good battery conditioning the charger need to know what type of source is being fed into it. The following describes how the solar charger handles operation varies depending on changer source:

- Mains/DC – 1 hour on charge – then 1 hour off charge (charge algorithm and timing while charging). Starting in stage 1 and moving through to stage 3 – when the 1 hour elapses, it will stop charging at whatever stage it is in, then turn off charging for 1 hour then recommence charging where it left off.

- Solar – Operates to charge algorithm – up to a max of 18 hrs charging – then 1 hour rest (This is done in case solar is selected – but it is connected to the mains). The charging will move from one stage to the next and stay in stage 3 if required – until the solar is removed. When solar reappears the sequence starts at stage 1 again.

Note: Charging control always starts at stage 1 and move through to stage 3. If stage 3 terminates due to a condition or timeout, then charging will turn off for 1 hour and then recommence at stage 1.

6.3.2.2 Charge Algorithm Stages

The following describes the operation of the different stages of the charge algorithm:

CC: Charge at a constant 'current' (trying to keep the Iout current constant) until the 'voltage' (the Vout voltage) reaches the specified level with a maximum 'interval' specified. (0=> No time limit) If there is sufficient solar power for the current to reach the constant current level, the 'charge mode' returned is CC – if there is not sufficient power, the regulator enters maximum power point tracking mode and the 'charge mode' returned is M-CC. In this mode the Vin voltage and Iin current is monitored and the regulator adjusts itself so that the maximum power is retrieved from the solar. In MPPT mode, the minimum Vin voltage that is controlled down to is 10.5V.

CV : Charge at a constant 'voltage' (trying to keep Vout voltage constant) until the 'current' (the Iout current) falls to the specified level with a maximum 'interval' specified. (0=> No time limit) If there is sufficient solar for the voltage to reach the constant voltage level, the 'charge mode' returned is CV – if there is not sufficient power, the regulator enters maximum power point tracking mode and the 'charge mode' returned is M-CV. In this mode the Vin voltage and Iin current is monitored and the regulator adjusts itself so that the maximum power is retrieved from the solar. In MPPT mode, the minimum Vin voltage that is controlled down to is 10.5V.

Disc : Forced disconnect mode. The solar is purposefully not used to charge the battery. Batteries last longer when cycled – that is, discharged and then charged – so disabling the charge for a time can, believe it or not, be beneficial to the battery.

Sleep : When there is no solar present the regulator enters sleep mode, waking once a second to see if solar is present. If solar has been absent for less than 4 hours (clouds passing overhead), the logger returns to the previous charging state – if however solar has been absent for more than 4 hours (overnight), the logger returns to a stage #1 charging state.

NOTE: Throughout this description:
Vin = Solar Voltage, Iin = Solar Current, Vout = Battery Voltage, Iout = Battery Charge Current

6.3.3 Charger LED Flash States

The solar regulator charge status can be determined by viewing the red status LED located at the top of the main board.

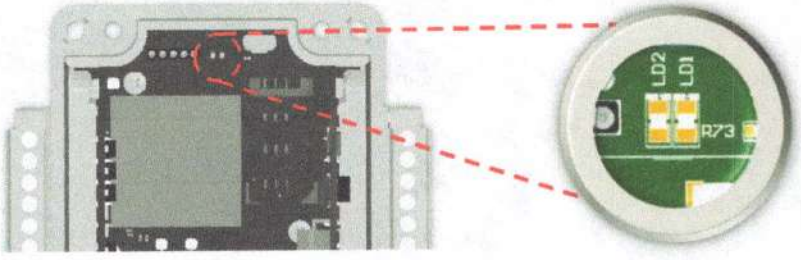


Figure 17- Location of solar regulator status LED (Red)

Table 7 – Shows the solar charge status LED sequence[16]

State	One Second	One Second	One Second	One Second	One Second
Sleep mode (1mS on)					
CC Mode					
CV Mode					
Not Charging					

6.4 SMS Communication

The iRIS can send a standard text message in response to a request received via SMS (see Section below). If the call-back mode is set to SMS a message is also sent if an alarm is activated, a comms scheduler trigger occurs or user initiated communications test is done.

The SMS message is constructed from the site name, iRIS's time, plus the sensor name, last logged value, derived values (min, max, etc.) and units of all the sensors that have their SMS enable flag set.

My Site Name (AG5-0003),03/09/2020:12:34:56:Water Level=7.69m,Battery=12.73,RSSI=-085dBm

If the message was sent because of an alarm event, the message will have the prefix "ALARM!" at the start of the message.

6.4.1 SMS Text Commands

The iRIS can accept incoming SMS messages and if they are valid it will respond appropriately. Any text message received that is invalid will be ignored.
To use the SMS receive function, simply send a text to the iRIS voice number with the appropriate message as described below.

None of the messages are case-sensitive. They are shown in upper case for clarity.

The six commands currently supported are:

GOL - Go On-Line.
This is useful as a poll-on-demand type function. The iRIS will not reply to this command, but will immediately initiate a wireless connection of the type defined in the Call-back Mode setting. Typically, this is an IP connection, but could be a SMS message (but the message will be sent to the numbers defined in the Phone Number configuration, which may not include the requester's number).

Command	Description
GOL	Same action as scheduled task using details from schedule and TCP IP/Port or FTP or SMS settings
GOL <IP>,<Port>,[<APN>,<UID>,<PWD>]	Same action as scheduled task using details from schedule except it creates a TCP connection and overrides the following: • <IP> – TCP/IP address of host e.g. 203.190.210.84 • <Port> - TCP/IP port of host e.g. 7781

[16] Measured in 100mS slices, except for sleep where on time is 1ms

	• <APN> - Access Point Name, if not omitted then the APN configured in the device will be used. • <UID> - the <APN> must be included to use this parameter • <PID> - the <APN and <UID> must be included to use this parameter

For example:

GOL

Or when to make a one-off connection (uses the already configured APN):

GOL 192.168.1.10,7777

Or when to make a one-off connection (overrides the already configured APN), useful if the iRIS has been deployed without setting the correct APN:

GOL 192.168.1.10,7781,Hyquest.GDSP.nz

RQ - ReQuest current sensor values.
This command can be used to retrieve the iRIS details and current sensor readings. The reply message body is in the following format:

<SiteName>(<SerialNumber>),<DateTime>:<SensorAName>=<SensorAValue><Sensor AUnits>, <SensorBName>=<SensorBValue><SensorBUnits>, ,...

Where the elements are as follows and are derived from the iRIS's configuration:

Element	Description
<SiteName>	Site name of the iRIS
<DateTime>	Date and time of the message as it is sent using the iRIS local settings.
<SensorAName>	Name of the first sensor that has include in SMS option set.
<SensorAValue>	Current value of the sensor in engineering units
<SesnorAUnits>	Units for the first sensor.

Example message output:

RQ

My Site(AG5-0003)03/09/2020 9:52:09:Daily Rainfall=010.0mm,Battery=12.05 V,Signal=-077dBm

Only sensors that have been selected will be included in this message (see section Error! Reference source not found. **for information one enabling/disabling sensor in the message output). By default, none of the sensors are included so the message will only contain site name, serial number and date/time.**

The limit of the size of message that can be set is 160 characters. This means that it is important to consider which sensors are included in the message.

INT – change call-in schedule on INTerval

This command changes the call-in schedule On Interval setting (see section 5.5.4.5 from information on configuring this setting via iLink), allowing the user to increase or decrease the update rate of data sent out via the cellular telemetry module.

The message is in the format:

INT=t

Where **t** is the interval in units of minutes.

Example:

INT=60

Will change the schedule interval to 60 minutes

The iRIS will respond to this command with an SMS message with contents in the format:

<SiteName> (<SerialNumber>)<DateTime>: On Interval for module <n> now <t> mins.

Where elements are as follows:

Element	Description
<SiteName>	Site name of the iRIS
<SerialNumber>	Serial number of the iRIS
<DateTime>	Time of the message as it is sent using the iRIS local settings
<n>	Module number (either 1 or 2)
<t>	Interval time (minutes) that has been change to.

For example:

INT=10

My Site(AG5-0003)03/09/2020 9:52:09: On interval for module 1 is now 10 mins.

For iRIS loggers fitted with more than one telemetry module, this command will only affect the schedule of the cellular module of which the SIM is fitted.

AINT – change call-in schedule Alarm INTerval

This command changes the call-in schedule Alarm Interval setting (see section 5.5.4.5 from information on configuring this setting via iLink), allowing the user to increase or decrease the update rate of data sent out via the cellular telemetry module while an alarm is active.

The message is in the format:

AINT=t

Where **t** is the interval in units of minutes.

Example:

AINT=6

Will change the schedule interval to 60 minutes.

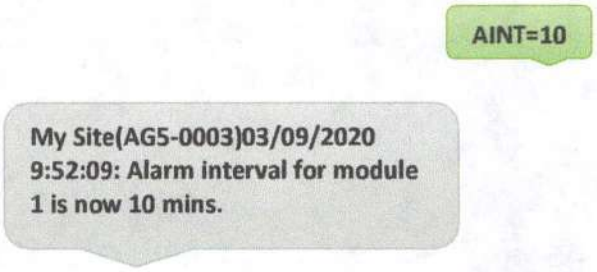
The iRIS will respond to this command with an SMS message with contents in the format:

<SiteName> (<SerialNumber>)<DateTime>: Alarm Interval for module <n> now <t> mins.

Where elements are as follows:

Element	Description
<SiteName>	Site name of the iRIS
<SerialNumber>	Serial number of the iRIS
<DateTime>	Time of the message as it is sent using the device local settings
<n>	Module number (either 1 or 2)
<t>	Interval time (minutes) that has been change to.

For example:



For iRIS loggers fitted with more than one telemetry module, this command will only affect the schedule of the cellular module of which the SIM is fitted.

OUT – Change the state of the digital OUTputs.
This command allows the user to control the digital outputs of the device. For this feature to be effective the digital output must be configured to Remote mode (see section **Error! Reference source not found.**, Digital Output Modes). Also, the iRIS will only act on the command if the received command is from one of the phone number in the approved/authorised SMS list (see section **Error! Reference source not found.** for configuring these number).

The possible commands are:

Command	Description
OUTx y	Change digital output x to state y. x = 1 – Digital IO (DIO) terminal x = 2 – Digital Out (DO) terminal y = 0 – Off y = 1 – On
OUTx=y	Same as above

The response is in the format (if the senders SMS number is authorised)

<SiteName> (<SerialNumber>)<DateTime>:<MessageN> <State>

The response is in the format (if the senders SMS is not authorised)

<SiteName> (<SerialNumber>)<DateTime>:<NotAuthMsg>

Where elements are as follows:

Element	Description		
<SiteName>	Site name of the iRIS		
<SerialNumber>	Serial number of the iRIS		
<DateTime>	Time of the message as it is sent using the iRIS local settings.		
<MessageN>	Either a default message per output or a user defined message per output. If user defined message is blank, the default message is used.		
	N	Default Message	User Message Index
	1	OUT1	1
	2	OUT2	2
<State>	State which the digital output was changed to and is text ON or OFF		

<NoAuthMsg>	Either a single default message (**Not Authorised!**) or a user defined message when the senders SMS number is not in the authorised list. If user defined message is blank, the default message is used.

For example (in response to OUT1=1 from an authorised number and no custom messages):

OUT1=1

My Site(AG5-0003)03/09/2020 9:52:09:OUT1 ON

Or in response to OUT1=1 from an unauthorised number and no custom messages:

OUT1=1

My Site(AG5-0003)03/09/2020 9:52:09:Not Authorised!

Or in response to OUT2=0 from an authorised number and with a custom messages index 1 = "Pump power" and index 2 = "Siren"

OUT2=0

My Site(AG5-0003)03/09/2020 9:52:09: Siren OFF

Or in response to OUT2=0 from an unauthorised number and with a custom reject message of "SMS Number not valid"

OUT2=0

My Site(AG5-0003)03/09/2020 9:52:09: SMS Number not valid

WiFi – Change the state of the Wi-Fi access point in the iRIS.
This command can be used to turn on or off the Wi-Fi access point via SMS message, the same action as pressing and holding the centre button (see section **Error! Reference source not found.** or 5.2). This can be of use if the keypad of the iRIS is not easily accessible.

To turn on the Wi-Fi send the message:

WiFi on

To turn off the Wi-Fi send the message:

WiFi off

6.5 File Transfer Protocol (FTP) Operation

The iRIS acts as an FTP client, when requested to connect to a given FTP server it will upload a file containing data since the last upload. The iRIS can communicate with up to two servers at the same time, each has an associated independent start of data pointer, which means only new data is uploaded not all data since beginning of memory. The data format and file name convention are described in the following sections.

6.5.1 File Name Convention

The file name is made up of a five elements and inclusion/exclusion of the elements is user configurable via a set of check boxes (see 0). The possible elements are as follows:

- **Base File Name** – this is a constant alphanumeric of up to 16 characters. Avoid using reserved characters such as \ /:*?"<>?|
- **Serial Number** – the serial number of the logger in the format AG5-XXXX where XXXX is a number between 0000 and 9999.
- **Site Name** – the site name as configured in section 5.5.1.
- **Date Time** – the date and time of the transaction. The order of the day month and year is defined by the Date format in the system configuration (see section 5.5.1) and the application of the UTC offset (configured in section 5.5.1) is defined by the **Sample Time Stamps in UTC** option in section 0
- **File Type** – this defines the extension either .CSV or .TXT

The order of the elements is fixed and are separated by underscores (except the extension which is separated by a period), as follows:

<BaseFileName>_<SerialNumber>_<SiteName>_<DateTime>.Extention

The following are some examples of possible file name.

```
MyFile_AG5-0002_InnovationPark_240918204526.csv
AG5-0002_240918204526.csv
240918204526.txt
MyFile.csv
AG5-0002.csv
```

6.5.2 File Contents Format

The file contents format for both CSV and TXT types is the same and can be considered as Comma Separated Values format (CSV). An optional header, which describes the columns can be placed on the first line/row of the file. The insertion is controlled by the **Include Header** option, see section 0. The header is as follows:

```
Sensor ID,Sample Date,Sample Time,Sample Value<CR><LF>
```

The remainder of the file contains one or more lines, each with four elements:

- **Sensor ID** – this is the Virtual Sensor number (1-20) as configured in section 0.
- **Sample Date** – this is the date of when the sample is recorded, the format is configured in section 5.5.1.
- **Sample Time** – this is the time of when the sample is recoded. The application of UTC offset (configured in section 5.5.1) to this value is defined by the Sample Time Stamps in UTC option which can be configured in 0.

- **Sample Value** – the value measured by the logger at the sample date and time for the given sensor ID. The value has a fixed-point format and this can be configured on a per sensor basis and is configured by the Format setting (see section 5.5.7.1).

An example of the file data is (without header):

```
1,23/09/2018,21:10:00,1.290000<CR><LF>
1,23/09/2018,21:10:00,1.310000<CR><LF>
1,23/09/2018,21:15:00,1.300000<CR><LF>
2,23/09/2018,21:10:00,25.125000<CR><LF>
2,23/09/2018,21:10:00,25.250000<CR><LF>
2,23/09/2018,21:15:00,25.125000<CR><LF>
3,23/09/2018,21:10:00,12.330000<CR><LF>
3,23/09/2018,21:10:00,12.350000<CR><LF>
3,23/09/2018,21:15:00,12.337626<CR><LF>
```

Note all lines are terminated with a carriage return and linefeed.

6.5.3 FTP Terminology

6.5.3.1 Active verses Passive mode

The following explanation is paraphrased from the web page https://slacksite.com/other/ftp.html

Introduction
One of the most commonly seen questions when dealing with firewalls and other Internet connectivity issues is the difference between active and passive FTP and how best to support either or both of them.

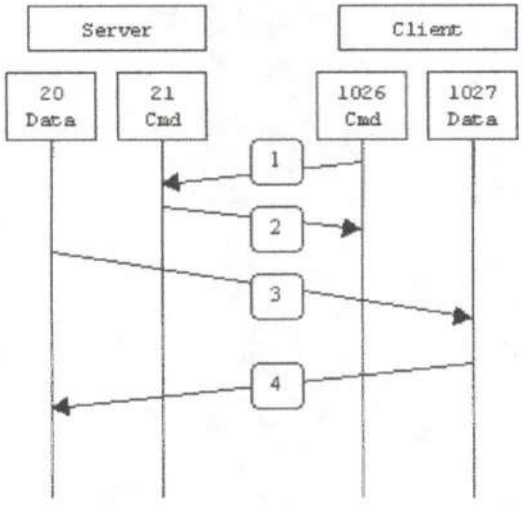
FTP is a TCP based service exclusively. There is no UDP component to FTP. FTP is an unusual service in that it utilizes two ports, a 'data' port and a 'command' port (also known as the control port). Traditionally these are port 21 for the command port and port 20 for the data port. The confusion begins however, when we find that depending on the mode, the data port is not always on port 20.

Active FTP
In active mode FTP the client (iRIS) connects from a random unprivileged port (N > 1023) to the FTP server's command port, port 21. Then, the client starts listening to port N+1 and sends the FTP command `PORT N+1` to the FTP server. The server will then connect back to the client's specified data port from its local data port, which is port 20.

From the server-side firewall's standpoint, to support active mode FTP the following communication channels need to be opened:

- FTP server's port 21 from anywhere (Client initiates connection)
- FTP server's port 21 to ports > 1023 (Server responds to client's control port)
- FTP server's port 20 to ports > 1023 (Server initiates data connection to client's data port)
- FTP server's port 20 from ports > 1023 (Client sends ACKs to server's data port)

When drawn out, the connection appears as follows:



In step 1, the client's command port contacts the server's command port and sends the command `PORT 1027`. The server then sends an ACK back to the client's command port in step 2. In step 3 the server initiates a connection on its local data port to the data port the client specified earlier. Finally, the client sends an ACK back as shown in step 4.

The main problem with active mode FTP actually falls on the client side. The FTP client doesn't make the actual connection to the data port of the server--it simply tells the server what port it is listening on and the server connects back to the specified port on the client. From the client side firewall this appears to be an outside system initiating a connection to an internal client--**something that is usually blocked**.

Active FTP Example

Below is an actual example of an active FTP session. The only things that have been changed are the server names, IP addresses, and user names. In this example an FTP session is initiated from testbox1.slacksite.com (192.168.150.80), a Linux box running the standard FTP command line client, to testbox2.slacksite.com (192.168.150.90), a Linux box running ProFTPd 1.2.2RC2. The debugging (`-d`) flag is used with the FTP client to show what is going on behind the scenes. Everything in red is the debugging output which shows the actual FTP commands being sent to the server and the responses generated from those commands. Normal server output is shown in black, and user input is in **bold**.

There are a few interesting things to consider about this dialog. Notice that when the `PORT` command is issued, it specifies a port on the *client* (192.168.150.80) system, rather than the server. We will see the opposite behaviour when we use passive FTP. While we are on the subject, a quick note about the format of the `PORT` command. As you can see in the example below it is formatted as a series of six numbers separated by commas. The first four octets are the IP address while the last two octets comprise the port that will be used for the data connection. To find the actual port multiply the fifth octet by 256 and then add the sixth octet to the total. Thus, in the example below the port number is ((14*256) + 178), or 3762. A quick check with `netstat` should confirm this information.

```
testbox1: {/home/p-t/slacker/public_html} % ftp -d testbox2
Connected to testbox2.slacksite.com.
220 testbox2.slacksite.com FTP server ready.
Name (testbox2:slacker): slacker
---> USER slacker
331 Password required for slacker.
Password: TmpPass
---> PASS XXXX
```

```
230 User slacker logged in.
---> SYST
215 UNIX Type: L8
Remote system type is UNIX.
Using binary mode to transfer files.
ftp> ls
ftp: setsockopt (ignored): Permission denied
---> PORT 192,168,150,80,14,178
200 PORT command successful.
---> LIST
150 Opening ASCII mode data connection for file list.
drwx------   3 slacker    users         104 Jul 27 01:45 public_html
226 Transfer complete.
ftp> quit
---> QUIT
221 Goodbye.
```

Passive FTP

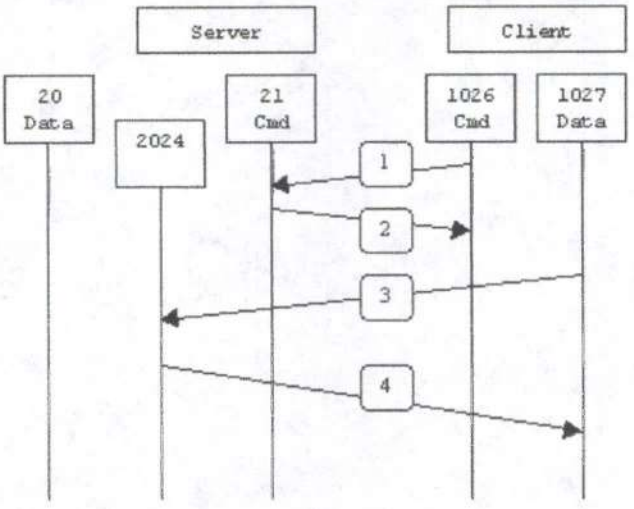
In order to resolve the issue of the server initiating the connection to the client a different method for FTP connections was developed. This was known as passive mode, or `PASV`, after the command used by the client to tell the server it is in passive mode.

In passive mode FTP the client initiates both connections to the server, solving the problem of firewalls filtering the incoming data port connection to the client from the server. When opening an FTP connection, the client opens two random unprivileged ports locally (N > 1023 and N+1). The first port contacts the server on port 21, but instead of then issuing a `PORT` command and allowing the server to connect back to its data port, the client will issue the `PASV` command. The result of this is that the server then opens a random unprivileged port (P > 1023) and sends `P` back to the client in response to the `PASV` command. The client then initiates the connection from port N+1 to port P on the server to transfer data.

From the server-side firewall's standpoint, to support passive mode FTP the following communication channels need to be opened:

- FTP server's port 21 from anywhere (Client initiates connection)
- FTP server's port 21 to ports > 1023 (Server responds to client's control port)
- FTP server's ports > 1023 from anywhere (Client initiates data connection to random port specified by server)
- FTP server's ports > 1023 to remote ports > 1023 (Server sends ACKs (and data) to client's data port)

When drawn, a passive mode FTP connection looks like this:



In step 1, the client contacts the server on the command port and issues the `PASV` command. The server then replies in step 2 with `PORT 2024`, telling the client which port it is listening to for the data connection. In step 3 the client then initiates the data connection from its data port to the specified server data port. Finally, the server sends back an ACK in step 4 to the client's data port.

While passive mode FTP solves many of the problems from the client side, it opens up a whole range of problems on the server side. The biggest issue is the need to allow any remote connection to high numbered ports on the server. Fortunately, many FTP daemons, including the popular WU-FTPD allow the administrator to specify a range of ports which the FTP server will use.

The second issue involves supporting and troubleshooting clients which do (or do not) support passive mode.

As an example, the command line FTP utility provided with Solaris does not support passive mode, necessitating a third-party FTP client, such as ncftp.

NOTE: This is no longer the case--use the `-p` option with the Solaris FTP client to enable passive mode!

With the massive popularity of the World Wide Web, many people prefer to use their web browser as an FTP client. Most browsers only support passive mode when accessing ftp:// URLs. This can either be good or bad depending on what the servers and firewalls are configured to support.

Passive FTP Example

Below is an actual example of a passive FTP session. The only things that have been changed are the server names, IP addresses, and user names. In this example an FTP session is initiated from testbox1.slacksite.com (192.168.150.80), a Linux box running the standard FTP command line client, to testbox2.slacksite.com (192.168.150.90), a Linux box running ProFTPd 1.2.2RC2. The debugging (`-d`) flag is used with the FTP client to show what is going on behind the scenes. Everything in red is the debugging output which shows the actual FTP commands being sent to the server and the responses generated from those commands. Normal server output is shown in black, and user input is in **bold**.

Notice the difference in the `PORT` command in this example as opposed to the active FTP example. Here, we see a port being opened on the *server* (192.168.150.90) system, rather than the client. See the discussion about the format of the `PORT` command above, in the Active FTP Example section.

```
testbox1: {/home/p-t/slacker/public_html} % ftp -d testbox2
Connected to testbox2.slacksite.com.
220 testbox2.slacksite.com FTP server ready.
Name (testbox2:slacker): slacker
---> USER slacker
331 Password required for slacker.
Password: TmpPass
---> PASS XXXX
230 User slacker logged in.
---> SYST
215 UNIX Type: L8
Remote system type is UNIX.
Using binary mode to transfer files.
ftp> passive
Passive mode on.
ftp> ls
ftp: setsockopt (ignored): Permission denied
---> PASV
227 Entering Passive Mode (192,168,150,90,195,149).
---> LIST
150 Opening ASCII mode data connection for file list
drwx------   3 slacker    users         104 Jul 27 01:45 public_html
226 Transfer complete.
ftp> quit
---> QUIT
221 Goodbye.
```

6.6 Logging Auxiliary sensor information

In addition of the main parameter being measured and recorded auxiliary information can be recorded without using an extra virtual sensor. These apply to period average sampling methods and the names of the different type of information are as follows:

- Minimum
- Maximum
- Standard Deviation
- Calculated flow rate or total
- Check count

Any combination of the above can be enabled on a per sensor basis (see section 5.5.7.2).

6.6.1 Minimum

The minimum is measured for each logging period for the given sensor. For example, if water level is being logged every 15 minutes then minimum will be recorded once between each of the following inter 00:00:01 to 00:15:00, 00:15:01 to 00:30:00, 00:30:01 to 00:30:00 ... 23:30:01 to 23:45:00, 23:45:01 to 00:00:00.

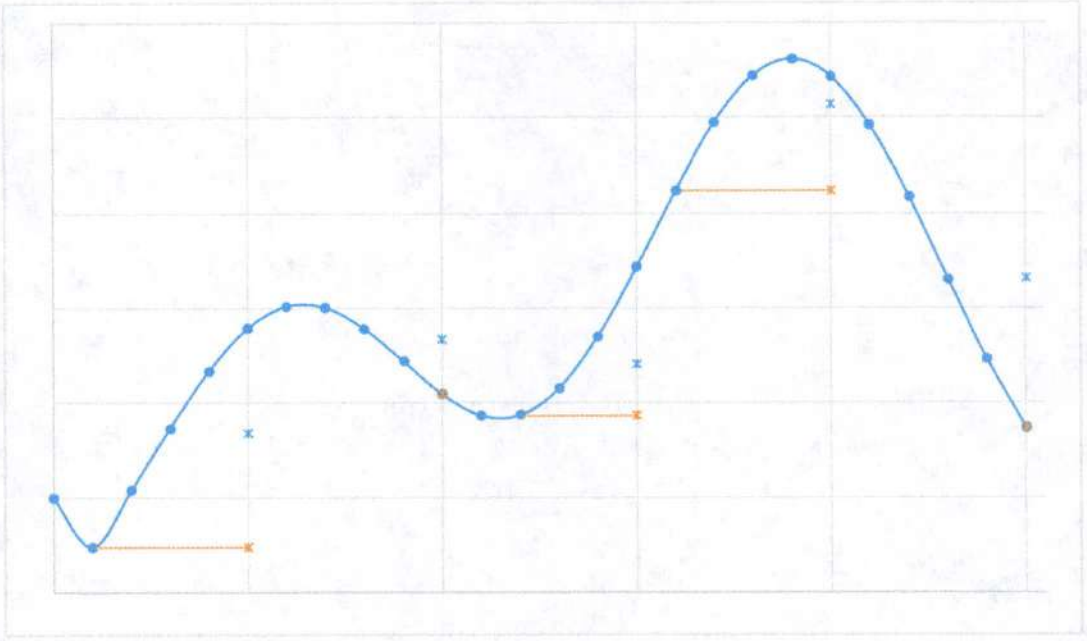


Figure 18 Graphical example of when average value is measured (blue x) and minimum is measured (orange x)

6.6.2 Maximum

The Maximum is measured for each logging period for the given sensor. For example, if water level is being logged every 15 minutes then Maximum will be recorded once between each of the following inter 00:00:01 to 00:15:00, 00:15:01 to 00:30:00, 00:30:01 to 00:30:00 ... 23:30:01 to 23:45:00, 23:45:01 to 00:00:00.

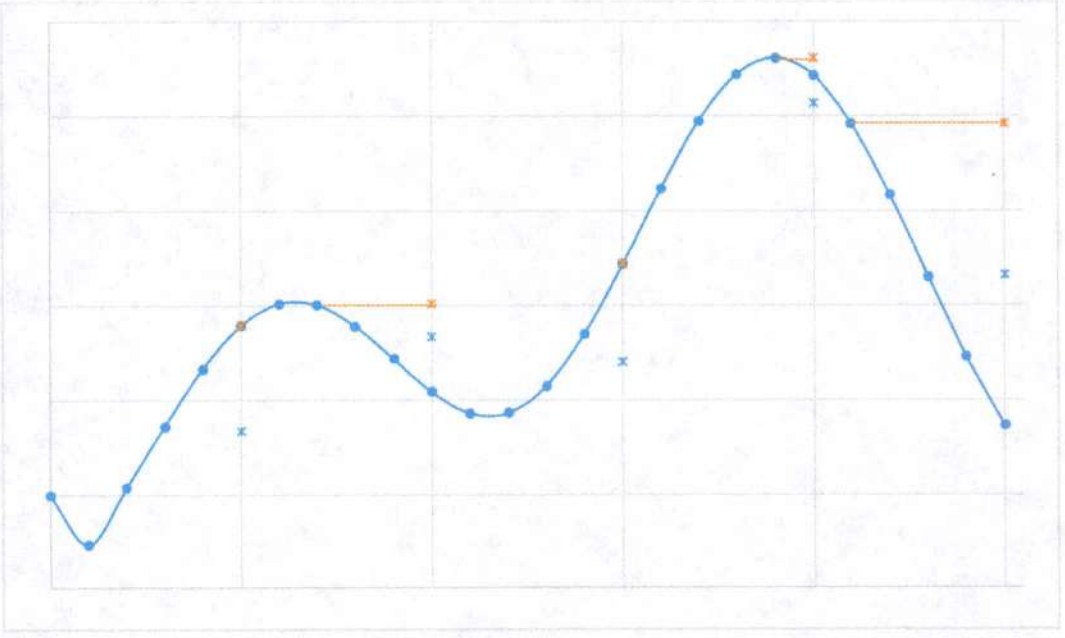


Figure 19 Graphical example of when average value is measured (blue x) and maximum is measured (orange x)

6.6.3 Standard Deviation

The Standard Deviation auxiliary measurement is measure of the amount of variation of the samples taken over the logging period (e.g. 15 minutes). It is calculated and logged at the end of the period. A low value means the samples taken during period are close to the average value.

Standard deviation is found by taking the square root of the average of the squared deviations of the values. Since we average is not known until the end (samples for the period are not retained to the end of the period), we subtract square (average) from the Sum-of-Squares/N and square root that as Standard Deviation.

As each sample is measured the following two equations are used to keep a running sum of the squares and the count of the number of samples during the period:

$$RunningSquaredSum = RunningSquaredSum + Sample^2$$

$$AverageCount = AvergeCount + 1$$

At the end of the period the following is used to calculate the standard deviation:

$$Standard\ Deviation = \sqrt{\frac{RunningSquaredSum}{AverageCount} - Average^2}$$

6.6.4 Calculated flow rate or total

This option is used to calculate the average flow rate for a given period from the total volume that flow for the period or vice versa.

When the iRIS is configured with a source of Pulse in then the main value being recorded is assumed to be a flow total accumulated over the period (e.g. 15 minutes) and is in units of cubic meters (m^3). At the end of the period the following equation is used to calculated the average flow rate, recorded as the auxiliary value.

$$FlowRate = \frac{FlowTotal \times 1000}{60 \times LogRate}$$

Where LogRate is the period over which the total is being recorded (in units of minutes) and FlowRate is the average flow rate for the period (in units of litres per second l/s).

For example, a flow total of 1.32m^3 over 15 minutes will result in 1.32 x 1000 / 60 x 15 = 1.466 l/s

When the iRIS is configured with a source of Analog in then the main value being recorded is assumed be flow rate in units of litres per second l/s. At the end of the period the following equation is used to calculated the total volume based on the average flow rate during the period , recorded as the auxiliary value.

$$FlowTotal = \frac{FlowRate \times 60 \times LogRate}{1000}$$

Where LogRate is the period over which the total is being recorded (in units of minutes) and FlowTotal is the total volume for the period (in units of cubic meters m^3).

For example, a flow total of 1.46 l/s over 15 minutes will result in 1.466 x 60 x 15 / 60 x 15 = 1.32 m^3

6.6.5 Check Count

This auxiliary method is used to assess any missing event based rainfall measurement. Event based rainfall measurement is where the rainfall tips are recorded with a timestamp of the time they happen. As opposed recoding the total over a fixed period. It is easy to determine if a recorded sample is missing in the period total case just looking for gaps in the dataset. But it impossible to use this method for event based data.

To resolve this the Check Count is used. This is a total that accumulates over time (continuously, not just over period). To use this to evaluate missing data simply total the event values and compare it to the check count, the should be the same. The following is an example of 5 event based samples with Check Count logging enabled, the last check count value does not match the totaled event based. The difference is 0.5 and with a little more analysis, it can be deduced that the missing sample(s) are between 11:02:30 and 11:04:09.

DT	Main Sample	Check Count
11/01/2020 10:56:22	0.5	0.5
11/01/2020 11:01:15	0.5	1.0
11/01/2020 11:01:49	0.5	1.5
11/01/2020 11:02:30	1.0	2.5
11/01/2020 11:04:09	0.5	3.5
	3.0	

6.7 General Hints

- If the unit is not to be used for some time, disconnect the internal battery to prevent it discharging.
- Always check the time and date are correct when commissioning the unit. The internal clock runs in UTC (GMT) and all logged data is time/date stamped in this time zone. HydroTel™ and/or iLink 2012 automatically adjust for this.

7 Diagnostics

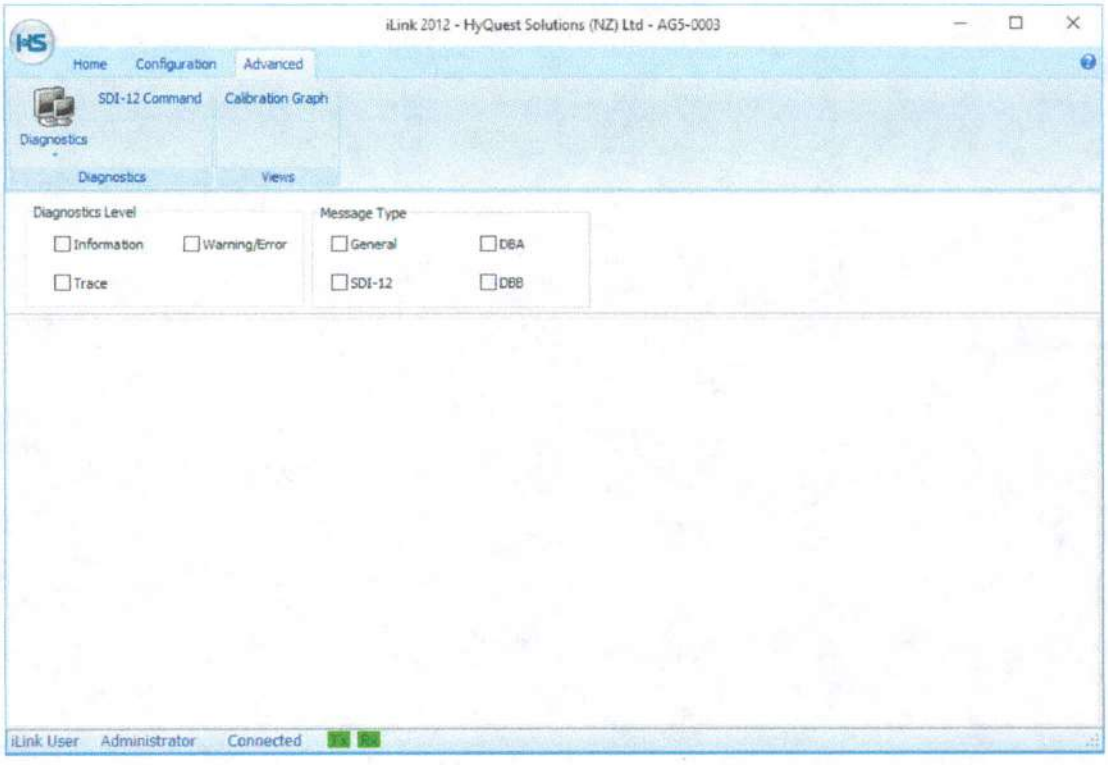
7.1 Real-time Diagnostics

The iRIS 270 allows for the user to monitor the operation of the logger, the communications daughter boards (if fitted) and the SDI-12 Bus in real time. This can be achieved either over the inbuilt Wi-Fi, cellular or Serial Daughterboard.

This feature can be found in the Advance ribbon of iLink 2012 and then clicking on the Diagnostics button



Initially the diagnostic screen will not show any information, the appropriate sources and level need to be chosen by the user.



There are three levels of diagnostic information:

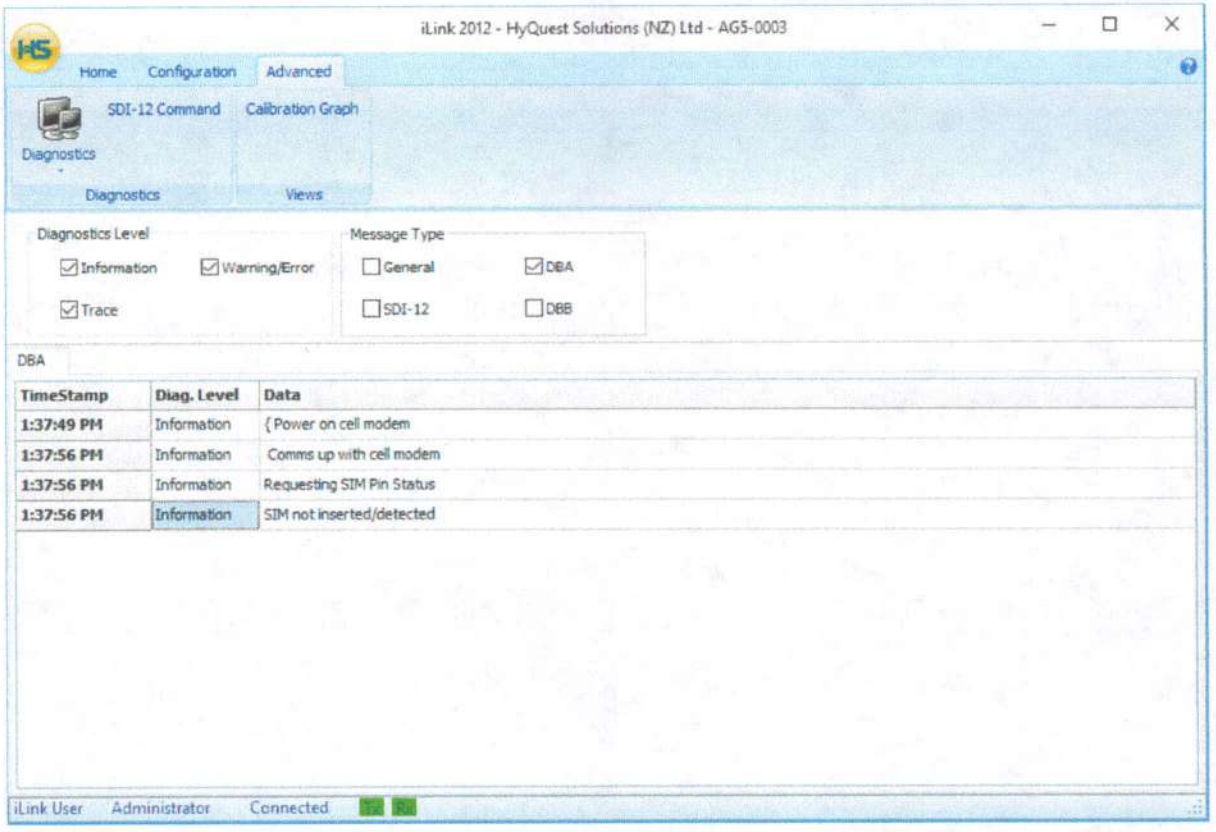
Information – regular statements about operation of the given source.
Warning\Error – this indicates an unexpected event occurring.
Trace – this is an in depth messages, often containing technical information.

Please note not all sources implement all of the above.

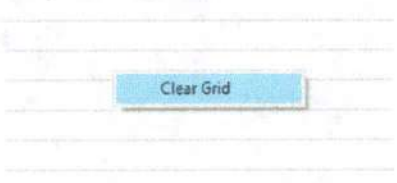
There are four message sources (or Message Types):

General – this relates to general operation of the logger, for example digital output schedules.
DBA – messages relating to the operation of the first daughter board.
DBB – messages relating to the second daughter board.
SDI-12 – messages relating to the activity on the SDI-12 Bus.

The following is an example of the power on sequence of the daughter board A and without a SIM card fitted:



The grid can be cleared by right clicking and selecting **Clear Grid**:



Diagnostics information and be saved by clicking the small arrow below the Diagnostics button in the advance ribbon.

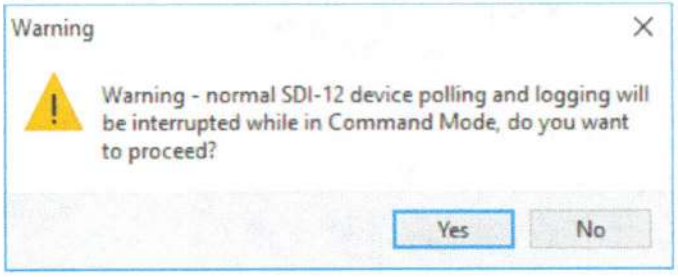


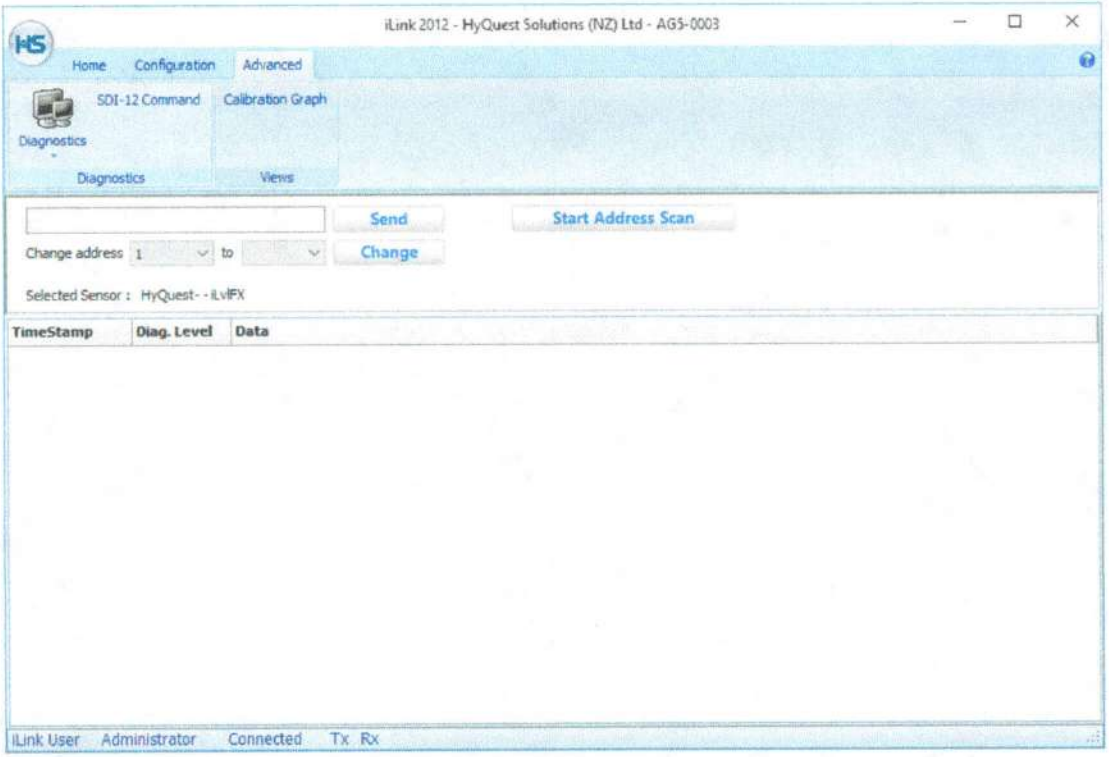
8 SDI-12 Command Mode (Pro Version Only)

An extension to the real time diagnostic function (as described in section 7.1) the iRIS is capable of sending user commands across the SDI-12 bus and displaying the results. It also has a handy address change function and SDI-12 address scan function.

8.1 Accessing

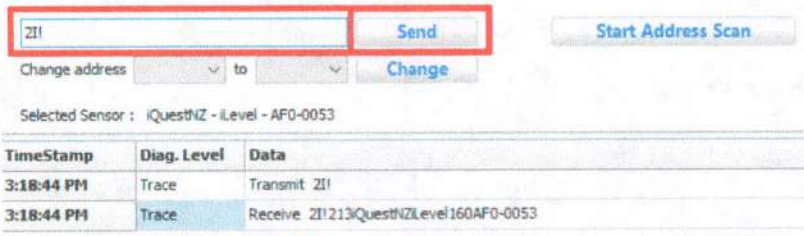
The command mode is accessible via the SDI-12 Command option in the Advanced ribbon of iLink 2012. When entering the SDI-12 command mode the user is prompted that the action will disable normal SDI-12 communications:





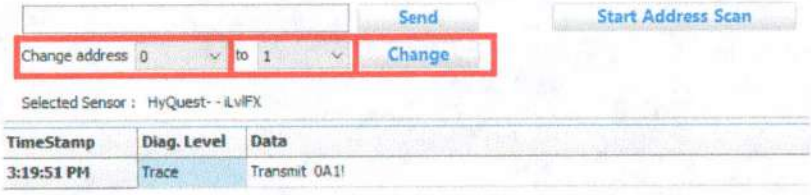
8.2 Sending user command to device

A specific SDI-12 command can be entered in to the edit box at the top of the window then click send button. See section 14 for more information on SDI-12.



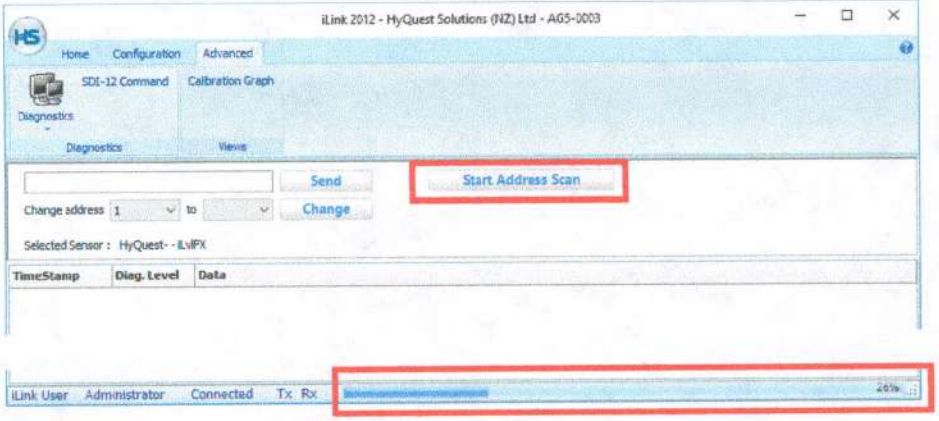
8.3 Address Change function

Although it is possible to change the address of the SDI-12 sensor using the user command function in the previous section, iLink can automatically formulate the command. From the first drop down box select the address of the sensor, then in the next drop down box select the address to change to. To make the change click the Change button.



8.4 Address Scan

After changing address or adding a new sensor to the bus, it is recommended to perform an Address Scan. This is done by clicking the **Start Address Scan** button. Progress of the scan is displayed in the status bar.



9 Using iLink 2012's Sensor Configuration Tool

To optimize the process of maintaining multiple iRIS installations with the same (or similar) sensor configuration, iLink 2012 includes a graphical configuration tool. This allows the configuration of any of the sensors to be changed, sent to the logger or saved to the disk. It also supports the retrieval of sensor settings from the logger and from disk. This means that setting up new loggers is made very simple as a common configuration file can be sent to each logger.

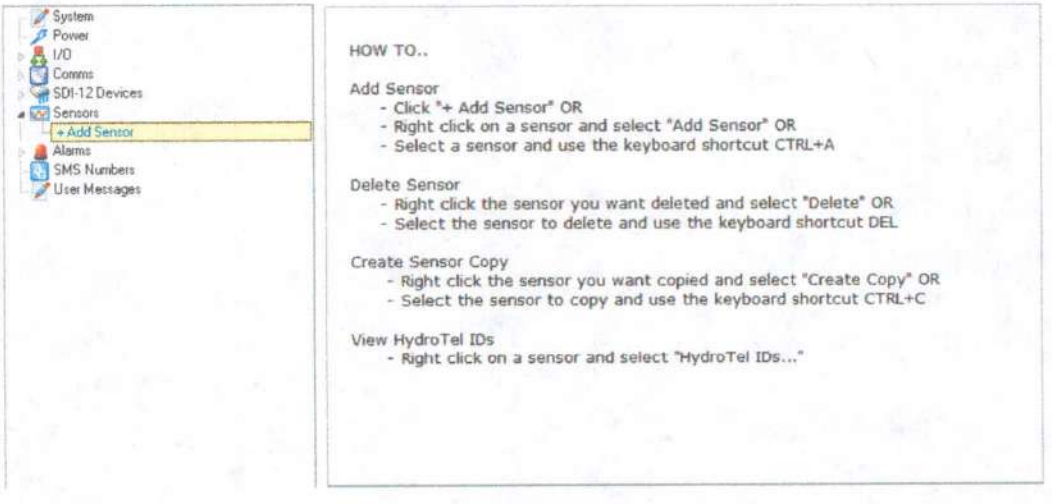
9.1 iRIS Sensor Configuration Example

This example shows how to set up a simple iRIS sensor configuration to measure water level from an SDI-12 sensor and also log internal battery voltage. This example is valid for iRIS Under Cover Pro loggers.

1. Connect to the iRIS using iLink.

2. Invoke the iRIS sensor configuration form by selecting Sensors node from Configuration→General Menu.

3. Expand the sensors branch and click the +Add Sensor option.



4. Click on the newly created sensor labelled "Disabled".

5. Set up the water level sensor. Enter the sensor name "Water Level".

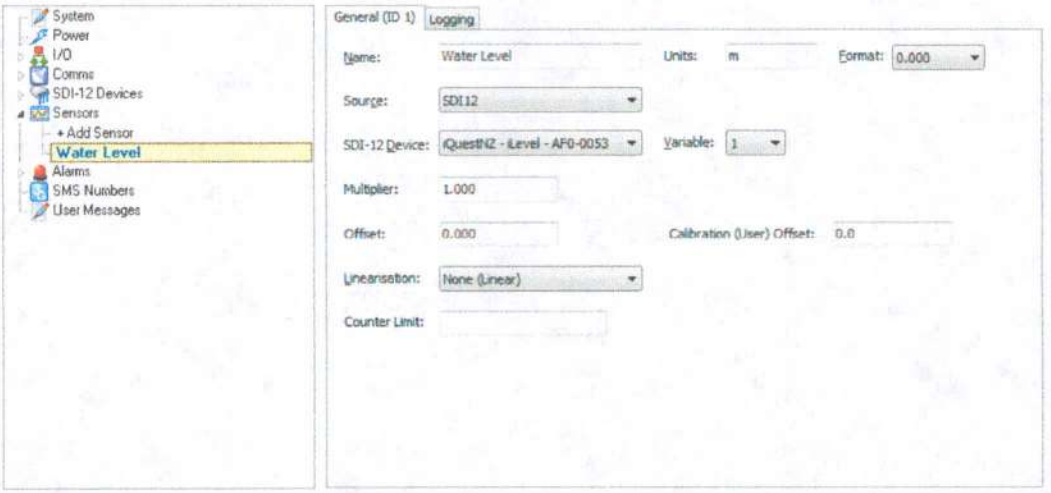
6. Now set the sensor source from the drop down list. Select source SDI-12. Then choose the correct SDI-12 device and the variable. In our example, the instrument is 'Hydserv-AD375M-H-104' and we require the first value (variable 1).

7. Enter the multiplier to scale the value. For SDI-12 instruments, the multiplier is typically 1 as the instrument itself provides an actual value in engineering units.

8. Enter the offset if required and known at this point. Usually, this is set on site to calibrate the measurement to a known reference of datum.

9. Enter the units of measurement (max 7 characters). This text is included in iLink unloaded data files.

10. The General Configuration should look like this:

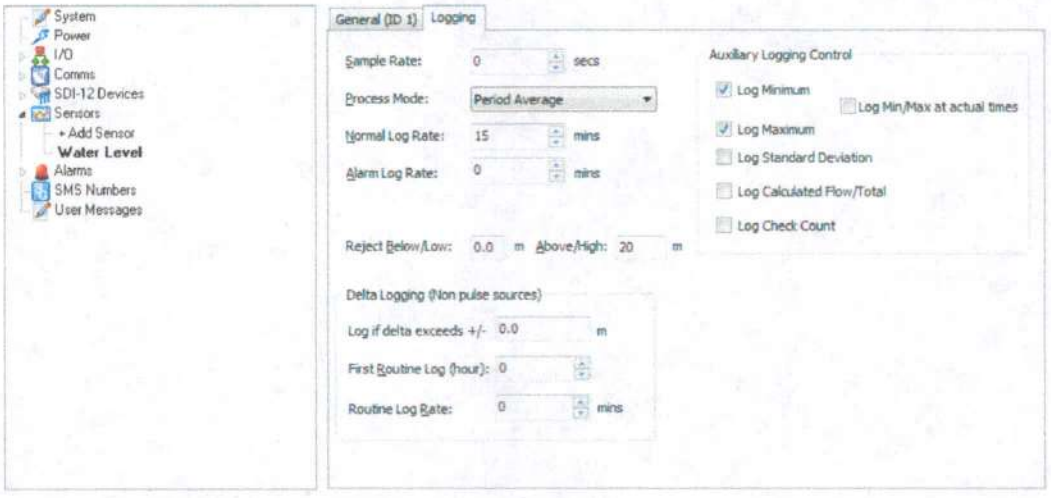


11. Now select the "Logging" tab and set up the logging parameters. In this example, we are measuring averaged water level in metres. The Normal log rate in this example is fixed at 15 minutes.

12. Our hypothetical sensor generates an error value of 999.99 if it develops a fault or is unable to take a measurement. Rather than have this cause a spike in our data, we will choose to reject values above our expected maximum of 20 metres by setting the Reject Above (High) value appropriately.

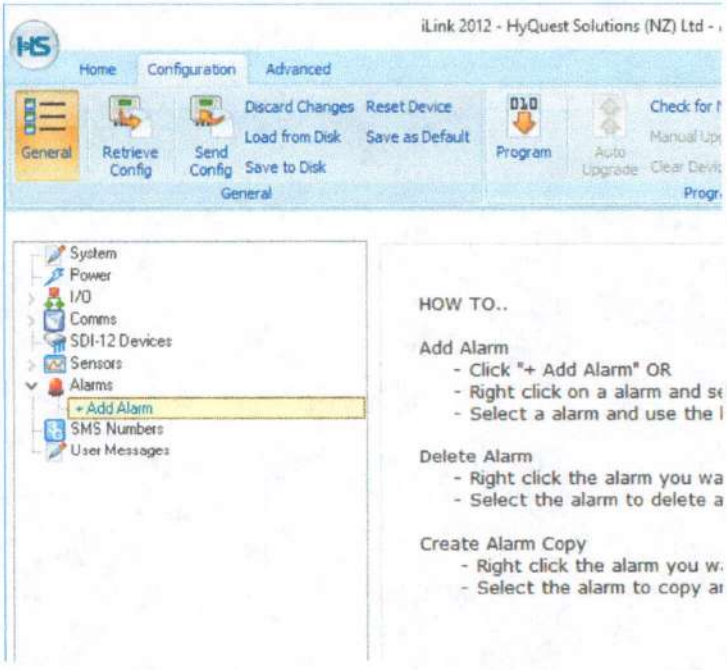
13. We also want to capture the minimum or maximum values over the period, so we enable the logging of these additional values as well.
14. **Delta Logging:** It is possible to over-ride the fixed rate logging to an "event" mode for non-pulse sensor types. This is enabled by setting a non-zero delta value. In this mode the sensor measurements and processing (e.g. averaging) are still done exactly as before. The only difference in this mode is when the sample is due to be logged, the variation of the current value from the last logged value is checked. Only if the difference is more than the hysteresis value, the sample is actually logged. A once per day "check" log is done at the start of the hour which is defined by the "First Routine Log (Hour)" setting no matter what the difference is. NOTE: Do not set the Process Mode to "Event". This is reserved for use with pulse type sources.

15. The logging configuration should now look like this:



16. Next select the "Alarms" node. We are going to set a low level alarm at 3.5 metres and a high level alarm at 17 metres. Both alarms will have a reset differential of 0.1 metres making the reset levels 3.6 metres and 16.9 metres respectively. The alarms are set to be immediately acting, so no duration delay is required.

17. Click Add Alarm node to create the first alarm:



18. Click on the newly created alarm labelled "Disabled".

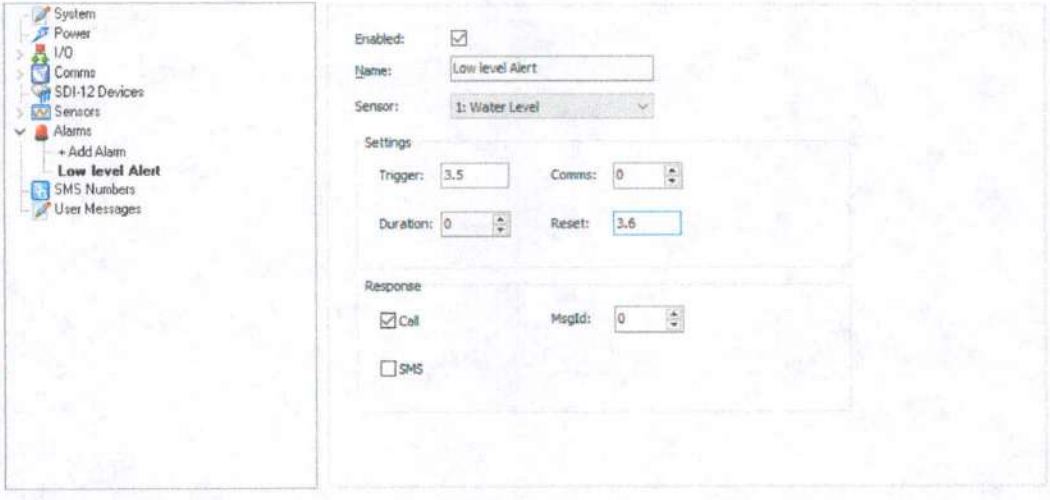
19. Click the enabled check box and give the alarm a name, e.g. "Low level Alert".

20. Now choose "Water Level" sensor as a source.

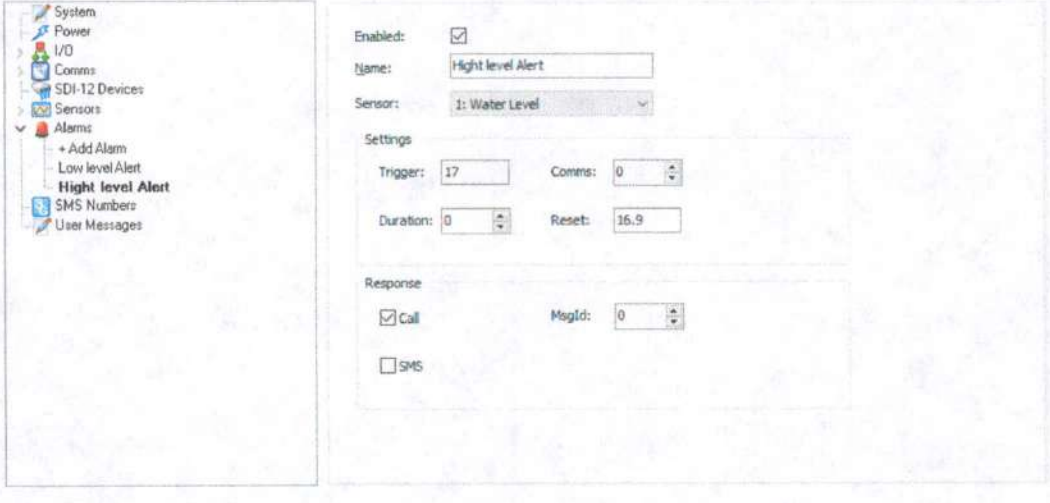
21. In the trigger box enter 3.5 and in the reset enter 3.6.

22. Click the Call check box to get the logger to make a call-in when the event occurs.

23. The Alarms Configuration should look like this:

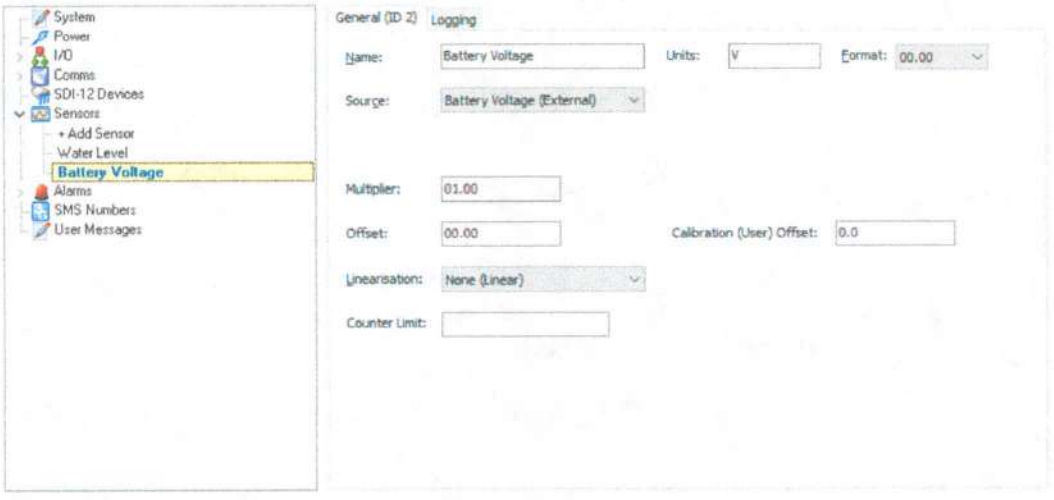


24. Repeat this for the high level alarm, but this time name it "High level Alert", use a trigger of 17 and a reset of 16.9. The Alarm Configuration should look like this:



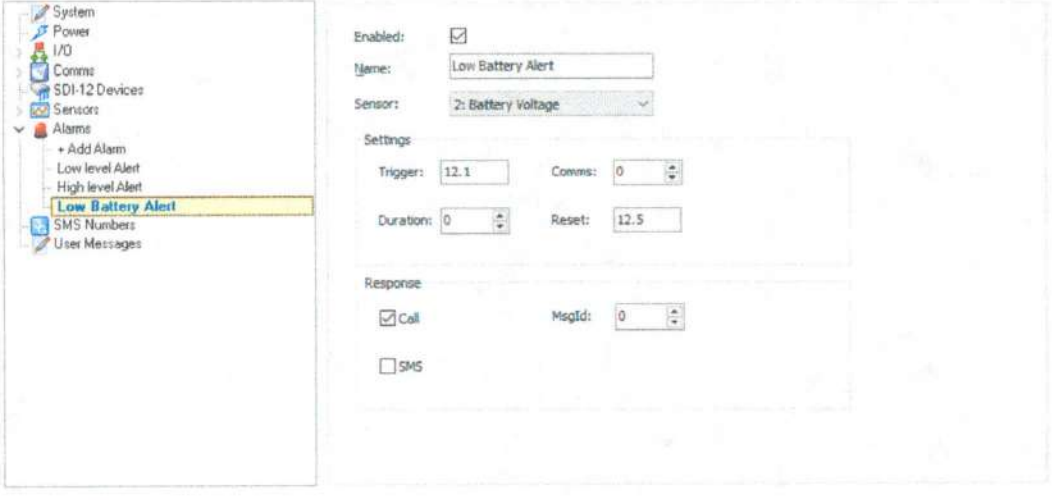
25. Next set up the Sensor 2 to log the internal battery voltage. Expand the sensors branch and click the +Add Sensor option.

26. Click on the newly created "Disabled" sensor in the tree. Then repeat the steps used for configuring the Water Level sensor earlier, but in this case, select Battery Voltage (External) and name it "Battery Voltage". The configuration should look like this:



27. Set up the logging parameters, with a simple 60 log rate.

28. In our example we are logging the averaged battery voltage every 60 minutes. We have set a low voltage alarm at 12.1 volts which resets when the battery rises to at least 12.5 volts again. The configuration tabs should look like this:



29. The sensor configuration is now complete. Now enter the logger's site name in the Site Name field in the System section. The site name is the text that appears in the header of downloaded data files.

30. Save the configuration to disk by clicking the "Save to Disk" button. Enter a suitable name for your configuration. The file can then be opened and sent to other loggers requiring the same sensor configuration at a late date.

31. Finally, send the configuration to the connected iRIS. To do this, click the "Send Config" button.

32. The progress can be seen on the status bar at the bottom of the iLink 2012 window.

33. The process is now complete. If you want to edit or save the configuration in an already configured iRIS, the reverse operation can be done by using the "Retrieve Config" button. The configuration can then be edited and sent back to the iRIS and/or saved to disk.

10Analogue Input Scaling

This section explains the recommended procedure to use when scaling an analogue input (voltage or current). It makes use of the scaling calculator provided in the iLink program. However, the calculation can also be done manually using this formula. V = Input V, EU = Engineering Units (scaled output e.g. metres).

Multiplier = (Maximum EU – Minimum EU) / (Maximum V – Minimum V)

Offset = Maximum EU - (Multiplier * Maximum V)

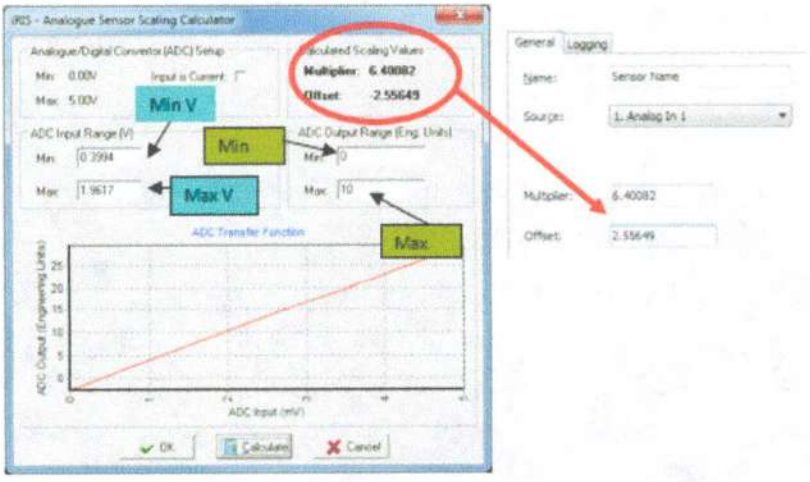
10.1 Example: A 4-20mA Water Level Sensor

In this example, we have a water level instrument connected to the iRIS Analogue Input 1. This instrument is designed to provide a nominal 4-20mA signal for a 0-10 metre water level range. However, in the real world, most instruments are not exact and a small difference in actual signal may occur.

The internal current sink resistor in the iRIS is 100Ω (theoretically giving 2V at 20mA). An external resistor of a different value can be used if desired. E.g. 250Ω will give 5V at 20mA.

There is a very small reduction in resistance caused by the internal input impedance of the iRIS input channel to take into account (see Section 5.3.3 Analogue Inputs). Therefore the voltage measured by the iRIS for a given water level is slightly different.

1. Power up the installation and allow it to stabilize.
2. Set the instrument to zero water level (using a calibrator)
3. Note the actual voltage measured by the iRIS.
4. Now increase the instrument input to full scale (10m) using the calibrator. Again, note the measured voltage relating to this input level. This time it is 1.9617V for a 10m level input.
5. Using the iLink Scaling Calculator, enter the minimum and maximum measured voltages and the levels they represent in the appropriate fields. Click the "Calculate" button to generate the correct multiplier and offset parameters to use in the sensor setup menu for Sensor 1 as shown.



11 Modbus Protocol

11.1 Protocol Overview

Modbus is a serial communications protocol originally published by Modicon (now Schneider Electric) in 1979 for use with its programmable logic controllers (PLCs). Modbus has become a de facto standard communication protocol and is now a commonly available means of connecting industrial electronic devices.

A detailed reference guide can be found at the following web address:
http://modbus.org/docs/PI_MBUS_300.pdf

This section will be a brief overview of the protocol, with indication as to which aspects are supported by the iRIS.

Modbus protocol uses a Master and Slave topology. A single Master device can interrogate (both read and writing data) to one or more slaves. Communications is achieved over a serial or TCP interface, at this point in time the iRIS supports RS-232 and RS-485 serial protocols. Due to space constraints the Modbus Protocol can be used on the Serial Sensor Interface – see 4.2.4 for more information about configuration. The iRIS 270 can have up to three sperate interfaces.

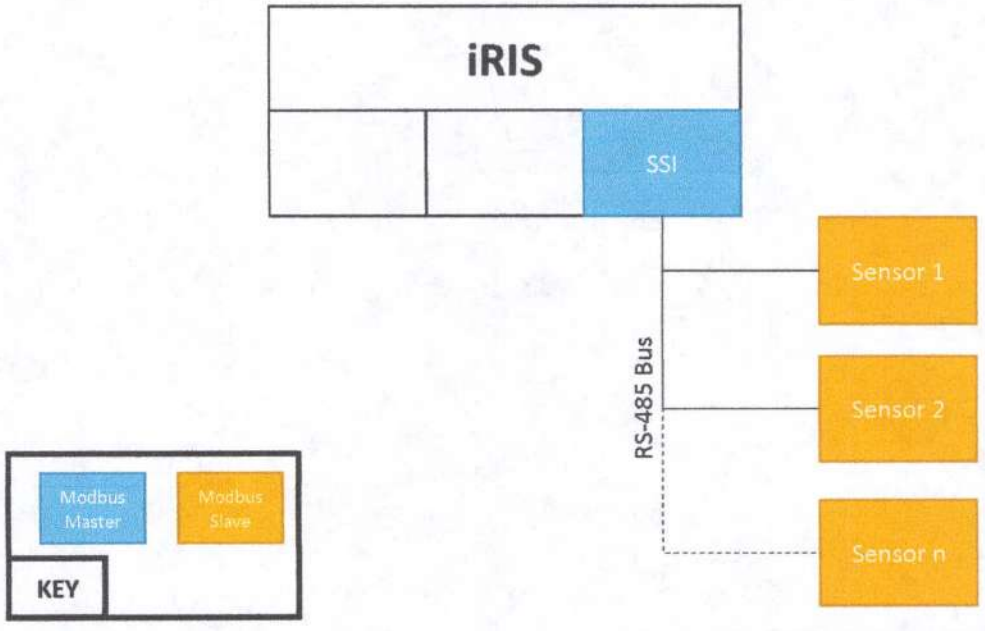


Figure 20 – Block diagram of an example of physical connection of Modbus devices to the iRIS.

There are three main application of the master/slave topology that can be used on the iRIS:

- **Data Collection** – the iRIS acts as a master and the sensor(s) act as slaves.
- **Data Source** – The iRIS acts as slave and another system which acts as a master. The iRIS provides scaled measurements obtained from its physical channels (e.g. Analogue, digital and SDI-12 inputs) to the master.
- **Protocol Gateway** – the iRIS acts as a slave to another system which acts as a master. Information is passed between the host (e.g. HydroTel) and the Master via the iRIS. In addition the iRIS can act as a data source to both the Modbus host and the base.

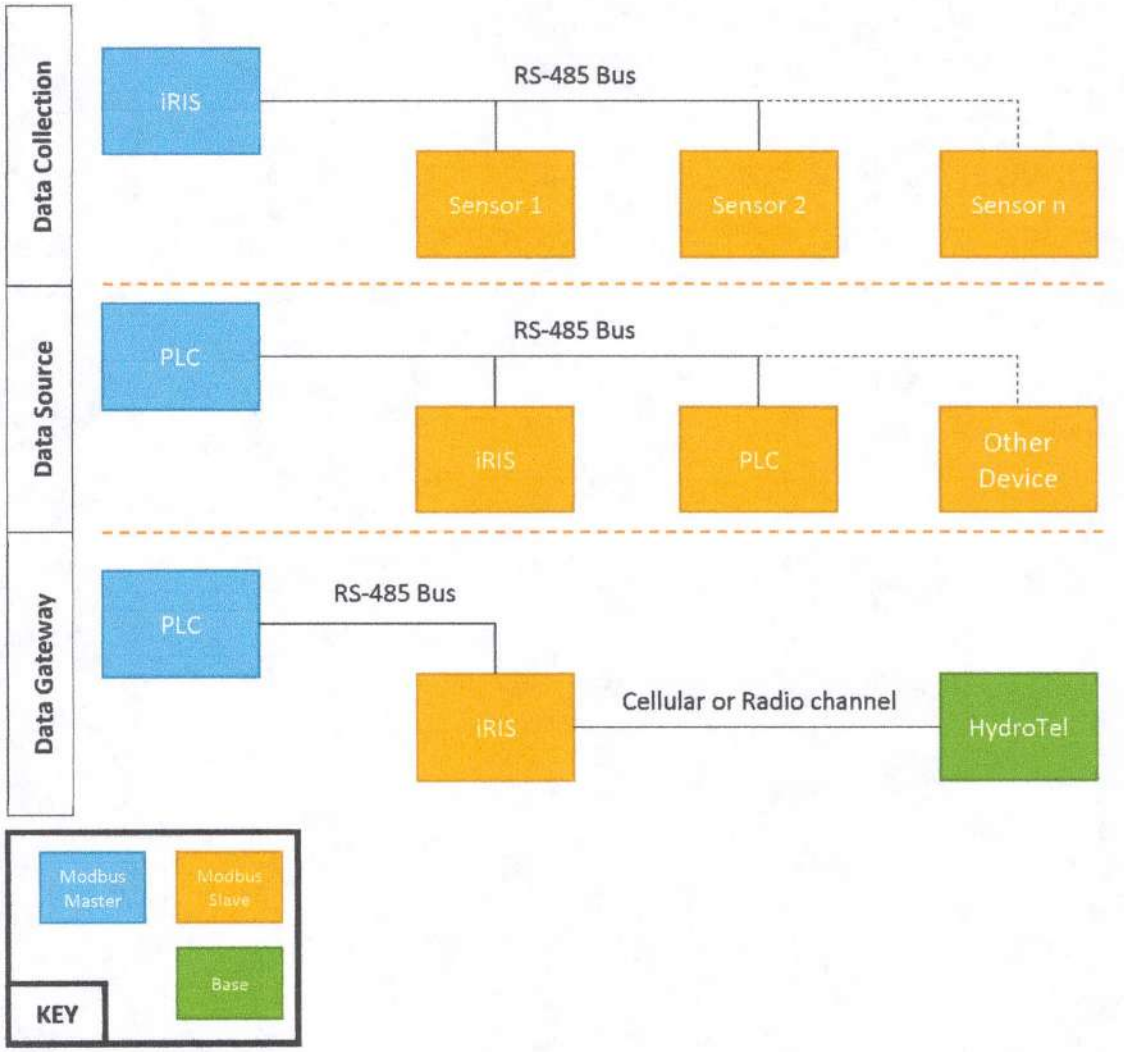


Figure 21 – Block diagram of the application topologies that can be implemented by the iRIS. Note the RS-485 bus can be replaced with an RS-232 connection, with a single slave.

One of the key concepts of Modbus is the function code. Most requests from the Master contains the address of the slave it wishes to converse with, the function code and the number of registers required.

When the iRIS acts as a Master, it can support the following function codes, the two digit hexadecimal code is the packet and is often referenced in the sensor manual.

Table 8 – Supported reading function codes when the iRIS is a Master

Function code	Name	Description
0x01	Coils	A coil is considered as a discrete output and is either a zero or one (1 bit)
0x02	Discrete Inputs	The is a single input and is either a zero or one (1 bit)
0x03	Holding Registers	A holding register is 16 bit and can be interpreted as different data types
0x04	Input Registers	An input register can be considered as a bit field of inputs (16 bits per register)

The most versatile of the register types is the Holding register. Each is 16 bits in length and several can be can be combined to make lager dater types.

Table 9 – Data types supported by the iRIS

Data Type Label	Number of registers used	Description
U_INT16	1	The unsigned integer type represents whole numbers between 0 and 65,535
S_INT16	1	The signed integer type represents whole numbers between -32,768 and 32,768
ON_OFF	1	Single bit either zero or one.
U_INT32	2	The unsigned integer type represents whole numbers between 0 and 4,294,967,295
S_INT32	2	The signed integer type represents whole numbers between -2,147,483,648 and 2,147,483,647
FLOAT	2	The floating point data type is in a IEEE754 single precision format.

When the iRIS acts as a slave the Master can either read the current and last logged values for each of the sensor (1 -50). These are held in holding registers and represented as floating point data types (using two registers). The register address for each address are listed in Table 11.

Also the Master can write data to the logger as a data source. This is done by performing either a single or multiple holding register write. The starting holding register location for this is at 40201. The location of each of the registers that follow are dynamically allocated based on the user created data types.

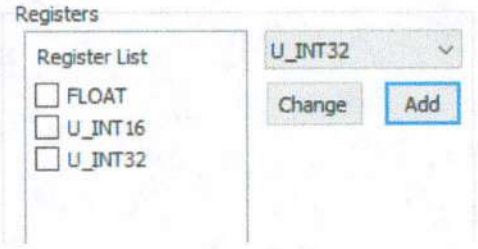


Figure 22 – Example of slave register map in iLink

Table 10 – Location of example slave register Map in Figure 22

Register address	Data Type	# Regs
40201 – 40202	Float	2
40203	Unsigned Integer	1
40204 – 40205	Unsigned Integer (32 bit)	2

Table 11 – Modbus holding register map for iRIS sensors

Register address	Description	Data Type
40001 – 40002	Sensor 1 Current Value	Float
40003 – 40004	Sensor 1 Last logged	Float
40005 – 40006	Sensor 2 Current Value	Float
40007 – 40008	Sensor 2 Last logged	Float
40009 – 40010	Sensor 3 Current Value	Float
40011 – 40012	Sensor 3 Last logged	Float
40013 – 40014	Sensor 4 Current Value	Float
40015 – 40016	Sensor 4 Last logged	Float
40017 – 40018	Sensor 5 Current Value	Float
40019 – 40020	Sensor 5 Last logged	Float
40021 – 40022	Sensor 6 Current Value	Float
40023 – 40024	Sensor 6 Last logged	Float
40025 – 40026	Sensor 7 Current Value	Float
40027 – 40028	Sensor 7 Last logged	Float
40029 – 40030	Sensor 8 Current Value	Float
40031 – 40032	Sensor 8 Last logged	Float
40033 – 40034	Sensor 9 Current Value	Float
40035 – 40036	Sensor 9 Last logged	Float
40037 – 40038	Sensor 10 Current Value	Float
40039 – 40040	Sensor 10 Last logged	Float
40041 – 40042	Sensor 11 Current Value	Float
40043 – 40044	Sensor 11 Last logged	Float
40045 – 40046	Sensor 12 Current Value	Float
40047 – 40048	Sensor 12 Last logged	Float
40049 – 40050	Sensor 13 Current Value	Float
40051 – 40052	Sensor 13 Last logged	Float
40053 – 40054	Sensor 14 Current Value	Float
40055 – 40056	Sensor 14 Last logged	Float
40057 – 40058	Sensor 15 Current Value	Float
40059 – 40060	Sensor 15 Last logged	Float
40061 – 40062	Sensor 16 Current Value	Float
40063 – 40064	Sensor 16 Last logged	Float
40065 – 40066	Sensor 17 Current Value	Float
40067 – 40068	Sensor 17 Last logged	Float
40069 – 40070	Sensor 18 Current Value	Float
40071 – 40072	Sensor 18 Last logged	Float
40073 – 40074	Sensor 19 Current Value	Float
40075 – 40076	Sensor 19 Last logged	Float
40077 – 40078	Sensor 20 Current Value	Float
40079 – 40080	Sensor 20 Last logged	Float
40081 – 40082	Sensor 21 Current Value	Float
40083 – 40084	Sensor 21 Last logged	Float
40085 – 40086	Sensor 22 Current Value	Float
40087 – 40088	Sensor 22 Last logged	Float
40089 – 40090	Sensor 23 Current Value	Float
40091 – 40092	Sensor 23 Last logged	Float
40093 – 40094	Sensor 24 Current Value	Float
40095 – 40096	Sensor 24 Last logged	Float
40097 – 40098	Sensor 25 Current Value	Float
40099 – 40100	Sensor 25 Last logged	Float
40101 – 40102	Sensor 26 Current Value	Float
40103 – 40104	Sensor 26 Last logged	Float
40105 – 40106	Sensor 27 Current Value	Float
40107 – 40108	Sensor 27 Last logged	Float
40109 – 40110	Sensor 28 Current Value	Float
40111 – 40112	Sensor 28 Last logged	Float
40113 – 40114	Sensor 29 Current Value	Float
40115 – 40116	Sensor 29 Last logged	Float
40117 – 40118	Sensor 30 Current Value	Float
40119 – 40120	Sensor 30 Last logged	Float
40121 – 40122	Sensor 31 Current Value	Float
40123 – 40124	Sensor 31 Last logged	Float
40125 – 40126	Sensor 32 Current Value	Float
40127 – 40128	Sensor 32 Last logged	Float
40129 – 40130	Sensor 33 Current Value	Float
40131 – 40132	Sensor 33 Last logged	Float
40133 – 40134	Sensor 34 Current Value	Float
40135 – 40136	Sensor 34 Last logged	Float
40137 – 40138	Sensor 35 Current Value	Float
40139 – 40140	Sensor 35 Last logged	Float
40141 – 40142	Sensor 36 Current Value	Float
40143 – 40144	Sensor 36 Last logged	Float
40145 – 40146	Sensor 37 Current Value	Float
40147 – 40148	Sensor 37 Last logged	Float
40149 – 40150	Sensor 38 Current Value	Float
40151 – 40152	Sensor 38 Last logged	Float
40153 – 40154	Sensor 39 Current Value	Float
40155 – 40156	Sensor 39 Last logged	Float
40157 – 40158	Sensor 40 Current Value	Float
40159 – 40160	Sensor 40 Last logged	Float
40161 – 40162	Sensor 41 Current Value	Float
40163 – 40164	Sensor 41 Last logged	Float
40165 – 40166	Sensor 42 Current Value	Float
40167 – 40168	Sensor 42 Last logged	Float
40169 – 40170	Sensor 43 Current Value	Float
40171 – 40172	Sensor 43 Last logged	Float
40173 – 40174	Sensor 44 Current Value	Float
40175 – 40176	Sensor 44 Last logged	Float
40177 – 40178	Sensor 45 Current Value	Float
40179 – 40180	Sensor 45 Last logged	Float
40181 – 40182	Sensor 46 Current Value	Float
40183 – 40184	Sensor 46 Last logged	Float
40185 – 40186	Sensor 47 Current Value	Float
40187 – 40188	Sensor 47 Last logged	Float
40189 – 40190	Sensor 48 Current Value	Float
40191 – 40192	Sensor 48 Last logged	Float
40193 – 40194	Sensor 49 Current Value	Float
40195 – 40196	Sensor 49 Last logged	Float
40197 – 40198	Sensor 50 Current Value	
40199 – 40200	Sensor 50 Last logged	

11.2 Example of iRIS acting as a Master

This section describes how to use iLink to configure the iRIS to obtain information from a fictitious sensor that measure wind speed, wind direction and temperature. Real sensors will have a different register map etc. and please refer to the sensor manual.

The example also assumes that the sensor has been wired to the Serial Sensor Interface which has been configured appropriately.

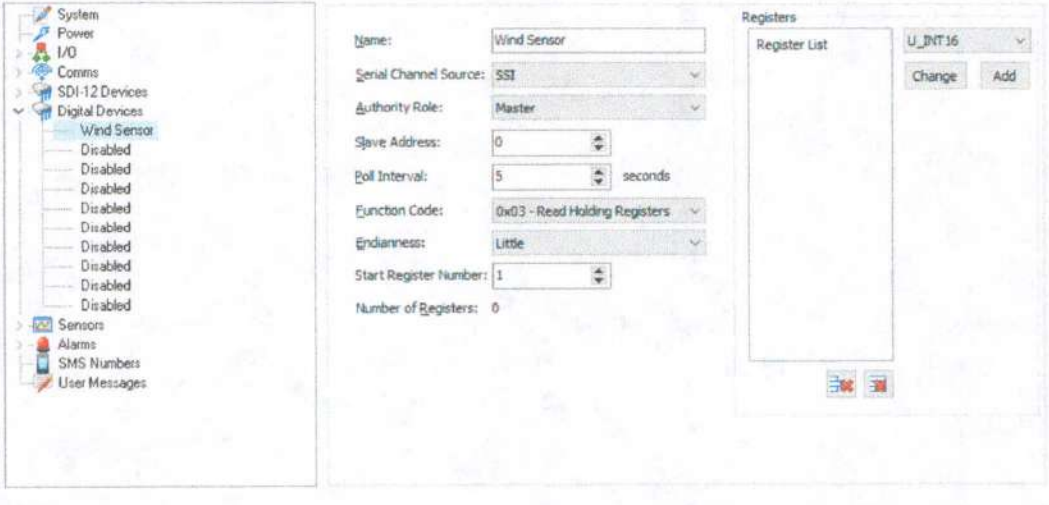
1. Connect to the iRIS with iLink and navigate to the configuration section.

2. Expand the **Digital Devices** branch and select the first Device of the tree.

3. Give the device a name, this is used in the Virtual sensor configuration later.

4. Change the following:

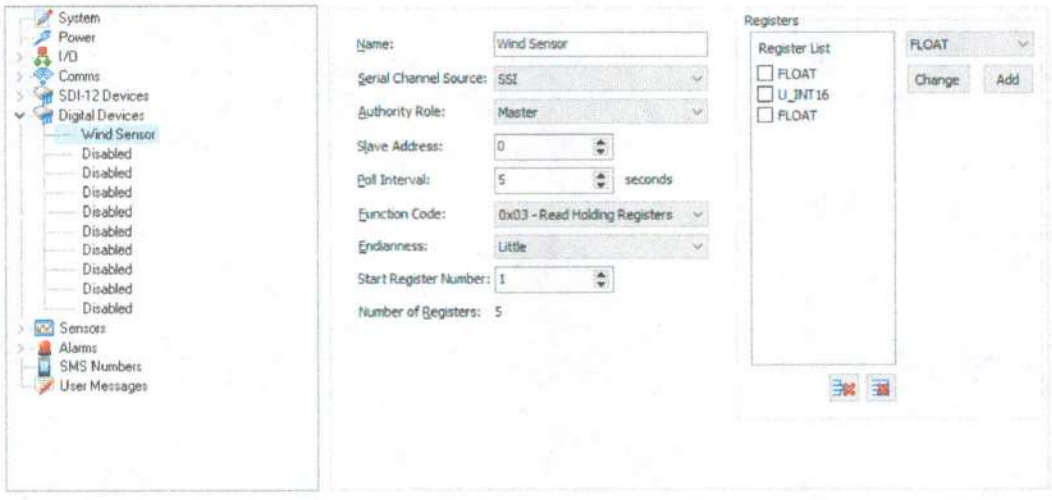
    a. Serial Channel Source: **SSI**
    b. Authority Roll: **Master**
    c. Slave Address: **0**
    d. Poll Interval: **5**
    e. Function Code: **0x03 Read Holding Registers**
    f. Endianness: **Little**
    g. Start Register: **1**



5. In the **Registers** section select the **FLOAT** data type and click the **Add** button. This will add Float datatype to the Registers List. In this example this represents the wind speed. If the type is incorrect then click the tick box next to the incorrect datatype in the list, choose the correct type and click the Change button.

6. In the **Registers** section select the **U_INT16** data type and click the **Add** button. This will add U_INT16 datatype to the Registers List. In this example this represents the wind direction.

7. In the **Registers** section select the **FLOAT** data type and click the **Add** button. This will add Float datatype to the Registers List. In this example this represents the Air Temperature. The Resisters list should look like this:



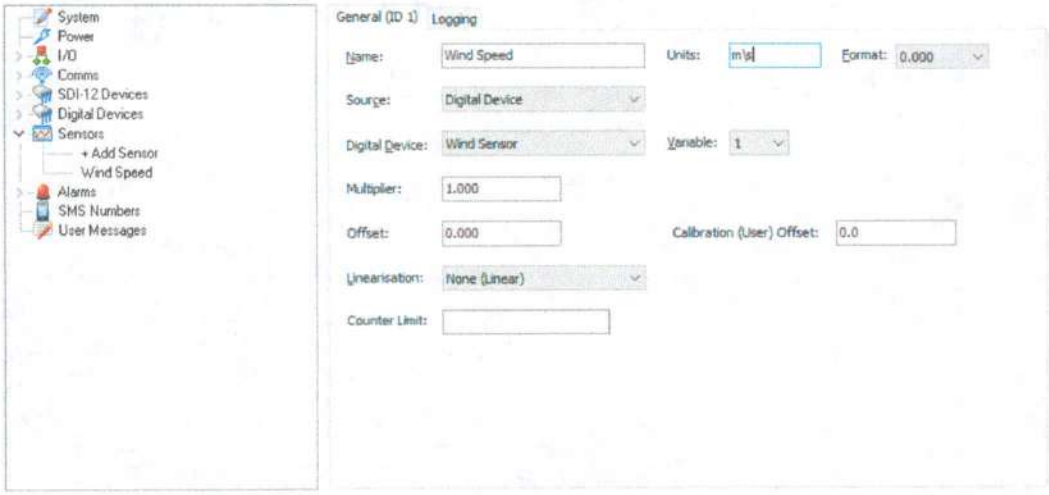
8. Click the **Send Config** button to commit this to the logger.

9. Click the **Retrieve Config** button to obtain the dynamically created indices.

10. Navigate to the **Sensors** section of the configuration tree and click the **+ Add Sensor** branch.

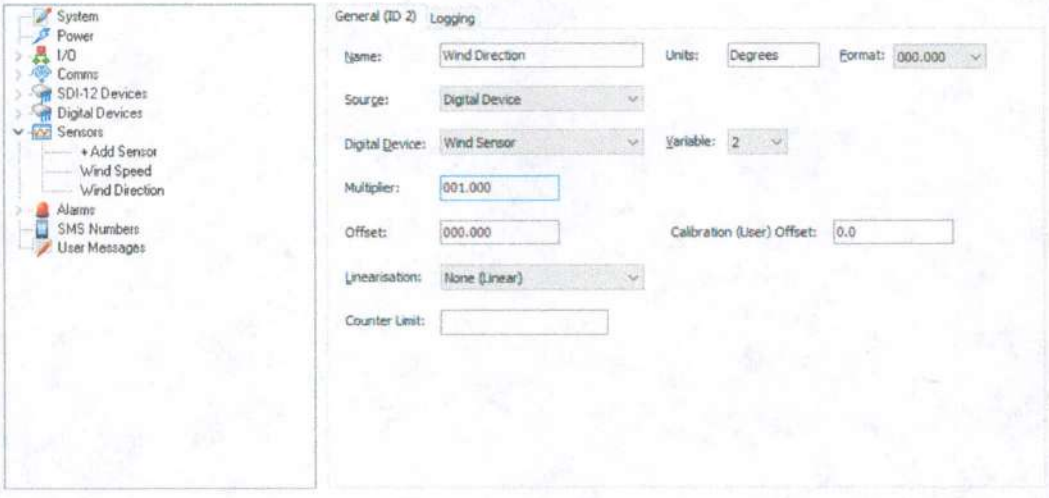
11. In the newly created sensor enter the following:

    a. Name: **Wind Speed**
    b. Source: **Digital Device**
    c. Digital Device: <Name given in step 3>
    d. Variable: **1**
    e. Units: **m\s**



12. Click the **+ Add Sensor** branch and in the newly created sensor enter the following:

    a. Name: **Wind Direction**
    b. Source: **Digital Device**
    c. Digital Device: <Name given in step 3>
    d. Variable: **2**
    e. Units: **Degrees**



13. Click the **+ Add Sensor** branch and in the newly created sensor enter the following:

    a. Name: **Temperature**
    b. Source: **Digital Device**
    c. Digital Device: <Name given in step 3>
    d. Variable: **3**
    e. Units: **Degrees C**



14. Configure logging as required.

15. Click the **Send Confg** button to commit the settings to the logger.

11.3 Example of iRIS acting as a Slave Sensor

This section describes how to use iLink to configure the iRIS to provide information it has obtained from it analogue and digital inputs to a Modbus Master, for example a Programmable logic controller (PLC).

The example also assumes that the PLC has been wired to the Serial Sensor Interface which has been configured correctly.

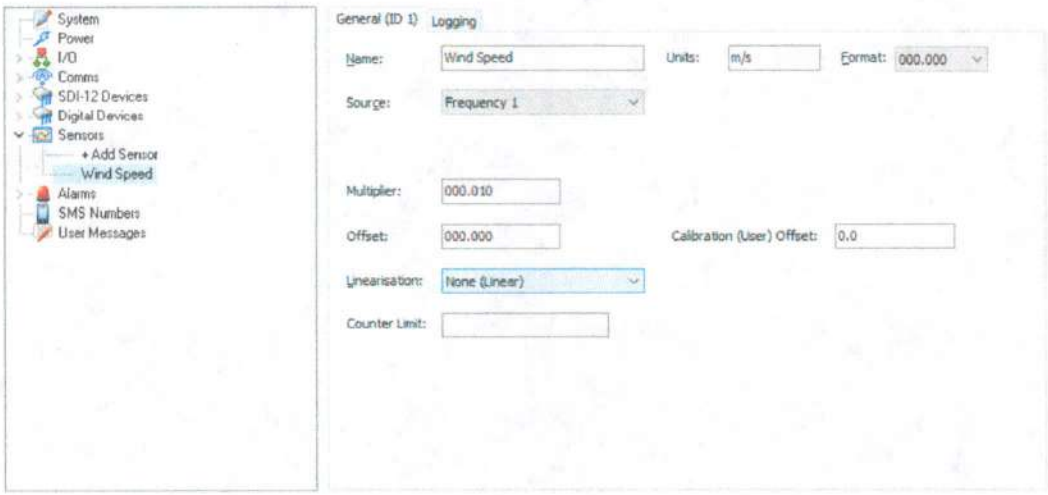
1. Connect to the iRIS with iLink and navigate to the configuration section.
2. Expand the **Digital Devices** branch and select the first Device of the tree.
3. Give the device a name, this is used in the Virtual sensor configuration later.
4. Change the following:

    a. Serial Channel Source: **SSI**
    b. Authority Roll: **Slave**
    c. Slave Address: **0**
    d. Endianness: **Little**



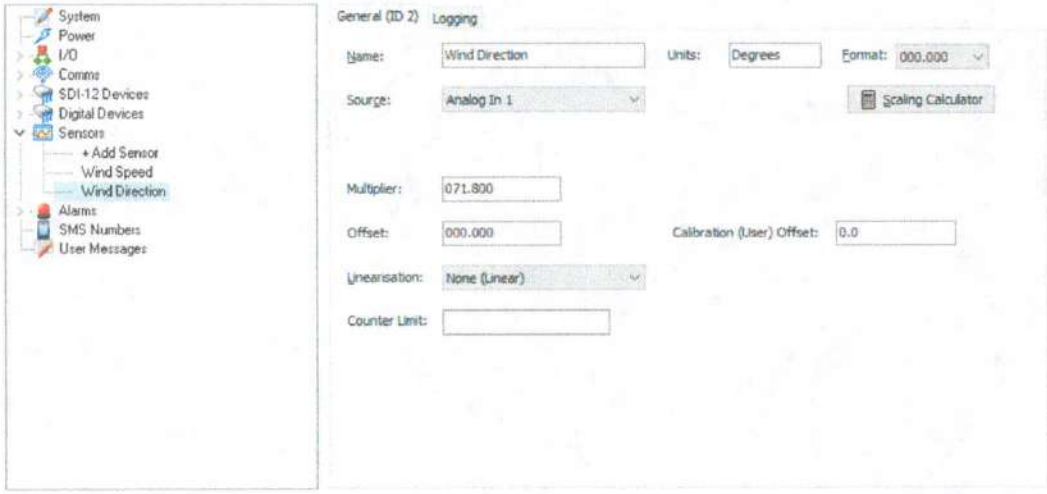
5. Leave the Registers list blank.
6. Click the **Send Config** button to commit this to the logger.
7. Click the **Retrieve Config** button to obtain the dynamically created indices.
8. Navigate to the **Sensors** section of the configuration tree and click the **+ Add Sensor** branch.
9. In the newly created sensor enter the following:

    a. Name: **Wind Speed**
    b. Source: **Frequency 1**
    c. Multiplier: **0.01**
    d. Units: **m\s**



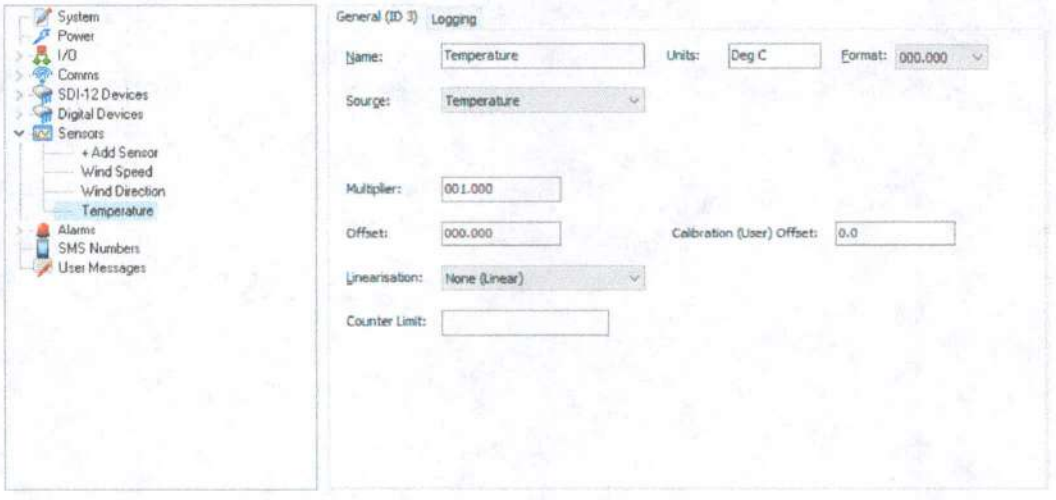
10. Click the **+ Add Sensor** branch and in the newly created sensor enter the following:

    a. Name: **Wind Direction**
    b. Source: **Analogue Input 1**
    c. Multiplier: **71.8**
    d. Units: **Degrees**



11. Click the **+ Add Sensor** branch and in the newly created sensor enter the following:

    a. Name: **Temperature**
    b. Source: **Temperature**
    c. Multiplier: **1**
    d. Units: **Deg C**



12. Configure logging as required.

13. Click the **Send Confg** button to commit the settings to the logger.

14. Configure the PLC to poll the logger with the following details:

    a. Function: Read Multiple Holding Registers
    b. Slave Address: 0
    c. Register address: 40001 or 0 (depends on PLC operation)
    d. Number of registers to retrieve: 12[17]
    e. Register data type: Single precision float

The data retrieved by the PLC will be in the following order and have the meaning described in the table:

Holding Register	Register Address	Value
40001 – 40002	0 – 1	Current Wind Speed
40003 – 40003	2 – 3	Last logged Wind Speed
40005 – 40006	4 – 4	Current Wind Direction
40007 – 40008	6 – 5	Last logged Wind Direction
40009 – 400010	8 – 7	Current Temperature
400011 – 400012	10 – 11	Last logged Temperature

[17] The number of registers is calculated from the number of sensors to be obtained x 2 (current value and last logged) x 2 (number of registers per float data type). In this example the number of registers is 3 x 2 x 2 = 12.

11.4 Example of iRIS acting as a protocol gateway (Modbus Slave)

This section describes how to use iLink to configure the iRIS to act as a gateway between a Modbus host (for example a Programmable Logic Controller (PLC)) and HydroTel. The iRIS will operate as Modbus Slave and the PLC will read and write values into holding registers that can be read and written too by HydroTel.

In this example there are three parameters for each direction. As the iRIS is acting purely as a gateway the type of values/data represented by the parameters (e.g. water level, temperature, etc.) is irrelevant and hence not referred to in the iRIS configuration. This will be defined in data originator (HydroTel and the PLC)

The example also assumes that the PLC has been wired to the Serial Sensor Interface which has been configured correctly. Also that appropriate settings for logger to HydroTel communications has been set to the logger and tested.

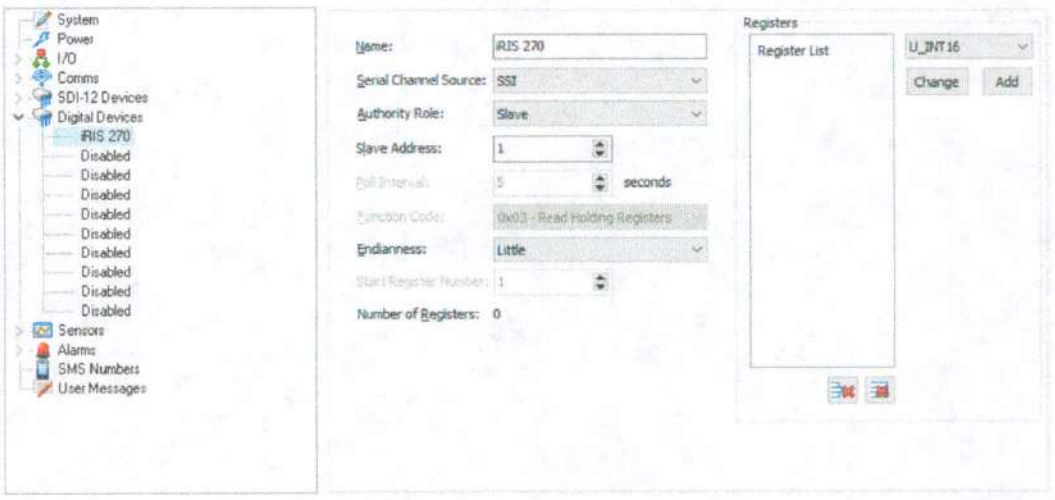
1. Connect to the iRIS with iLink and navigate to the configuration section.

2. Expand the **Digital Devices** branch and select the first Device of the tree.

3. Give the device a name, this is used in the Virtual sensor configuration later.

4. Change the following:

    a. Serial Channel Source: **SSI**
    b. Authority Roll: **Slave**
    c. Slave Address: **0**
    d. Endianness: **Little**



16. In the **Registers** section select the **S_INT16** data type and click the **Add** button. This will add signed integer data type to the Registers List. If the type is incorrect entered then click the tick box next to the incorrect data type in the list, choose the correct type and click the Change button.

17. Repeat previous step 5 times, until there are six S_INT16 data types in the Register List.



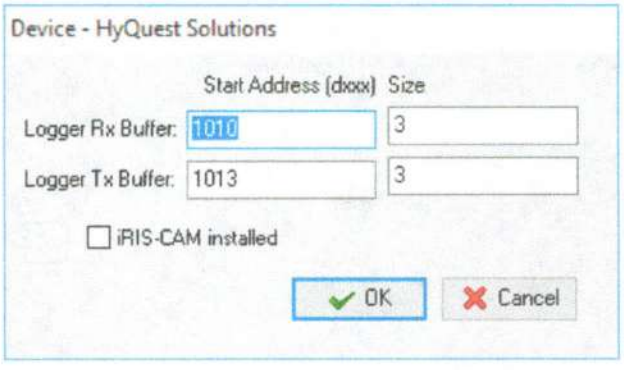
18. Click the **Send Config** button to commit this to the logger.

19. Click the **Retrieve Config** button to obtain the dynamically created indices.

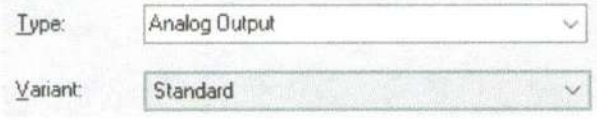
20. In HydroTel Client, if not already done so create a logger and site.

21. For the Device Parameters configure the:

    a. **Logger RX Buffer Start Address (dxxx)** to be **1010** and the **Size** to be **3.** This is the locations that are written to in the logger from HydroTel.
    b. **Logger TX Buffer Start Address (dxxx)** to be **1013** and the **Size** to be **3.** This is the locations that are read from the logger by HydroTel.

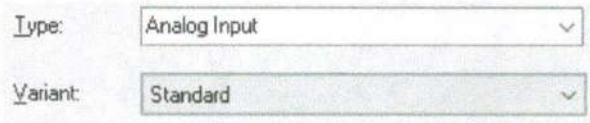


22. Create three objects and points with Object **Type: Analogue Output**:



23. The points associated with these objects should have unique (with in the group) Identifier of 0, 1 and 2.

24. Create three objects and points with Object **Type: Analogue Input**:



25. The points associated with these objects should have unique (with in the group) Identifier of 0,1 and 2.

15. Configure the PLC to poll the logger with the following details:

a.	Function:	Write Multiple Holding Registers
b.	Slave Address:	0
c.	Register address:	40201 or 200 (depends on PLC operation)
d.	Number of registers to write:	3
e.	Register data type:	Signed 16-bit Integer

16. Configure the PLC to poll the logger with the following details:

a.	Function:	Read Multiple Holding Registers
b.	Slave Address:	0
c.	Register address:	40204 or 203 (depends on PLC operation)
d.	Number of registers to retrieve:	3
e.	Register data type:	Signed 16 bit Integer

The configuration is complete. To aid in understanding the data flow in this example the following table may act as a visualisation. The Objects listed are those created above (the actual names will different in reality, for example Gate height SP, etc.).

HydroTel			iRIS			PLC
Object	Point ID	Function	d Location	Modbus Reg	Modbus Addr	Function
Analogue Out A	0	Write →	1010	40201	200	→Read
Analogue Out B	1		1011	40202	201	
Analogue Out C	2		1012	40203	202	
Analogue In A	0	←Read	1013	40204	203	←Write
Analogue In B	1		1014	40205	204	
Analogue In C	2		1015	40206	205	

Table 12 – Data flow visualisation of the Modbus gateway example

12 Appendix A – Specific Information

12.1 General Characteristics

The iRIS Under Cover is supplied in an environmentally sealed (IP65) enclosure constructed from a special corrosion-resistant aluminium alloy that is finished in a hard-anodised coating. This provides a very high degree of mechanical strength and EMI shielding, and enables completely stand-alone mounting in outdoor situations.

The iRIS Under Cover supports a maximum of twenty external sensors (1-20). Sources for these sensors may be chosen from physical digital or analogue inputs or virtual sources (via serial communication or calculations). Sources may also be from internal measurements (battery voltage, supply voltage, temperature and RSSI). There is a pool of 40 free format alarms, each with separate trigger and reset levels. Each alarm also has a duration, which is used to delay the alarm trigger for analogue inputs and to determine the time over which pulse input counters should be totalised (rainfall etc.).

Data from all enabled sensors are logged format which includes full date and time stamp to a 1 second resolution. The iRIS Under Cover Pro version supports SDI-12 communication with a range of industry standard intelligent sensors.



Figure 23 - iRIS Under Cover External View

12.2 Technical Specifications

Dimensions: 130 mm x 220 mm x 75 mm (5.11 in x 8.66 in x 2.95 in)
(Including terminal connectors and gland)

Mass: iRIS Under Cover: 1.4Kg (49.4 oz.)

Power Supply: External 8-30V dc power supplies can be connected to charger input. Supports a directly connected solar panel (no regulator).
External battery.

Comms Interface: 1 x Wi-Fi (for user configuration only)
1 x USB slave via micro USB connector (for user configuration only).
2 x Telemetry modules

SDI-12 Interface: SDI-12 hardware interface that fully complies with the SDI-12 electrical standard – only applicable to iRIS under Cover Pro devices.[18]

Digital I/O: 2 x Digital Inputs
- 30Vdc maximum input, switch to 0Vdc to activate.
- Maximum input frequency 5 kHz. Debounce filtering is provided reducing the maximum frequency to 20Hz. This is enabled by a jumper link.

1 x Digital Output[18]
- Open drain pull-down (max 300mA @ 30V). IRIS Under Cover only: Switched VIN output.

1 x Digital Inputs/Outputs[18]. Each channel configurable as either an input or output.
Digital Input Mode:
- 30Vdc maximum input, switch to 0Vdc to activate.
- Link selectable for either mechanical (<20Hz) or electronic (<5kHz) switching.

Digital Output Mode:
When set for output, the channel can be either:
- Switched 12V out (max 100mA) or
- Open-drain pull-down (max 100mA @ 30V)

Analogue I/O: 2 x 16 bit uni-polar analogue inputs. Input impedance 98kΩ. Referenced to 0V common.
Range:
- 0 – 100mV
- 0 – 5.000V
- 0 – 30.0V

Link selectable for either voltage (0-5V) or current (0-20mA) mode. Integral current mode resistor value 100R.
Internal measurements available for monitoring are:
- Battery and Supply Voltage
- Internal Temperature (°C or °F)
- Received Signal Strength (RSSI or RSCP)

[18] Only available on iRIS Under Cover Pro Version

Logging Memory: Non-volatile flash storage of 1,398,100 time/date stamped data points. Capacity 16MB (later units). Circular buffer mode (oldest data is overwritten when the buffer is full).

Clock/Calendar: Non-volatile with the integral lithium battery. Accurate to +/-20 secs month.

Environmental: Storage Temperature: -40°C - +85°C. (-40°F - +185°F)
Operating Temperature: -40°C - +70°C. (-40°F - +158°F)

12.3 Mounting

The iRIS can be mounted by installing suitable screws through the mounting pillars which are exposed when the lid is opened. The recommended mounting screws are M4 machine screws or Twinfast® wood screws.

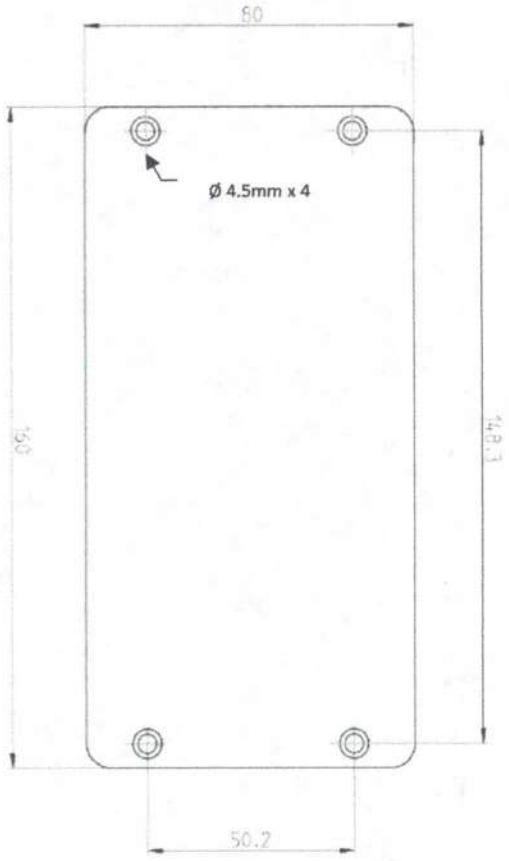


Figure 24 - Mounting Diagram

It is very important that the four retaining pins are locked installation to maintain the IP65 rating of the enclosure.

13 Appendix B – Upgrading Firmware

13.1 Overview

This section describes the procedure to use when upgrading the firmware component in an iRIS.

The upgrade procedure has been carried out many times without issue. However, because the process does involve erasing and reprogramming of flash memory, it is important that a good, securely connected power supply is provided to the iRIS throughout the upgrade process.

13.2 iRIS Executive Firmware File Naming Conventions

The iRIS firmware is available as a single file for downloading and flash upgrading using iLink 2012. The upgrade file is in the format:

iRISUnderCover_x-y-z.bin where:

x-y-z is the firmware version:

x – Major version
y – Minor version
z – Build version

e.g. iRISUnderCover_1-0-0.bin iRIS Under Cover Firmware, 1.0.0

The default repository for the firmware files is C:\ProgramData\iQuest\iLink2\Programs.

13.3 Active verse Pending Firmware

There are up to two copies of firmware stored on the iRIS, they are stored in the Active and Pending regions of non-volatile memory. The version information for both of these areas can be obtained using iLink.

Active – current running firmware image.

Pending – the area containing firmware image that will be used to upgrade the Active area or used as a backup if the Active area is corrupted. It is a landing area for new firmware to be placed while the operation of the logger is not affected, thus allowing for interruptions to communications a power. Upon completion of upload of a new firmware file, the activate command is sent to the logger, invalidating the Active area and forcing c copy of the pending area to the Active.

A pending version of preceded with a 9 indicates that the firmware is partially uploaded to the logger. For example, 91.4.3 indicates that version 1.4.3 of the firmware is part way through being uploaded to the logger

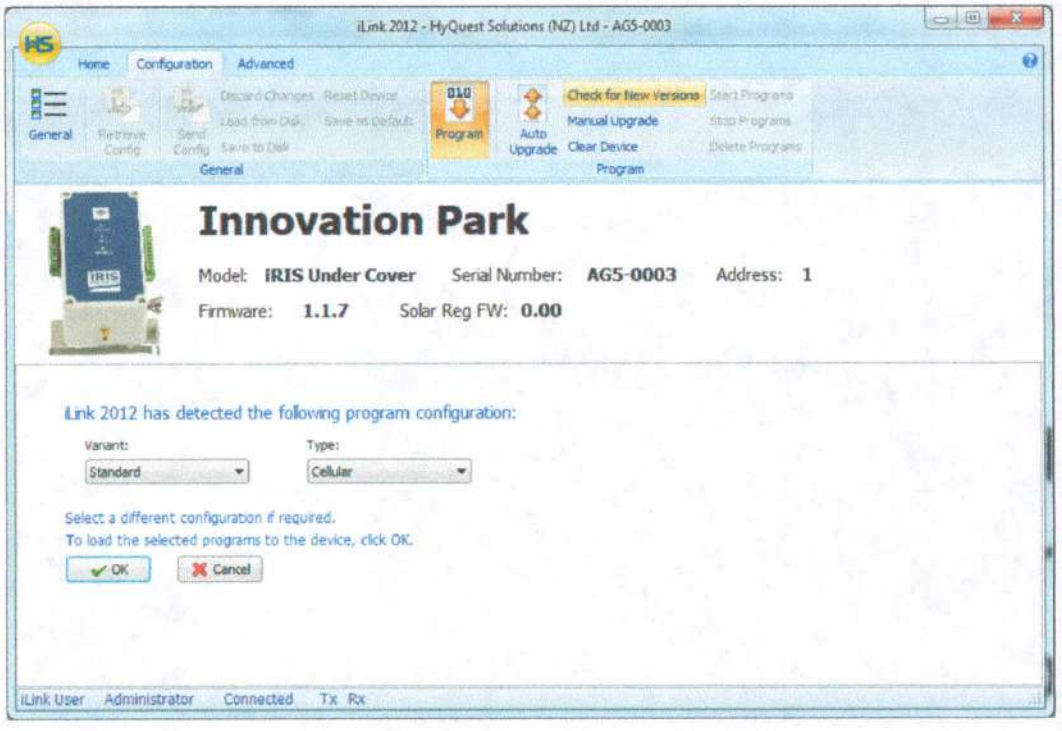
13.4 iRIS Automated Upgrade Procedure (Firmware)

iLink 2012 has an automated firmware upgrade tool that supports the iRIS Under Cover. This tool includes several checks to confirm the validity of the components being installed.

The automated upgrade tool will automatically select the latest version of firware.

The example given below shows a full, automatic firmware upgrade for an iRIS Under Cover.

1. Make sure the required upgrade files are available on the computer. Ideally these should be located in the default deployment folders listed above in Section 13.2.
2. Connect to the iRIS using iLink 2012.
3. Click the Program button under the button under the Configuration tab.
4. Click the Auto Upgrade button.
5. Click OK to load the selected programs to the device. The progress of the upgrade can be seen on the status bar.



6. Once the process is completed, you can see a message saying "Upgrade completed successfully" on the status bar and the iLink 2012 window will show the current software status of the device.

13.5 iRIS Manual Upgrade Procedure (Firmware)

iLink 2012 also allows you to upgrade the software and firmware manually. Please go through the below steps to do a manual upgrade of software and firmware for the iRIS.

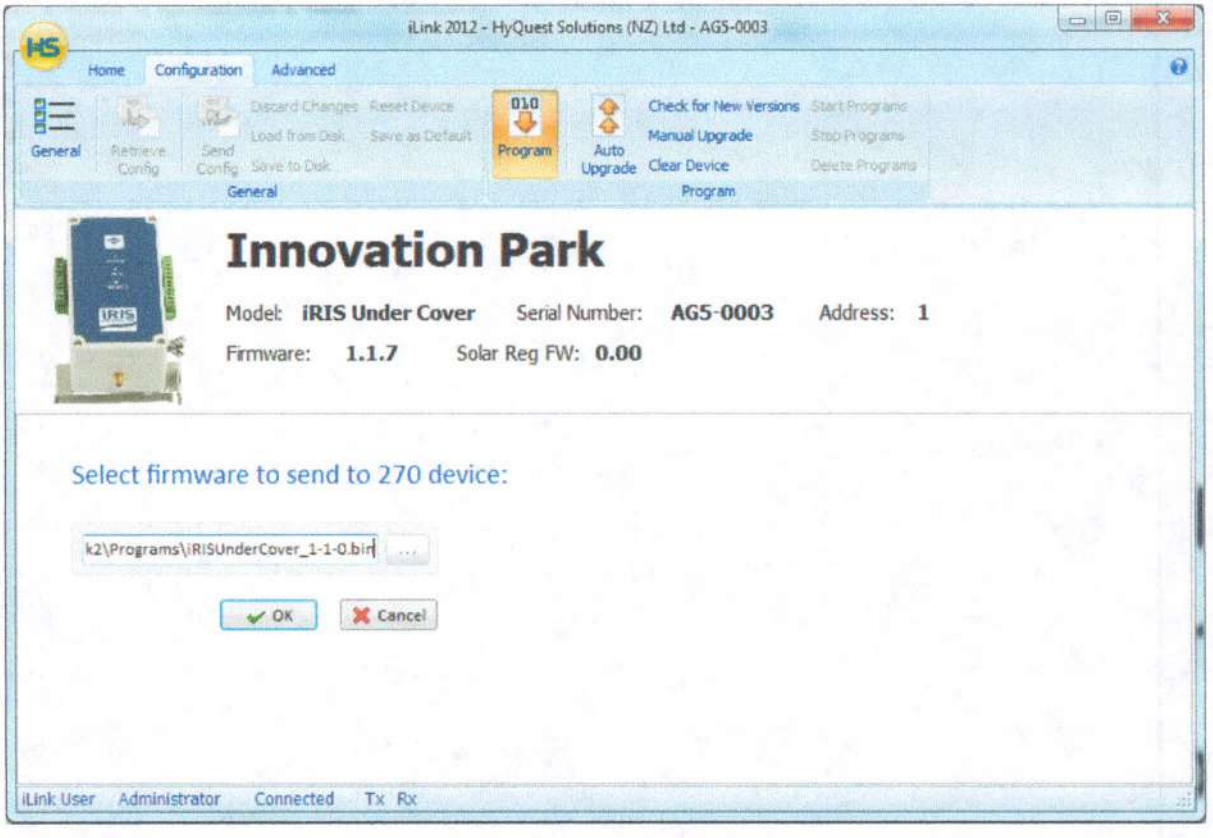
1. Make sure the required upgrade files are available on the computer. Ideally these should be located in the default deployment folders listed above in Section 13.2.

2. Connect to the iRIS using iLink 2012.

3. Click the Program button under the button under the Configuration tab.

4. Click on the Manual Upgrade.

5. Select the new firmware file using the firmware browse button.



6. Click OK to load the selected programs to the device.

7. Once the process is completed, you can see a message saying "Upgrade completed successfully" on the status bar and the iLink 2012 window will show the current software status of the device.

8. Click the Activate button to commit the new firmware to the unit overwriting current version.

14 APPENDIX C – SDI-12

14.1 What is SDI-12?

SDI-12 stands for **S**erial **D**igital **I**nterface at **12**00 bps. It is a standard to interface battery powered data recorders with microprocessor-based sensors designed for environmental data acquisition (EDA).

EDA is accomplished by means of a sensor, or sensors, and a data recorder, which collects and saves the data. SDI-12 is a standard communications protocol, which provides a means to transfer measurements taken by an intelligent sensor to a data recorder. An intelligent sensor typically takes a measurement, makes computations based on the raw sensor reading, and outputs the measured data in engineering units. For example, an SDI-12 pressure sensor may take a series of pressure measurements, average them, and then output pressure in psi, inches of mercury, bars, millibars, or torrs. The sensor's microprocessor makes the computations, converts sensor readings into the appropriate units, and uses the SDI-12 protocol to transfer data to the recorder.

SDI-12 is a multi-drop interface that can communicate with multi-parameter sensors. Multi-drop means that more than one SDI-12 sensor can be connected to a data recorder. The SDI-12 bus is capable of having ten sensors connected to it. Having more than ten sensors, however, is possible. Some SDI-12 users connect more than ten sensors to a single data recorder.

Multi-parameter means that a single sensor may return more than one measurement. For example, some water quality sensors return temperature, conductivity, dissolved oxygen, pH, turbidity, and depth.

14.2 Advantages of SDI-12

A serial-digital interface is a logical choice for interfacing microprocessor-based sensors with a data recorder. This has advantages for sensors and data recorders.

- Unique and complex self-calibration algorithms can be done in microprocessor-based sensors.
- Sensors can be interchanged without reprogramming the data recorder with calibration or other information.
- Power is supplied to sensors through the interface.
- Hybrid circuit and surface mount technologies make it practical to include the power supply regulator, a microprocessor, and other needed circuitry in small sensor packages.
- Sensors can use low cost EEPROMs (electrically erasable programmable read only memory) for calibration coefficients and other information instead of internal trimming operations.
- The use of a standard serial interface eliminates significant complexity in the design of data recorders.
- Data recorders can be designed and produced independently of future sensor development.
- SDI-12 data recorders interface with a variety of sensors.
- SDI-12 sensors interface with a variety of data recorders.
- Personnel trained in SDI-12 will have skills to work with a variety of SDI-12 data recorders and SDI-12 sensors.

14.3 SDI-12 Electrical Interface

The SDI-12 electrical interface uses the SDI-12 bus to transmit serial data between SDI-12 data recorders and sensors. The SDI-12 bus is the cable that connects multiple SDI-12 devices. This is a cable with three conductors:

1) A serial data line
2) A ground line
3) A 12-volt line

In the following specifications, all values not indicating specific limits have an allowable tolerance of ±10% of the value. The SDI-12 bus is capable of having at least 10 sensors connected to it.

14.3.1 Serial Data Line

The data line is a bi-directional, three-state data transfer line. Table 13 shows the logic and voltage levels for the transmission of serial data for the SDI-12 standard. The data line uses negative logic.

Condition	Binary state	Voltage range
Marking	1	-0.5 to 1.0 volts
Spacing	0	3.5 to 5.5 volts
Transition	undefined	1.0 to 3.5 volts

Table 13 – Logic and voltage levels for serial data on SDI-12 bus

Voltage Transitions

During normal operation, the data line voltage slew rate must not be greater than 1.5 volts per microsecond.

14.3.2 Ground Line

The ground line must be connected to the circuit ground and the earth ground at the data recorder. The sensor circuit ground also must be connected to the ground line, but not normally to its own earth ground. If it is necessary to connect the sensor circuitry to earth ground, a heavy (12 AWG or larger) ground wire should be connected between the sensor earth ground and the data recorder earth ground for lightning protection.

The ground conductor should be large enough to keep the voltage drop between the data recorder and all sensors less than 0.5 volts during the maximum combined sensor current drain.

14.3.3 Volt-Line

The data recorder (or the external power supply) provides between 9.6 volts and 16 volts to the 12-volt line, with respect to ground, as measured under a maximum sensor load of 0.5 amperes. SDI-12 does not require the data recorder to be the source of power to the 12-volt line. Sensors connected to the 12-volt line must not have inductive loads. SDI-12 does not require voltage limiting for transient protection in the sensor. Transient protection is however recommended.

Note: This information is taken from:
SDI-12 Serial-Digital Interface Standard for Microprocessor-Based Sensors,
Version 1.3 – January 28, 2016
Prepared By
SDI-12 Support Group
(Technical Committee)

15 Unlock Pro Features

When an iRIS 270 is purchased with the standard feature set and to be able to take advantage of the features available in the Pro version, an unlock processes need to be follow.

1. Contact HyQuest Solutions for an Unlock Code, these are keyed against the serial number of the logger to be unlocked.

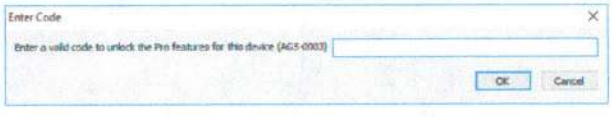
2. Connect to the logger in question with iLink 2012.

3. Select the **Advanced** ribbon.

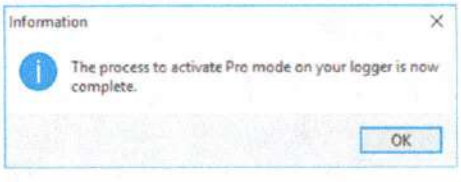
4. Click the **Unlock Pro Version** button.



5. Enter the key provided by HyQuest Solution



6. If the code is correct iLink will now unlock the logger and display the following message on success



16 User Notes