

**PRODUCT CATALOGUE** 

# UNIDATA ENVIRONMENTAL MONITORING AND INDUSTRIAL MEASUREMENT



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DNVGL





### IP Dataloggers



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### THE INTERNET OF THINGS (IOT)



What is the IOT? It is the concept of and the implementation of connecting sensors and control devices to the physical environment, to machinery, and to animals and humans, and then connecting those devices across the internet so we can monitor and control just about everything. It is a good thing? Many say it will enhance our lives. Perhaps it will and perhaps it won't. Regardless it is happening and we need to understand and embrace it to allow better monitoring of the environment.

Unidata has been participating in the IOT for almost 10 years now, but it was not called the IOT then. It was called telemetry (metering from a distance or tele-metering) instead. We started when we released the Neon Range of IP Data loggers, and we have deployed several thousand of these already. These systems monitor water levels, gas pressures and the like over the cell phone and satellite networks. In the last 5 years we have seen a faster growth in this area as well as a steady decline in the cost of connecting sensors across the internet. The type and the number of telemetry applications has grown and now includes such things as monitors for smart agriculture, smart livestock management and smart cities which monitor things like streetlights and parking spaces using relatively inexpensive sensors. The cost of metering from a distance is now lower than having a person come to look at and measure these things

Apart from the low priced sensors, the networks to carry this data have grown in size and have reduced in cost. There are several emerging and competing technologies becoming available, and these are overviewed below.

#### LP WAN TECHNOLOGY

There are many vendors providing LPWAN technology, the main players being LoRa WAN and Sigfox. LPWAN can be described in simple terms as a low cost and low power and very long range (about 5 km) WiFi which can only carry a very small data volume. These volumes are appropriate for some applications for example a farm with a large number of soil moisture sensors, a bore monitoring application for a number of bores in a small geographical area or a metering application. These technologies can be deployed in a private network environment, in the same way you use normal WiFi in your house or office and you manage the network, or you can purchase a service from a Telco and they manage the network.

#### NARROWBAND LTE TECHNOLOGY

This is the cell phone industry approach to the IOT, and there are new low cost low bandwidth options becoming available in the next year, for example current 4G/ LTE provides speeds of up to 25Mb and we all use this for our web browsing and other applications. IOT applications generally only need a speed of 64Kb, or less. There are new 4G /LTE modules being released in the next year which will be much cheaper and these will compete with the LPWAN technologies.

Which technology will win? No one knows, perhaps it will be the same as VHS and Beta when those technologies were competing in the video recording market decades ago.

At Unidata we are offering both technology options. We are also releasing our full range of Neon Remote Loggers, with both technologies, our customers can choose based on their specific need.

### INTERNET PROTOCOL IP TELEMETRY & MESSAGE BASED TELEMETRY

Unidata's Neon Internet Protocol Telemetry Dataloggers and associated Neon Server Applications Software facilitate transport of data from the measuring instruments in the field to a central office. Telemetry systems have been used extensively for successfully transporting data from field measurement devices to central computer systems for many years. With the growth of coverage of internet and telecommunications networks, especially cellular and satellite networks, there are now more options available for telemetry.

### PULL AND PUSH TELEMETRY – A SHORT HISTORY

In past years, data was recorded from field instruments with chart recorders and the charts were collected from the field and brought into the office for analysis. In the 1970's data loggers came into wide usage allowing the transfer of data either in the field or by taking the logger back to the office. Fixed phone lines and modems at the site allowed data transfer without a physical visit to the site. With this development, "pull telemetry" was born and soon expanded with the advent of mobile and satellite phones. However, the transaction still required modem and a connection to be initiated to transfer data.

With the arrival and expansion of the internet and TCP/IP data a new method was possible, whereby a shared packet networks (public and private) could be used to transfer data from the field to the office by sending the data in packets across shared TCP/IP networks.

With a packet network the sending end initiates the transfer; hence this type of telemetry is called push telemetry or connectionless telemetry, removing the need for a dedicated connection. Another method of push telemetry is cellular short messaging, but this is not a guaranteed delivery method, which is an important consideration for telemetry applications.

With TCP/IP each packet sent should receive an acknowledgement or the packet will be resent, ensuring data delivery.

With SMS type messages there is generally no such acknowledgement method built into the system and messages may be lost.

### MOBILE / CELLULAR PHONE NETWORKS

Telecommunications providers continue to expand their cellular networks to provide more coverage, services and speed. Whilst mobile / cellular networks are an ideal fit for push telemetry, which only require slower speeds, there is one design aspect which is very relevant to telemetry applications.

Network growth is generally related to population growth, with most providers advertising coverage by percentage of population. However most of the population is in the large cities where infrastructure, shared across many users, makes expansion economically viable. Generally, telemetry is needed in remote, less populated areas where extra base stations are not economically viable. Hence while 90% of the population may be covered by such networks, perhaps only 50% of the country area is covered by the network.

Regardless of this, mobile / cellular phone networks will always offer the most economic method of communication where there is coverage.

### LPWAN COMMUNICATIONS

There are several LPWAN technologies available, including technologies such as LoRa and Sigfox, but all of these services can be considered as low power, long range WiFi links and they are in the mix of services available, however their capacity is limited to a message only service. Unidata supports the most common LoRa technology for LPWAN applications

### SATELLITE COMMUNICATIONS

Whilst there has been a rapid expansion of cellular / mobile networks, the global coverage of satellite communications still offer the most effective means of communications with remote sites outside of cellular coverage. There are two main types of satellite services, equatorial orbit satellites and low earth orbit satellites. The diagram, over page, shows in diagrammatic for such services.

Equatorial satellites orbit the earth at around 26,000km at the same speed as the earth rotates; and so are stationary with respect to the earth's surface. This means that they can act as a stationary radio repeater, receiving microwave signals from one point, amplifying and changing their frequency and re transmitting them back to earth, usually using focused antennas which point to the required area of coverage. Low earth orbit (LEO) satellites complete the orbit within an hour or two and cover a smaller area. They are "accessible" during the time when they are overhead, within view of the user on the earth. LEO satellites are at a height of around 1000 km and there are generally 20 or more satellites in any LEO system. On average there will be at least one to 4 satellites in view at any one time.

For communications to occur one of these satellites needs to be acquired, communication established and the data transfer completed in 10 to 20 minutes while the satellite is in view.

Some systems can effectively transfer the call or data transfer to another satellite automatically as indicated in the diagram above right. As a general rule equatorial satellites require more power and are more expensive per call than a LEO satellite system. Also, as the equatorial satellite does not move in relation to a user on the earth, they are always available immediately. Unidata offer a range of products that allow data communication using cellular or satellite networks and these are detailed further in the Products section.

There are emerging new services based on microsatellites and these are low capacity services, hence they are message based services rather than full IP protocol services. The service levels are lower, however costs for bandwidth are also lower.

#### THE NRL FULL PROTOCOL IMPLEMENTATION - INTERNET CONNECTION REQUIRED

The Internet provides the transport mechanism between the Neon Servers and the telecommunication provider gateways. This means that NRL units can be used anywhere in the world provided there is an internet connection available. The connection to the internet can be via a cell phone data service, a satellite service or a WiFi or Ethernet connection.

With the full protocol service the communications between the NRL and the Neon Server are closely coupled and each transmission is checked and acknowledged, such that a beak in communications does not result in lost data. Rather the NRL attempts to communicate with the Neon Server on a pre-set schedule and continues to log and store data and then re send if and when the communications link and or the Neon Server service is restored.

Also the remote NRL can be configured online, parameters can be adjusted and a new program (scheme) and updated firmware can be downloaded remotely from the Neon Server.

# LEO Satellites MEO Satellites GEO Satellites

LEO Satellites – Low Earth Orbit 100 to 1,500 km MEO Satellites – Medium Earth Orbit 5,000 to 10,000 km GEO Satellites – Geostationary Orbit 36,000 km



### THE NRL MESSAGE BASED IMPLEMENTATION - LORA LPWAN & SATELLITE SERVICES

There are communications services available which provide a short message service, similar to an SMS text message service.

The NRL supports LoRa LPWAN, Iridium Short Burst Data service and also other emerging message based services. These services are in general terms message only services, where a message is sent from the NRL to the Neon Server without acknowledgement, without the ability to reconfigure NRL online and without the ability to download programs (schemes). These message based services are generally lower cost and they suit low data rate applications very well and are less expensive.



### **3016** NEON REMOTE LOGGER 16 ANALOG CHANNELS / TOUCH SCREEN DISPLAY





The 3016 Neon Remote Logger NRL is self-contained data logger/rtu with 16 high resolution analog channels in a compact case which connects to sensors in the field, collects readings from those sensors and transmits the collected data to a central Neon server, or it can be set up to operate as a stand-alone datalogger/rtu. The model number suffix indicates data transmission via a cellular 2G/3G network or via a cellular 4G/LTE network, satellite or Wi-Fi network.

All Neon data logger/ rtu units routinely collect and log sensor data and periodically connect to a central Neon comms and web server via an IP network using a push data model to upload the logged data. The central Neon server can be cloud hosted, virtual or physical. The Neon server is offered as a Neon data hosted service using a Unidata Neon server for a monthly fee or customers can purchase Neon server license and run the Neon software on their own server.

The Neon system receives, processes, displays, stores and reports collected data in many ways. The Neon system also can issue control commands based on pre- set algorithms and issue alarms and notifications via several mediums. Alarm set points can be set up on the Neon data logger/ rtu units as well as the Neon central server and alarm notifications can be sent via several methods including email and sms text messages. Alarm triggers

can initiate physical actions in the field such as turning pumps on and off or activating other control functions based on the internal program within the Neon data logger/ rtu.

The Neon system has fully bi directional communications between the Neon data logger/ rtu units and the central Neon server. This allows for remote diagnosis, remote programming and remote firmware updating for operation of the remote equipment and thereby reducing costly site visits. Neon data logger/ rtu units can be configured to read sensors, log data internally to local memory and push data to the central Neon server at user settable intervals such as once a minute, every few minutes, every hour, once a day. Data to be viewed on the Neon Web server in near real time from any browser and can be reported to other systems using email, ftp, and web services.

#### **SPECIFICATIONS**

**MODEL A** 

PHYSICAL SPECIFICATIONS		
MATERIAL:	Powder Coated Aluminium Enclosure	
SIZE:	295mm x 160mm x 40mm (LxWxH)	
WEIGHT:	850 grams	
OPERATING TEMPERATURE:	-20°C to 60°C. Not affected by humidity	
ANTENNAE:	Model dependant, external stub/whip/satellite antenna	
<b>ELECTRICAL SPECIFIC</b>	ATIONS	
EXTERNAL POWER:	9 to 30V DC (provision for dual power inputs)	
CURRENT DRAW:	<800µA Standby, Max 500mA Active	
RTC BACKUP BATTERY:	3.6V Li Coin Cell (5 year life)	
INSTRUMENT POWER/ REFERENCE VOLTAGE:	12V regulated, 200mA fused, 5V regulated, 100mA fused	
ANALOG CHANNELS:	16 Single ended (max) or 8 Differential (max), 24 bit resolution, 8 user selectable gain ranges 0 to 5000mV (gain=1) to 0 to 39mV (gain=128)	
MODBUS:	2 independent channels, RS485, RTU or ASCII protocol, 57600 baud (max), Functions 01, 02, 03, 04, 05/15, 06/16	
SDI-12:	2 independent channels, SDI V1.3 Compliant, instrument and recorder modes supported	
UNIDATA HSIO:	High speed serial interface	
COUNTERS:	4, 1 x 16 bit, DC to 320 Hz potential free contacts or 0 to 5V DC digital input (C0); 3 x 16 bit, DC to 32kHz potential free contacts or 0 to 5V DC digital input (C1, C2, C3)	
DIGITAL INPUTS:	4, Low<1.1V, High >2.05V, Max = 5V DC	
DIGITAL OUTPUTS:	2, Open Drain FET, 30V DC, 250mA max	

RELAYS:	2, Normally Open and Normally Closed Contacts, 1A 30V DC, 0.5A 125V AC
CONFIGURATION PORT:	RS232 serial port, 230400 maximum baud rate, USB-B port, Optional Bluetooth Low Power Wireless interface
MODEM INTERFACE:	Optional internal 3G/4G Modem, Dual SIM card support RS232 Interface for connection of external Satellite Modem
SERIAL INSTRUMENT:	RS232 port, full implementation (all 9 signals available), baud rate 230400 max
WIRELESS INSTRUMENT:	Optional LPWAN sensor interface
DATA INTERFACE:	USB thumb drive port for data download /logger configuration
ETHERNET PORT:	10/100 Mbit
LCD DISPLAY:	320 x 240, Colour, Resistive Touch Panel
KEYPAD:	5 button membrane keypad
ACCELEROMETER:	Senses changes in logger orientation
<b>INTEGRATED LOGGER</b>	SPECIFICATIONS
STORAGE MEMORY:	7.5Mbytes Flash (non-volatile), 3.75 Million log data points
MEMORY EXPANSION:	SD card, micro size, 32Gbyte maximum capacity, 16 Billion log data points
SCAN RATE:	Programmable from 1 second to 5 minutes
LOG RATE:	Programmable from 1 second to 24 hours
TIME CLOCK:	Battery Backed Real Time Clock (RTC), Accuracy +/- 10 seconds/month (non- Neon version), locked to server time clock (Neon version)
CPU:	16 Bit, 20MHz, Ultra Low Power

### **3008** NEON REMOTE LOGGER 8 ANALOG CHANNELS / TOUCH SCREEN DISPLAY





Image: State of the state

The 3008 Neon Remote Logger NRL is self-contained data logger/rtu with 8 high resolution analog channels in a compact case which connects to sensors in the field, collects readings from those sensors and transmits the collected data to a central Neon server, or it can be set up to operate as a stand-alone datalogger/rtu. The model number suffix indicates data transmission via a cellular 2G/3G network or via a cellular 4G/LTE network, satellite or Wi-Fi network.

All Neon data logger/ rtu units routinely collect and log sensor data and periodically connect to a central Neon comms and web server via an IP network using a push data model to upload the logged data. The central Neon server can be cloud hosted, virtual or physical. The Neon server is offered as a Neon data hosted service using a Unidata Neon server for a monthly fee or customers can purchase Neon server license and run the Neon software on their own server.

The Neon system receives, processes, displays, stores and reports collected data in many ways. The Neon system also can issue control commands based on pre- set algorithms and issue alarms and notifications via several mediums. Alarm set points can be set up on the Neon data logger/ rtu units as well as the Neon central server and alarm notifications can be sent via several methods including email and sms text messages. Alarm triggers

can initiate physical actions in the field such as turning pumps on and off or activating other control functions based on the internal program within the Neon data logger/ rtu.

The Neon system has fully bi directional communications between the Neon data logger/ rtu units and the central Neon server. This allows for remote diagnosis, remote programming and remote firmware updating for operation of the remote equipment and thereby reducing costly site visits. Neon data logger/ rtu units can be configured to read sensors, log data internally to local memory and push data to the central Neon server at user settable intervals such as once a minute, every few minutes, every hour, once a day. Data to be viewed on the Neon Web server in near real time from any browser and can be reported to other systems using email, ftp, and web services.

PHYSICAL SPECIFICATIONS		
MATERIAL:	Powder Coated Aluminium Enclosure	
SIZE:	282mm x 122mm x 40mm (LxWxH)	
WEIGHT:	650 grams	
OPERATING TEMP:	-20°C to 60°C. Not affected by humidity	
ANTENNAE:	Model dependant, external stub/whip/satellite antenna	
ELECTRICAL SPECIFICATIONS		
EXTERNAL POWER:	9 to 30V DC (provision for dual power inputs)	
CURRENT DRAW:	<800µA Standby, Max 500mA Active	
RTC BACKUP BATTERY:	3.6V Li Coin Cell (5 year life)	
INSTRUMENT POWER/ REFERENCE VOLTAGE:	12V regulated, 200mA fused, 5V regulated, 100mA fused	
ANALOG CHANNELS:	8 Single ended (max) or 4 Differential (max), 24 bit resolution, 8 user selectable gain ranges 0 to 5000mV (gain=1) to 0 to 39mV (gain=128)	
MODBUS:	2 independent channels, RS485, RTU or ASCII protocol, 57600 baud (max), Functions 01, 02, 03, 04, 05/15, 06/16	
SDI-12:	2 independent channels, SDI V1.3 Compliant, instrument and recorder modes supported	
COUNTERS:	4, 1 x 16 bit, DC to 320 Hz potential free contacts or 0 to 5V DC digital input (C0); 3 x 16 bit, DC to 32kHz potential free contacts or 0 to 5V DC digital input (C1, C2, C3)	
DIGITAL OUTPUTS:	1, Open Drain FET, 30V DC, 250mA max	
RELAYS:	2, Normally Open and Normally Closed Contacts, 1A 30V DC, 0.5A 125V AC	

CONFIGURATION PORT:	RS232 serial port, 230400 maximum baud rate, USB-B port, Optional Bluetooth Low Power Wireless interface	
MODEM INTERFACE:	Optional internal 3G/4G Modem, Dual SIM card support RS232 Interface for connection of external Satellite Modem	
SERIAL INSTRUMENT:	RS232 port, full implementation (all 9 signals available), baud rate 230400 max	
WIRELESS NSTRUMENT:	Optional LPWAN sensor interface	
DATA INTERFACE:	USB thumb drive port for data download /logger configuration	
ETHERNET PORT:	10/100 Mbit	
LCD DISPLAY:	320 x 240, Colour, Resistive Touch Panel	
KEYPAD:	5 button membrane keypad	
ACCELEROMETER:	Senses changes in logger orientation	
INTEGRATED LOGGER SPECIFICATIONS		
STORAGE MEMORY:	7.5Mbytes Flash (non-volatile), 3.75 Million log data points	
MEMORY EXPANSION:	SD card, micro size, 32Gbyte maximum capacity, 16 Billion log data points	
SCAN RATE:	Programmable from 1 second to 5 minutes	
LOG RATE:	Programmable from 1 second to 24 hours	
TIME CLOCK:	Battery Backed Real Time Clock (RTC), Accuracy +/- 10 seconds/month (non- Neon version), locked to server time clock (Neon version)	
CPU:	16 Bit, 20MHz, Ultra Low Power	



### **3004** NEON REMOTE LOGGER 4 ANALOG CHANNELS / TOUCH SCREEN DISPLAY

Unidata



MODEL A

The 3004 Neon Remote Logger NRL is small self-contained data logger/rtu with 4 high resolution analog channels in a compact case which connects to sensors in the field, collects readings from those sensors and either transmits the collected data to a central server via a cellular network, or can be uses as a stand-alone datalogger/rtu. The model number suffix indicates data transmission via a cellular 2G/3G network or via a cellular 4G/LTE network.

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All Neon data logger/ rtu units routinely collect and log sensor data and periodically connect to a central Neon comms and web server via an IP network using a push data model to upload the logged data. The central Neon server can be cloud hosted, virtual or physical. The Neon server is offered as a Neon data hosted service using a Unidata Neon server for a monthly fee or customers can purchase Neon server license and run the Neon software on their own server.

The Neon system receives, processes, displays, stores and reports collected data in many ways. The Neon system also can issue control commands based on pre- set algorithms and issue alarms and notifications via several mediums. Alarm set points can be set up on the Neon data logger/ rtu units as well as the Neon central server and alarm notifications can be sent via several methods including email and sms text messages. Alarm triggers

can initiate physical actions in the field such as turning pumps on and off or activating other control functions based on the internal program within the Neon data logger/ rtu.

The Neon system has fully bi directional communications between the Neon data logger/ rtu units and the central Neon server. This allows for remote diagnosis, remote programming and remote firmware updating for operation of the remote equipment and thereby reducing costly site visits. Neon data logger/ rtu units can be configured to read sensors, log data internally to local memory and push data to the central Neon server at user settable intervals such as once a minute, every few minutes, every hour, once a day. Data to be viewed on the Neon Web server in near real time from any browser and can be reported to other systems using email, ftp, and web services.

PHYSICAL SPECIFICATIONS		
MATERIAL:	Powder Coated Aluminium Enclosure	
SIZE:	182mm x 110mm x 34mm (LxWxH)	
WEIGHT:	400 grams	
OPERATING TEMPERATURE:	-20°C to 60°C. Not affected by humidity	
ANTENNAE:	Model dependant, external stub/whip	
ELECTRICAL SPECIFICATIONS		
EXTERNAL POWER:	9 to 30V DC (provision for dual power inputs)	
CURRENT DRAW:	<800µA Standby, Max 500mA Active	
RTC BACKUP BATTERY:	3.6V Li Coin Cell (5 year life)	
INSTRUMENT POWER/REFERENCE VOLTAGE:	5V regulated, 100mA fused	
ANALOG CHANNELS:	4 Single ended (max), 24 bit resolution	
MODBUS:	1 independent channels, RS485, RTU or ASCII protocol, 57600 baud (max), Functions 01, 02, 03, 04, 05/15, 06/16	
SDI-12:	1 independent channels, SDI V1.3 Compliant, instrument and recorder modes supported	
COUNTERS:	4, 1 x 16 bit, DC to 320 Hz potential free contacts or 0 to 5V DC digital input (C0); 3 x 16 bit, DC to 32kHz potential free contacts or 0 to 5V DC digital input (C1, C2, C3)	

DIGITAL OUTPUTS:	1, Open Drain FET, 30V DC, 250mA max	
RELAYS:	1, Normally Open and Normally Closed Contacts, 1A 30V DC, 0.5A 125V AC	
CONFIGURATION PORT:	USB-B port	
MODEM INTERFACE:	Optional internal 3G/4G Modem, Single SIM card support	
DATA INTERFACE:	USB thumb drive port for data download /logger configuration	
LCD DISPLAY Optional:	320 x 240, Colour, Resistive Touch Panel	
KEYPAD Comes with LCD option only:	5 button membrane keypad	
ACCELEROMETER:	Senses changes in logger orientation	
INTEGRATED LOGGER SPECIFICATIONS		
STORAGE MEMORY:	7.5Mbytes Flash (non-volatile), 3.75 Million log data points	
MEMORY EXPANSION:	SD card, micro size, 32Gbyte maximum capacity, 16 Billion log data points	
SCAN RATE:	Programmable from 1 second to 5 minutes	
LOG RATE:	Programmable from 1 second to 24 hours	
TIME CLOCK:	Battery Backed Real Time Clock (RTC), Accuracy +/- 10 seconds/month (non- Neon version), locked to server time clock (Neon version)	
CPU:	16 Bit, 20MHz, Ultra Low Power	

### **3004** NEON METERING LOGGER – LORA WAN



**ne**®n

**MODEL A** 



The 3004 Neon Metering Logger LoRa WAN utilises the LoRa communication system as its method of sending sensor data from the field to the Neon Server.

The 3004 Neon Metering Logger LoRa WAN connects to sensors in the field, collects readings from those sensors, logs the sensor data provides control functions and also transmits the collected data to a central server via a LoRa WAN network, which utilises MQTT.

The 3004 Neon Metering Logger LoRa WAN is programmed, either in the factory, or in the field with a Unidata standard program called a scheme. The scheme specifies how often and for how long the datalogger should collect data from the sensors and how often the data should be sent to the server. Control outputs are also set up in the scheme by setting up custom events.

The NML LoRa operates in what Unidata calls LoRa Mode 2. In this mode, sensors are read by the logger according to the scheme. A set of short data packets will be sent, as set by logging interval, to the LoRa WAN gateway over either private or public LoRa network. LoRa WAN gateway transfers data packets to Neon Server using Ethernet, cellular or satellite network. The LoRa Wan system has a typical range of to 5 Km, the range reduces in built up areas depending on building density and increases where there is line of sight and a larger antenna.

A wide range of sensor types are supported, for example, analog sensors, frequency counters, digital inputs as well as Modbus and SDI-12.

Control of external equipment (such as triggering a relay when a user defined event occurs, or initiating a shutdown), can be accomplished via Relay contacts and Open Drain FET output.

Sensors are connected to the logger via pluggable terminal blocks, allowing for easy removal of the logger if servicing is required.



OPERATING FREQUENCIES:	LoRa AU915, US915, EU868, AS923
SCAN RATE:	Programmable from 1 second to 5 minutes
LOG RATE:	Programmable from 1 second to 24 hours
MATERIAL:	Polycarbonate
SIZE:	L190mm x W80mm x H55mm
WEIGHT:	300g
OPERATING TEMPERATURE:	-20° to +60°C. Not affected by humidity
INTERNAL POWER:	3.6 Volt Lithium D Cell
EXTERNAL POWER:	9 to 15V DC
CURRENT DRAW:	100μA Standby
ACCELEROMETER:	Optional

ANTENNAE:	On board, optional external whip antenna
PROVIDES INSTRUMENT POWER:	12V regulated, 200mA
ANALOG CHANNELS:	4 Single ended (0-2500mV) with 12 bit resolution
MODBUS:	1xModbus RS485 RTU protocol, 57600 baud max
SDI-12:	1xSDI V1.3 Compliant, instrument mode
COUNTERS:	2 x 16 bit, DC to 32kHz potential free contacts or 0 to 5V DC digital input
DIGITAL OUTPUTS:	1 Open Drain FET, 30V DC, 250mA max
CONFIGURATION PORT:	USB Port

![](_page_11_Picture_15.jpeg)

### **3004NC** NEON METERING LOGGER – CELLULAR

![](_page_12_Picture_1.jpeg)

neøn

#### MODEL A-MC

![](_page_12_Picture_3.jpeg)

The 3004MC Neon Metering Logger Cellular is a Neon Metering Logger in the 3004M range which has a smaller form factor than the standard metal enclosure 3004. It is housed in a polycarbonate case. It utilises the Cellular phone networks as its method of sending sensor data from the field to the Neon Server.

The 3004MC Neon Metering Logger Cellular connects to sensors in the field, collects readings from those sensors, logs the sensor data, provides control functions and also transmits the collected data to a central server via a Cellular phone network.

The 3004MC Neon Metering Logger Cellular is programmed in the field with a Unidata standard program called a scheme. The scheme specifies how often and for how long the datalogger should collect data from the sensors and how often the data should be sent to the server. Control outputs are also set up in the scheme by setting up custom events.

A wide range of sensor types are supported, for example, analog sensors, frequency counters, digital inputs as well as Modbus and SDI-12.

Control of external equipment (such as triggering a relay when a user defined event occurs, or initiating a shutdown), can be accomplished via Relay contacts and Open Drain FET output.

Sensors are connected to the logger via pluggable terminal blocks, allowing for easy removal of the logger if servicing is required.

PHYSICAL SPECIFICATIONS		
MATERIAL:	Polycarbonate	
SIZE:	L190mm x W80mm x H55mm	
WEIGHT:	300g	
OPERATING TEMPERATURE:	-20° to +60°C. Not affected by humidity	
ANTENNAE:	On board stub antenna, optional external whip antenna	
ELECTRICAL SPECIFICATIONS		
EXTERNAL POWER:	9 to 30V DC	
CURRENT DRAW:	50µA Standby	
INTERNAL POWER:	3.6 Volt Lithium D Cell	
INSTRUMENT POWER:	15V or 18V regulated, 80mA (user selectable)	
ANALOG CHANNELS:	4 Single ended (0-5V DC) with 24 bit resolution	

MODBUS:	1 x Modbus RS485 RTU protocol, 57600 baud max	
SDI-12:	1 x SDI V1.3 Compliant, instrument mode	
COUNTERS: 2	16 bit, DC to 3kHz potential free contacts or 0 to 5V DC digital input (C0);	
	16 bit, DC to 300Hz potential free contacts or 0 to 5V DC digital input (C1)	
DIGITAL OUTPUTS:	1 Open Drain FET, 30V DC, 250mA max	
CONFIGURATION PORT:	USB Port	
OPERATING FREQUENCIES:	2G, 3G and 4G cellular networks	
SCAN RATE:	Programmable from 1 second to 5 minutes	
LOG RATE:	Programmable from 1 second to 24 hours	
ACCELEROMETER:	Optional	

### **3004ME** NEON REMOTE LOGGER – ETHERNET

### neøn

![](_page_13_Picture_2.jpeg)

#### MODEL B-ME

![](_page_13_Picture_4.jpeg)

The 3004ME Neon Remote Logger Ethernet is a Neon Remote Logger in the 3004M range which has a smaller form factor than the standard metal enclosure 3004. It is housed in a polycarbonate case. It utilises the Ethernet networks as its method of sending sensor data from the field to the Neon Server.

The 3004ME Neon Remote Logger Ethernet connects to sensors in the field, collects readings from those sensors, logs the sensor data, provides control functions and also transmits the collected data to a central server via a Ethernet network.

The 3004ME Neon Remote Logger Ethernet is programmed in the field with a Unidata standard program called a scheme. The scheme specifies how often and for how long the datalogger should collect data from the sensors and how often the data should be sent to the server. Control outputs are also set up in the scheme by setting up custom events.

A wide range of sensor types are supported, for example, analog; including 4-20mA sensors, frequency counters, digital inputs as well as Modbus and SDI-12.

Control of external equipment (such as triggering a relay when a user defined event occurs, or initiating a shutdown), can be accomplished via Open Drain FET output.

Sensors are connected to the logger via pluggable terminal blocks, allowing for easy removal of the logger if servicing is required.

PHYSICAL SPECIFICATIONS		
MATERIAL:	Polycarbonate	
SIZE:	L190mm x W80mm x H55mm	
WEIGHT:	300g	
OPERATING TEMPERATURE:	-20° to +60°C. Not affected by humidity	
ELECTRICAL SPECIFICATIONS		
EXTERNAL POWER:	9 to 30V DC	
CURRENT DRAW:	50µA Standby	
INTERNAL POWER:	3.6 Volt Lithium D Cell optional	
INSTRUMENT POWER:	5V, 12V or 18V regulated, 80mA (user selectable)	
INSTRUMENT REFERENCE VOLTAGE:	5V 10mA Max	
ANALOG CHANNELS:	4 Single ended (0-5V DC) with 24 bit resolution	
MODBUS:	1 x Modbus RS485 RTU protocol, 57600 baud max	

SDI-12:	1 x SDI V1.3 Compliant, instrument mode
UNIDATA HSIO:	High speed serial interface
COUNTERS: 4	16 bit, DC to 3kHz potential free contacts or 0 to 5V DC digital input (C0, C2); 16 bit, DC to 300Hz potential free contacts or 0 to 5V DC digital input (C1, C3)
DIGITAL OUTPUTS:	1 Open Drain FET, 30V DC, 250mA max
CONFIGURATION PORT:	USB Port
ETHERNET PORT:	10/100 Mbit
SCAN RATE:	Programmable from 1 second to 5 minutes
LOG RATE:	Programmable from 1 second to 24 hours
ACCELEROMETER:	Senses changes in logger orientation
LCD DISPLAY:	Optional, 320 x 240, Colour, Resistive Touch Panel
KEYPAD:	Optional, 5 button membrane keypad

![](_page_13_Picture_14.jpeg)

### **3004MH** NEON REMOTE LOGGER – MICROSATELLITE

#### **MODEL B-MH**

![](_page_14_Picture_2.jpeg)

![](_page_14_Picture_3.jpeg)

![](_page_14_Picture_4.jpeg)

The 3004MH Neon Remote Logger Microsatellite is a Neon Remote Logger in the 3004M range which has a smaller form factor than the standard metal enclosure 3004. It is housed in a polycarbonate case. It utilises a microsatellite network as its method of sending sensor data from the field to the Neon Server. The microsatellite network is a message based system, providing low cost satellite communications over a high latency service. This low cost service is ideal if you have a requirement for occasional short messages to report sensor data, when the latency of the messages is not very important. Latency from such systems is in the order of hours and the very low satellite airtime costs reflect this high latency service.

The 3004MH Neon Remote Logger Microsatellite connects to sensors in the field, collects readings from those sensors, logs the sensor data, provides some local control functions and also transmits the collected data to a central Neon server via a low earth orbit / low orbit density microsatellite satellite network.

The 3004MH Neon Remote Logger Microsatellite is programmed in the field with a Unidata standard program called a scheme. The scheme specifies how often and for how long the datalogger should collect data from the sensors and how often the data should be sent to the Neon server. Local control outputs are also set up in the scheme by setting up custom events. A wide range of sensor types are supported, for example, analog; including 4-20mA sensors, frequency counters, digital inputs as well as Modbus and SDI-12.

Control of external equipment (such as triggering a relay when a user defined event occurs, or initiating a shutdown), can be accomplished via Open Drain FET output.

Sensors are connected to the logger via pluggable terminal blocks, allowing for easy removal of the logger if servicing is required.

PHYSICAL SPECIFICATIONS		
MATERIAL:	Polycarbonate	
SIZE:	L190mm x W80mm x H55mm	
WEIGHT:	300g	
OPERATING TEMPERATURE:	-20° to +60°C. Not affected by humidity	
ANTENNAE:	External Dome Antenna	
<b>ELECTRICAL SPECIFICA</b>	TIONS	
EXTERNAL POWER:	9 to 30V DC	
CURRENT DRAW:	50µA Standby	
INTERNAL POWER:	3.6 Volt Lithium D Cell optional	
INSTRUMENT POWER:	5V, 12V or 18V regulated, 80mA (user selectable)	
INSTRUMENT REFERENCE VOLTAGE:	5V 10mA Max	
ANALOG CHANNELS:	4 Single ended (0-5V DC) with 24 bit resolution	
MODBUS:	1 x Modbus RS485 RTU protocol, 57600 baud max	

SDI-12:	1 x SDI V1.3 Compliant, instrument mode	
UNIDATA HSIO:	High speed serial interface	
COUNTERS: 4	16 bit, DC to 3kHz potential free contacts or 0 to 5V DC digital input (C0, C2); 16 bit, DC to 300Hz potential free contacts or 0 to 5V DC digital input (C1, C3)	
DIGITAL OUTPUTS:	1 Open Drain FET, 30V DC, 250mA max	
CONFIGURATION PORT:	USB Port	
OPERATING FREQUENCIES:	500 MHz	
SCAN RATE:	Programmable from 1 second to 5 minutes	
LOG RATE:	Programmable from 1 second to 24 hours	
ACCELEROMETER:	Senses changes in logger orientation	
LCD DISPLAY:	Optional, 320 x 240, Colour, Resistive Touch Panel	
KEYPAD:	Optional, 5 button membrane keypad	

### **3004MI** NEON REMOTE LOGGER – IRIDIUM SHORT BURST DATA

![](_page_15_Picture_1.jpeg)

![](_page_15_Picture_2.jpeg)

#### MODEL B-MI

![](_page_15_Picture_4.jpeg)

The 3004MI Neon Remote Logger Iridium SBD is a Neon Remote Logger in the 3004M range which has a smaller form factor than the standard metal enclosure 3004. It is housed in a polycarbonate case and utilises the high reliability Iridium satellite network short burst data subsystem. It is a high reliability message based system, providing reasonable cost satellite communications and a low latency. This service is ideal if you have a requirement for short messages to report sensor data. Latency from such systems is in the order of minutes and the satellite airtime costs reflect this low latency service.

The 3004MI Neon Remote Logger Iridium SBD connects to sensors in the field, collects readings from those sensors, logs the sensor data, provides some local control functions and also transmits the collected data to a central Neon server via a low earth orbit satellite network.

The 3004MI Neon Remote Logger Iridium SBD is programmed in the field with a Unidata standard program called a scheme. The scheme specifies how often and for how long the datalogger should collect data from the sensors and how often the data should be sent to the Neon server. Control outputs are also set up in the scheme by setting up custom events to operate on a local basis. A wide range of sensor types are supported, for example, analog; including 4-20mA sensors, frequency counters, digital inputs as well as Modbus and SDI-12.

Control of external equipment (such as triggering a relay when a user defined event occurs, or initiating a shutdown), can be accomplished via Open Drain FET output.

Sensors are connected to the logger via pluggable terminal blocks, allowing for easy removal of the logger if servicing is required.

PHYSICAL SPECIFICATIONS		
MATERIAL:	Polycarbonate	
SIZE:	L190mm x W80mm x H55mm	
WEIGHT:	300g	
OPERATING TEMPERATURE:	-20° to +60°C. Not affected by humidity	
ANTENNAE:	External Dome Antenna	
ELECTRICAL SPECIFICATIONS		
EXTERNAL POWER:	9 to 30V DC	
CURRENT DRAW:	50µA Standby	
INTERNAL POWER:	3.6 Volt Lithium D Cell optional	
INSTRUMENT POWER:	5V, 12V or 18V regulated, 80mA (user selectable)	
INSTRUMENT REFERENCE VOLTAGE:	5V 10mA Max	
ANALOG CHANNELS:	4 Single ended (0-5V DC) with 24 bit resolution	
MODBUS:	1 x Modbus RS485 RTU protocol, 57600 baud max	

SDI-12:	1 x SDI V1.3 Compliant, instrument mode
UNIDATA HSIO:	High speed serial interface
COUNTERS: 4	16 bit, DC to 3kHz potential free contacts or 0 to 5V DC digital input (C0, C2); 16 bit, DC to 300Hz potential free contacts or 0 to 5V DC digital input (C1, C3)
DIGITAL OUTPUTS:	1 Open Drain FET, 30V DC, 250mA max
CONFIGURATION PORT:	USB Port
OPERATING FREQUENCIES:	1.5 GHz
SCAN RATE:	Programmable from 1 second to 5 minutes
LOG RATE:	Programmable from 1 second to 24 hours
ACCELEROMETER:	Senses changes in logger orientation
LCD DISPLAY:	Optional, 320 x 240, Colour, Resistive Touch Panel
KEYPAD:	Optional, 5 button membrane keypad

![](_page_15_Picture_14.jpeg)

## **3004M IP68** NEON REMOTE LOGGER – IP68

### **IP68**

neøn

### MODEL B IP68

![](_page_16_Picture_3.jpeg)

Any Neon Remote Logger from 3004M range can be housed in an aluminium IP68 rated enclosure.

When high standard water protection is required, Unidata M series Neon Remote Loggers can be housed in a rugged die cast IP68 rated aluminium enclosure. Selected enclosure satisfies the requirements of IEC60529 IP68 conditions - being submerged under more than 1m of water for 24 hours without any water ingress. Enclosure is powder coated for extra corrosion protection and equipped with a circular 8 way IP68 stainless steel connector. Matching IP68 stainless steel connector is either assembled onto sensor, if available, or provided for customer to use.

PHYSICAL SPECIFICATIONS		
MATERIAL:	Aluminium Alloy	
SIZE:	L210mm x W80mm x H60mm	
WEIGHT:	635g	
OPERATING TEMPERATURE:	-20° to +60°C. Not affected by humidity	
ANTENNAE:	Dependent on a model chosen	
<b>ELECTRICAL SPECIFICA</b>	TIONS	
EXTERNAL POWER:	9 to 30V DC	
CURRENT DRAW:	50µA Standby	
INTERNAL POWER:	3.6 Volt Lithium D Cell optional	
INSTRUMENT POWER:	5V, 12V or 18V regulated, 80mA (user selectable)	
INSTRUMENT REFERENCE VOLTAGE:	5V 10mA Max	
ANALOG CHANNELS:	4 Single ended (0-5V DC) with 24 bit resolution	
MODBUS:	1 x Modbus RS485 RTU protocol, 57600 baud max	
SDI-12:	1 x SDI V1.3 Compliant, instrument mode	

UNIDATA HSIO:	High speed serial interface
COUNTERS: 4	16 bit, DC to 3kHz potential free contacts or 0 to 5V DC digital input (C0, C2);
	16 bit, DC to 300Hz potential free contacts or 0 to 5V DC digital input (C1, C3)
DIGITAL OUTPUTS:	1 Open Drain FET, 30V DC, 250mA max
CONFIGURATION PORT:	USB Port
OPERATING FREQUENCIES:	Dependent on a model chosen
SCAN RATE:	Programmable from 1 second to 5 minutes
LOG RATE:	Programmable from 1 second to 24 hours
ACCELEROMETER:	Senses changes in logger orientation
IP RATING:	IP68
NEMA RATING:	4, 4X, 6, 6P, 12, 13
LCD DISPLAY:	Optional, 320 x 240, Colour, Resistive Touch Panel
KEYPAD:	Optional, 5 button membrane keypad

![](_page_17_Picture_0.jpeg)

### NEON SYSTEM OVERVIEW

The Neon system collects measurements from Neon Remote Loggers (NRL) connected to field instruments and sensors and transmits these measurements to a central Neon Web based system for data storage, analysis, data presentation, graphical analysis and reporting and data transfer to other external systems.

The Neon system also provides facilities for remote management of Neon remote loggers via the Neon Web interface to allow for remote reconfiguration, sensor input changes and local program changes thereby minimising trips to site and reducing cost.

The communication protocol between Neon remote loggers and the central Neon Server is Internet Protocol / TCPIP and LoRa LPWAN technology protocol.

The communications method between Neon remote loggers and the central Neon Server can be any method which utilises TCPIP, and we support Cell Phone. Wi Fi, Direct Ethernet, Inmarsat BGAN M2M Satellite, Globalstar Satellite, Iridium Satellite and LoRa LPWAN across public and private networks.

The Starlog V4 software is a desktop application which assists with the setup of Neon remote logger configuration. This software allows for a point and click setup of Neon remote logger internal programs, called schemes. Schemes are downloaded to the loggers via a serial interface direct to the logger or uploaded to the Neon Web interface to be downloaded to a logger in the field via the Neon network.

The Neon system is offered to customers based on two options:

- A customer owned server model, where the customer purchases a Neon Application Software licence from Unidata and runs that software on their own servers, or
- A hosted application service model where Unidata provides access to run the system on Unidata secure servers on a fee for service basis.

There are a range of different Neon remote loggers available. While the models may be different, and the interfaces available in various models are different, the basic operation of all Neon remote loggers is the same.

#### **TYPICAL NEON MEASUREMENT SYSTEM:**

![](_page_17_Figure_12.jpeg)

![](_page_17_Figure_13.jpeg)

The figure above is an example of a Neon installation showing an NRL connected to a Modbus sensor.

![](_page_17_Picture_16.jpeg)

![](_page_18_Picture_0.jpeg)

Every day the NRL will send, via the Inmarsat satellite network, to the Neon server a "packet" of information containing the data in raw format. The Neon Server then extracts the raw data from the packet. The data is then stored on a secure server until the client accesses the data using a standard Web Browser.

The Neon Server receives, processes, displays, stores and reports collected data in many ways. On top of that The Neon Server also can issue control commands based on pre-set algorithms and issue alarms and notifications via several mediums.

Alarm set points can be set up on the NRL units as well as the Neon Server further alarm notifications can be sent via several methods including email and SMS text messages. Alarm triggers can initiate physical actions in the field such as turning pumps on and off or activating other control functions based on the internal program within the NRL.

The Neon system has fully bi-directional communications between the NRL and the Neon Server. This allows for remote diagnosis, remote programming and remote firmware updating for operation of the remote equipment and thereby reducing costly site visits.

NRL units can be configured to read sensors, log data internally to local memory and push data to the central Neon server at user settable intervals such as once a minute, every few minutes, every hour, or once a day. Data can be viewed on the Neon Web interface in near real time from any browser and the comprehensive reporting engine within Neon allows for reporting out to other systems using email, ftp, and web services, either dynamically, every minute, or on a daily, monthly, quarterly or annual basis. It contains two discrete sections:

 A LOGGER section where the terminal connects to the field transducers and the logging scheme, scan rates and diagnostics are managed.

The StarlogV4 support software allows a user to generate a logger program (called a scheme) which defines transducer information, logging scan rates, logger interval etc. and various engineering unit definitions. These files are called, for example the LDR and KBD files.

4. A COMMUNICATOR section which deals with communications to the server. This section contains, for example, a scheduler component and the modem component, either a Cellular Network modem or a Satellite Network modem. The communicator manages functions such as the reporting interval, the number of communications attempts per communications session, etc. The StarlogV4 support software allows a user to generate a configuration file for the Communicator section, called an FPO file in which the user sets the required communication parameters.

NEON REMOTE LOGGER COMMUNICATOR LOGGER DIAGNOSTICS LOG SCAN SCHEDULER SCHEME INTERPRETER PROCESS **UDP/IP COMMS** SIGNALS SCHEME HARDWARF MODEM ANALOGUE I/O DIGITAL I/O HSIO **SDI-12 RS232 INTERFACE** MODBUS

The NRL Internal architecture is shown below.

### **2013** NEON METERING MODULE 2G/3G/4G/LTE

![](_page_19_Picture_1.jpeg)

![](_page_19_Picture_2.jpeg)

The 2013 Neon Metering Module NMM is small self-contained data logger/rtu in a compact case which connects to sensors in the field, collects readings from those sensors and transmits the collected data to a central Neon server. The model number suffix indicates data transmission via a cellular 2G/3G network or via a cellular 4G/LTE network.

All Neon data logger/ rtu units routinely collect and log sensor data and periodically connect to a central Neon comms and web server via an IP network using a push data model to upload the logged data. The central Neon server can be cloud hosted, virtual or physical. The Neon server is offered as a Neon data hosted service using a Unidata Neon server for a monthly fee or customers can purchase Neon server license and run the Neon software on their own server.

The Neon system receives, processes, displays, stores and reports collected data in many ways. The Neon system also can issue control commands based on pre- set algorithms and issue alarms and notifications via several mediums. Alarm set points can be set up on the Neon data logger/ rtu units as well as the Neon central server and alarm notifications can be sent via several methods including email and sms text messages. Alarm triggers can initiate physical actions in the field such as turning pumps on and off or activating other control functions based on the internal program within the Neon data logger/ rtu.

The Neon system has fully bi directional communications between the Neon data logger/ rtu units and the central Neon server. This allows for remote diagnosis, remote programming and remote firmware updating for operation of the remote equipment and thereby reducing costly site visits. Neon data logger/ rtu units can be configured to read sensors, log data internally to local memory and push data to the central Neon server at user settable intervals such as once a minute, every few minutes, every hour, once a day. Data to be viewed on the Neon Web server in near real time from any browser and can be reported to other systems using email, ftp, and web services.

### SPECIFICATIONS

**MODEL F** 

PHYSICAL SPECIFICATIONS	MODBUS:	Optional RS485 RTU Protocol, 19200 baud max, Functions	
MATERIAL: Polycarbonate Enclosure		01, 02, 03, 04, 05/15, 06/16	
SIZE: 165mm x 85mm x 56mm (LxWxH)		4 x analog inputs – 12 bit resolution	
WEIGHT: 350 grams (including battery)		3 x counter input – 16 bit/skH2, 3–35 DC signal (included) 3 x counter inputs 8 bit/300Hz, 3–55 DC signal (option) 1 x open collector output, 250mA maximum 1 x HSIO (16 x 16 bit bi-directional, synchronous data) channel	
OPERATING TEMPERATURE: -30°C to 60°C. Not affected by humidity	I/O:		
MODEM: Sierra MC8548Q (3G) or HL7549 (4G)		1 x RS232C port / private leased line port	
Internal stub SMA antenna, optional external whip SMA	INTEGRATED LOG	GER SPECIFICATIONS	
antenna and external antenna port	STORAGE	30kB/15,000 readings – non-volatile flash memory	
ELECTRICAL SPECIFICATIONS	MEMORY:		
BATTERY: 3.6V 13Ah lithium (non-rechargeable)	MEMORY	8MB/4.000.000 readings – non-volatile flash memory	
BATTERY LIFE: up to 5 years (based on daily schedule)	EXPANSION:		
EXTERNAL POWER: 6V to 24V DC input available if required	SCAN RATE:	Programmable from 1 second to 5 minutes	
	LOG RATE:	Programmable from 1 second to 24 hours	
POWER: 5V unregulated supply (5mA max) plus 2.5V ref (5mA max)	) TIME CLOCK:	Crystal regulated, +/- 10 seconds/month – automatically	
SDI-12V 1.3 recorder (1200 baud smart instrument		network synchronised	
channel)	CPU:	16 Bit, Ultra Low Power	

![](_page_19_Picture_9.jpeg)

### 2013 NEON REMOTE MODULE 2G/3G/4G/LTE

![](_page_20_Picture_1.jpeg)

#### MODEL F

![](_page_20_Figure_3.jpeg)

The 2013 Neon Remote Module NRM is small self-contained data logger/rtu in a compact case which connects to sensors in the field, collects readings from those sensors and transmits the collected data to a central Neon server. The model number suffix indicates data transmission via a cellular 2G/3G network or via a cellular 4G/LTE network. The NRM also incorporates an LCD status display with operating buttons.

All Neon data logger/ rtu units routinely collect and log sensor data and periodically connect to a central Neon comms and web server via an IP network using a push data model to upload the logged data. The central Neon server can be cloud hosted, virtual or physical. The Neon server is offered as a Neon data hosted service using a Unidata Neon server for a monthly fee or customers can purchase Neon server license and run the Neon software on their own server.

The Neon system receives, processes, displays, stores and reports collected data in many ways. The Neon system also can issue control commands based on pre- set algorithms and issue alarms and notifications via several mediums. Alarm set points can be set up on the Neon data logger/ rtu units as well as the Neon central server and alarm notifications can be sent via several methods including email and sms text messages. Alarm triggers can initiate physical actions in the field such as turning pumps on and off or activating other control functions based on the internal program within the Neon data logger/ rtu.

The Neon system has fully bi directional communications between the Neon data logger/ rtu units and the central Neon server. This allows for remote diagnosis, remote programming and remote firmware updating for operation of the remote equipment and thereby reducing costly site visits. Neon data logger/ rtu units can be configured to read sensors, log data internally to local memory and push data to the central Neon server at user settable intervals such as once a minute, every few minutes, every hour, once a day. Data to be viewed on the Neon Web server in near real time from any browser and can be reported to other systems using email, ftp, and web services.

PHYSICAL SPECIFICATIONS		
MATERIAL:	Polycarbonate Enclosure	
SIZE:	165mm x 85mm x 56mm (LxWxH)	
WEIGHT:	350 grams (including battery)	
OPERATING TEMPERATURE:	-30°C to 60°C. Not affected by humidity	
MODEM:	Sierra MC8548Q (3G) or HL7549 (4G)	
ANTENNAE:	Internal stub SMA antenna, optional external whip SMA antenna and external antenna port	
ELECTRICAL SPECIFICATIONS		
BATTERY:	3.6V 13Ah lithium (non-rechargeable)	
BATTERY LIFE:	up to 5 years (based on daily schedule)	
EXTERNAL POWER:	6V to 24V DC input available if required	
INSTRUMENT POWER:	5V unregulated supply (5mA max) plus 2.5V ref (5mA max)	
SDI-12:	SDI-12V 1.3 recorder (1200 baud smart instrument channel)	

MODBUS:	Optional RS485 RTU Protocol, 19200 baud max, Functions 01, 02, 03, 04, 05/15, 06/16	
LCD:	Supertwist (STN), yellow-green. No backlight	
I/O:	4 x analog inputs – 12 bit resolution 1 x counter input – 16 bit/3kHz, 3–5V DC signal (included) 3 x counter inputs 8 bit/300Hz, 3–5V DC signal (option) 1 x open collector output, 250mA maximum 1 x HSIO (16 x 16 bit bi-directional, synchronous data) channel 1 x RS232C port / private leased line port	
INTEGRATED LOGGER SPECIFICATIONS		
STORAGE MEMORY:	30kB/15,000 readings – non-volatile flash memory	
MEMORY EXPANSION:	8MB/4,000,000 readings – non-volatile flash memory	
SCAN RATE:	Programmable from 1 second to 5 minutes	
LOG RATE:	Programmable from 1 second to 24 hours	
TIME CLOCK:	Crystal regulated, +/- 10 seconds/month – automatically network synchronised	
CPU:	16 Bit, Ultra Low Power	

### **2015** NEON REMOTE TERMINAL GLOBALSTAR SATELLITE

![](_page_21_Figure_1.jpeg)

#### MODEL F

The 2015 Neon Remote Terminal NRT is self-contained data logger/rtu in a compact aluminium case which connects to sensors in the field, collects readings from those sensors and transmits the collected data to a central Neon server via a Globalstar LEO Satellite network from any location within the satellite network coverage area.

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All Neon data logger/ rtu units routinely collect and log sensor data and periodically connect to a central Neon comms and web server via an IP network using a push data model to upload the logged data. The central Neon server can be cloud hosted, virtual or physical. The Neon server is offered as a Neon data hosted service using a Unidata Neon server for a monthly fee or customers can purchase Neon server license and run the Neon software on their own server.

The Neon system receives, processes, displays, stores and reports collected data in many ways. The Neon system also can issue control commands based on pre- set algorithms and issue alarms and notifications via several mediums. Alarm set points can be set up on the Neon data logger/ rtu units as well as the Neon central server and alarm notifications can be sent via several methods including email and sms text messages. Alarm triggers

can initiate physical actions in the field such as turning pumps on and off or activating other control functions based on the internal program within the Neon data logger/ rtu.

The Neon system has fully bi directional communications between the Neon data logger/ rtu units and the central Neon server. This allows for remote diagnosis, remote programming and remote firmware updating for operation of the remote equipment and thereby reducing costly site visits. Neon data logger/ rtu units can be configured to read sensors, log data internally to local memory and push data to the central Neon server at user settable intervals such as once a minute, every few minutes, every hour, once a day. Data to be viewed on the Neon Web server in near real time from any browser and can be reported to other systems using email, ftp, and web services.

#### SPECIFICATIONS

PHYSICAL SPECIFIC	PHYSICAL SPECIFICATIONS	
MATERIAL:	Powder Coated Aluminium Enclosure	
SIZE:	200mm x 112mm x 50mm (LxWxH)	
WEIGHT:	850 grams (including three batteries)	
OPERATING TEMPERATURE:	-20°C to 60°C. Not affected by humidity	
MODEM:	Globalstar Satellite Modem Qualcomm GSP1720	
ANTENNAE:	External Flat Fixed Mount Globalstar Antenna with optional 1m, 2m and 3m Cables	
ELECTRICAL SPECIFICATIONS		
BATTERY:	3 x 3.6V 13Ah lithium (non-rechargeable) batteries	
BATTERY LIFE:	up to 5 years (based on daily schedule)	
EXTERNAL POWER:	10.5V to 24V DC input available if required	
INSTRUMENT POWER:	5V unregulated supply (5mA max) plus 2.5V ref (5mA max)	
SDI-12:	SDI-12V 1.3 recorder (1200 baud smart instrument	

MODBUS:	Optional RS485 RTU Protocol, 19200 baud max, Functions 01, 02, 03, 04, 05/15, 06/16	
I/O:	4 x analog inputs – 12 bit resolution 1 x counter input – 16 bit/3kHz, 3–5V DC signal (included) 3 x counter inputs 8 bit/300Hz, 3–5V DC signal (option) 1 x open collector output, 250mA maximum 1 x HSIO (16 x 16 bit bi-directional, synchronous data) channel 1 x RS232C port / private leased line port	
INTEGRATED LOGGER SPECIFICATIONS		
STORAGE MEMORY:	30kB/15,000 readings – non-volatile flash memory	
MEMORY EXPANSION:	8MB/4,000,000 readings – non-volatile flash memory	
SCAN RATE:	Programmable from 1 second to 5 minutes	
LOG RATE:	Programmable from 1 second to 24 hours	
TIME CLOCK:	Crystal regulated, +/- 10 seconds/month – automatically network synchronised	
CPU:	16 Bit, Ultra Low Power	

Unidata Product Catalogue 2018

### **2016** NEON REMOTE TERMINAL 2G/3G/4G/LTE

![](_page_22_Picture_1.jpeg)

#### **MODEL F**

![](_page_22_Picture_3.jpeg)

The 2016 Neon Remote Terminal NRT is small self-contained data logger/rtu in a compact case which connects to sensors in the field, collects readings from those sensors and transmits the collected data to a central Neon server. The model number suffix indicates data transmission via a cellular 2G/3G network or via a cellular 4G/LTE network.

All Neon data logger/ rtu units routinely collect and log sensor data and periodically connect to a central Neon comms and web server via an IP network using a push data model to upload the logged data. The central Neon server can be cloud hosted, virtual or physical. The Neon server is offered as a Neon data hosted service using a Unidata Neon server for a monthly fee or customers can purchase Neon server license and run the Neon software on their own server.

The Neon system receives, processes, displays, stores and reports collected data in many ways. The Neon system also can issue control commands based on pre- set algorithms and issue alarms and notifications via several mediums. Alarm set points can be set up on the Neon data logger/ rtu units as well as the Neon central server and alarm notifications can be sent via several methods including email and sms text messages. Alarm triggers

can initiate physical actions in the field such as turning pumps on and off or activating other control functions based on the internal program within the Neon data logger/ rtu.

The Neon system has fully bi directional communications between the Neon data logger/ rtu units and the central Neon server. This allows for remote diagnosis, remote programming and remote firmware updating for operation of the remote equipment and thereby reducing costly site visits. Neon data logger/ rtu units can be configured to read sensors, log data internally to local memory and push data to the central Neon server at user settable intervals such as once a minute, every few minutes, every hour, once a day. Data to be viewed on the Neon Web server in near real time from any browser and can be reported to other systems using email, ftp, and web services.

PHYSICAL SPECIFICATIONS		
Powder Coated Aluminium Enclosure		
103mm x 70mm x 83mm (LxWxH)		
400 grams (including battery)		
-20°C to 60°C. Not affected by humidity		
Sierra MC8548Q (3G) or HL7549 (4G)		
stub SMA antenna, optional whip SMA antenna		
ELECTRICAL SPECIFICATIONS		
3.6V 13Ah lithium (non-rechargeable)		
up to 5 years (based on daily schedule)		
6V to 24V DC input available if required		
5V unregulated supply (5mA max) plus 2.5V ref (5mA max)		
SDI-12V 1.3 recorder (1200 baud smart instrument channel)		

MODBUS:	Optional RS485 RTU Protocol, 19200 baud max, Functions 01, 02, 03, 04, 05/15, 06/16	
1/0:	4 x analog inputs – 12 bit resolution 1 x counter input – 16 bit/3kHz, 3–5V DC signal (included) 3 x counter inputs 8 bit/300Hz, 3–5V DC signal (option) 1 x open collector output, 250mA maximum 1 x HSIO (16 x 16 bit bi-directional, synchronous data) channel 1 x RS232C port / private leased line port	
INTEGRATED LOGGER SPECIFICATIONS		
STORAGE MEMORY:	30kB/15,000 readings – non-volatile flash memory	
MEMORY EXPANSION:	8MB/4,000,000 readings – non-volatile flash memory	
SCAN RATE:	Programmable from 1 second to 5 minutes	
LOG RATE:	Programmable from 1 second to 24 hours	
TIME CLOCK:	Crystal regulated, +/- 10 seconds/month – automatically network synchronised	
CPU:	16 Bit, Ultra Low Power	

### **2017** NEON REMOTE TERMINAL ETHERNET

![](_page_23_Figure_1.jpeg)

**MODEL F** 

![](_page_23_Picture_3.jpeg)

The 2017 Neon Remote Terminal NRT is self-contained data logger/rtu in a compact aluminium case which connects to sensors in the field, collects readings from those sensors and transmits the collected data, as TCP/IP packets to a central Neon server via a standard Ethernet network.

All Neon data logger/ rtu units routinely collect and log sensor data and periodically connect to a central Neon comms and web server via an IP network using a push data model to upload the logged data. The central Neon server can be cloud hosted, virtual or physical. The Neon server is offered as a Neon data hosted service using a Unidata Neon server for a monthly fee or customers can purchase Neon server license and run the Neon software on their own server.

The Neon system receives, processes, displays, stores and reports collected data in many ways. The Neon system also can issue control commands based on pre- set algorithms and issue alarms and notifications via several mediums. Alarm set points can be set up on the Neon data logger/ rtu units as well as the Neon central server and alarm notifications can be sent via several methods including email and sms text messages. Alarm triggers

can initiate physical actions in the field such as turning pumps on and off or activating other control functions based on the internal program within the Neon data logger/ rtu.

The Neon system has fully bi directional communications between the Neon data logger/ rtu units and the central Neon server. This allows for remote diagnosis, remote programming and remote firmware updating for operation of the remote equipment and thereby reducing costly site visits. Neon data logger/ rtu units can be configured to read sensors, log data internally to local memory and push data to the central Neon server at user settable intervals such as once a minute, every few minutes, every hour, once a day. Data to be viewed on the Neon Web server in near real time from any browser and can be reported to other systems using email, ftp, and web services.

PHYSICAL SPECIFIC	PHYSICAL SPECIFICATIONS	
MATERIAL:	Powder Coated Aluminium Enclosure	
SIZE:	200mm x 112mm x 50mm (LxWxH)	
WEIGHT:	850 grams (including three batteries)	
OPERATING TEMPERATURE:	-20°C to 60°C. Not affected by humidity	
ELECTRICAL SPECIFICATIONS		
BATTERY:	3 x 3.6V 13Ah lithium (non-rechargeable) batteries	
BATTERY LIFE:	up to 5 years (based on daily schedule)	
EXTERNAL POWER:	10.5V to 24V DC input available if required	
INSTRUMENT POWER:	5V unregulated supply (5mA max) plus 2.5V ref (5mA max)	
SDI-12:	SDI-12V 1.3 recorder (1200 baud smart instrument channel)	
MODBUS:	Optional RS485 RTU Protocol, 19200 baud max, Functions 01, 02, 03, 04, 05/15, 06/16	

ETHERNET	Optional 1 or 3 standard Ethernet ports	
I/O:	4 x analog inputs – 12 bit resolution 1 x counter input – 16 bit/3kHz, 3–5V DC signal (included) 3 x counter inputs 8 bit/300Hz, 3–5V DC signal (option) 1 x open collector output, 250mA maximum 1 x HSIO (16 x 16 bit bi-directional, synchronous data) channel 1 x RS232C port / private leased line port	
INTEGRATED LOGGER SPECIFICATIONS		
STORAGE MEMORY:	30kB/15,000 readings – non-volatile flash memory	
MEMORY EXPANSION:	8MB/4,000,000 readings – non-volatile flash memory	
SCAN RATE:	Programmable from 1 second to 5 minutes	
LOG RATE:	Programmable from 1 second to 24 hours	
TIME CLOCK:	Crystal regulated, +/- 10 seconds/month – automatically network synchronised	
CPU:	16 Bit, Ultra Low Power	

![](_page_23_Picture_12.jpeg)

### **2018** NEON REMOTE TERMINAL INMARSAT BGAN M2M SATELLITE

![](_page_24_Picture_1.jpeg)

![](_page_24_Picture_2.jpeg)

The 2018 Neon Remote Terminal NRT is self-contained data logger/rtu in a compact aluminium case which connects to sensors in the field, collects readings from those sensors, and transmits the collected data, as TCP/IP packets to a central Neon server via an Inmarsat Satellite Network.

All Neon data logger/ rtu units routinely collect and log sensor data and periodically connect to a central Neon comms and web server via an IP network using a push data model to upload the logged data. The central Neon server can be cloud hosted, virtual or physical. The Neon server is offered as a Neon data hosted service using a Unidata Neon server for a monthly fee or customers can purchase Neon server license and run the Neon software on their own server.

The Neon system receives, processes, displays, stores and reports collected data in many ways. The Neon system also can issue control commands based on pre- set algorithms and issue alarms and notifications via several mediums. Alarm set points can be set up on the Neon data logger/ rtu units as well as the Neon central server and alarm notifications can be sent via several methods including email and sms text messages. Alarm triggers can initiate physical

actions in the field such as turning pumps on and off or activating other control functions based on the internal program within the Neon data logger/rtu.

The Neon system has fully bi directional communications between the Neon data logger/ rtu units and the central Neon server. This allows for remote diagnosis, remote programming and remote firmware updating for operation of the remote equipment and thereby reducing costly site visits. Neon data logger/ rtu can be configured to read sensors, log data internally to local memory and push data to the central Neon server. Data push can be driven by an event (event mode) or at user settable intervals such as once a minute, every few minutes, every hour, once a day. Built-in watch-dog timer assists data logger to self-recover and reconnect on transmission failure. Transmitted data can be rieported to other systems using email, ftp or web services.

### SPECIFICATIONS

**MODEL F** 

PHYSICAL SPECIFICATIONS		
MATERIAL:	Powder Coated Aluminium Enclosure	
SIZE:	200mm x 112mm x 50mm (LxWxH)	
WEIGHT:	850 grams (including three batteries)	
OPERATING TEMPERATURE:	-20°C to 60°C. Not affected by humidity	
MODEM:	Inmarsat Satellite Modem 9502 BGAN M2M	
ANTENNAE:	External Flat Fixed Mount Inmarsat BGAN M2M Antenna with 10m of Cable	
ELECTRICAL SPECIFICATIONS		
BATTERY:	3 x 3.6V 13Ah lithium (non-rechargeable) batteries	
BATTERY LIFE:	up to 5 years (based on daily schedule)	
EXTERNAL POWER:	10.5V to 24V DC input available if required	
INSTRUMENT POWER:	5V unregulated supply (5mA max) plus 2.5V ref (5mA max)	
SDI-12:	SDI-12V 1.3 recorder (1200 baud smart instrument channel)	

MODBUS:	Optional RS485 RTU Protocol, 19200 baud max, Functions 01, 02, 03, 04, 05/15, 06/16	
ETHERNET	Optional 1 or 3 standard Ethernet ports	
I/O:	4 x analog inputs – 12 bit resolution 1 x counter input – 16 bit/3kHz, 3–5V DC signal (included) 3 x counter inputs 8 bit/300Hz, 3–5V DC signal (option) 1 x open collector output, 250mA maximum 1 x HSIO (16 x 16 bit bi-directional, synchronous data) channel 1 x RS232C port / private leased line port	
INTEGRATED LOGGER SPECIFICATIONS		
STORAGE MEMORY:	30kB/15,000 readings – non-volatile flash memory	
MEMORY EXPANSION:	8MB/4,000,000 readings – non-volatile flash memory	
SCAN RATE:	Programmable from 1 second to 5 minutes	
LOG RATE:	Programmable from 1 second to 24 hours	
TIME CLOCK:	Crystal regulated, +/- 10 seconds/month – automatically network synchronised	
CPU	16 Rit Illtra Low Power	

### **2019** NEON REMOTE TERMINAL ETHERNET WI-FI

neøn

![](_page_25_Picture_2.jpeg)

![](_page_25_Picture_3.jpeg)

The 2019 Neon Remote Terminal NRT is self-contained data logger/rtu in a compact aluminium case which connects to sensors in the field, collects readings from those sensors and transmits the collected data, as TCP/IP packets to a central Neon server via a Wi-Fi network.

All Neon data logger/ rtu units routinely collect and log sensor data and periodically connect to a central Neon comms and web server via an IP network using a push data model to upload the logged data. The central Neon server can be cloud hosted, virtual or physical. The Neon server is offered as a Neon data hosted service using a Unidata Neon server for a monthly fee or customers can purchase Neon server license and run the Neon software on their own server.

The Neon system receives, processes, displays, stores and reports collected data in many ways. The Neon system also can issue control commands based on pre- set algorithms and issue alarms and notifications via several mediums. Alarm set points can be set up on the Neon data logger/ rtu units as well as the Neon central server and alarm notifications can be sent via several methods including email and sms text messages. Alarm triggers

can initiate physical actions in the field such as turning pumps on and off or activating other control functions based on the internal program within the Neon data logger/ rtu.

The Neon system has fully bi directional communications between the Neon data logger/ rtu units and the central Neon server. This allows for remote diagnosis, remote programming and remote firmware updating for operation of the remote equipment and thereby reducing costly site visits. Neon data logger/ rtu units can be configured to read sensors, log data internally to local memory and push data to the central Neon server at user settable intervals such as once a minute, every few minutes, every hour, once a day. Data to be viewed on the Neon Web server in near real time from any browser and can be reported to other systems using email, ftp, and web services.

PHYSICAL SPECIFICATIONS	
MATERIAL:	Powder Coated Aluminium Enclosure
SIZE:	200mm x 112mm x 50mm (LxWxH)
WEIGHT:	850 grams (including three batteries)
OPERATING TEMPERATURE:	-20°C to 60°C. Not affected by humidity
ELECTRICAL SPECIFICATIONS	
BATTERY:	3 x 3.6V 13Ah lithium (non-rechargeable) batteries
BATTERY LIFE:	up to 5 years (based on daily schedule)
EXTERNAL POWER:	10.5V to 24V DC input available if required
INSTRUMENT POWER:	5V unregulated supply (5mA max) plus 2.5V ref (5mA max)
SDI-12:	SDI-12V 1.3 recorder (1200 baud smart instrument channel)
MODBUS:	Optional RS485 RTU Protocol, 19200 baud max, Functions 01, 02, 03, 04, 05/15, 06/16

ETHERNET	1 or 3 standard Ethernet ports	
I/O:	4 x analog inputs – 12 bit resolution 1 x counter input – 16 bit/3kHz, 3–5V DC signal (included) 3 x counter inputs 8 bit/300Hz, 3–5V DC signal (option) 1 x open collector output, 250mA maximum 1 x HSIO (16 x 16 bit bi-directional, synchronous data) channel 1 x RS232C port / private leased line port	
INTEGRATED LOGGER SPECIFICATIONS		
STORAGE MEMORY:	30kB/15,000 readings – non-volatile flash memory	
MEMORY EXPANSION:	8MB/4,000,000 readings – non-volatile flash memory	
SCAN RATE:	Programmable from 1 second to 5 minutes	
LOG RATE:	Programmable from 1 second to 24 hours	
TIME CLOCK:	Crystal regulated, +/- 10 seconds/month – automatically network synchronised	
CPU:	16 Bit, Ultra Low Power	

![](_page_25_Picture_12.jpeg)

### **2020** NEON REMOTE TERMINAL ETHERNET, USB AND 3G/4G

![](_page_26_Picture_1.jpeg)

#### **MODEL F**

![](_page_26_Picture_3.jpeg)

The 2020 Neon Remote Terminal NRT is self-contained data logger/rtu in a compact aluminium case which connects to sensors in the field, collects readings from those sensors and transmits the collected data to a central Neon server via a cellular 3G/4G network. USB and Ethernet ports provide support for additional optional accessories like IP camera.

All Neon data logger/ rtu units routinely collect and log sensor data and periodically connect to a central Neon comms and web server via an IP network using a push data model to upload the logged data. The central Neon server can be cloud hosted, virtual or physical. The Neon server is offered as a Neon data hosted service using a Unidata Neon server for a monthly fee or customers can purchase Neon server license and run the Neon software on their own server.

The Neon system receives, processes, displays, stores and reports collected data in many ways. The Neon system also can issue control commands based on pre- set algorithms and issue alarms and notifications via several mediums. Alarm set points can be set up on the Neon data logger/ rtu units as well as the Neon central server and alarm notifications can be sent via several methods including email and sms text messages. Alarm triggers

can initiate physical actions in the field such as turning pumps on and off or activating other control functions based on the internal program within the Neon data logger/ rtu.

The Neon system has fully bi directional communications between the Neon data logger/ rtu units and the central Neon server. This allows for remote diagnosis, remote programming and remote firmware updating for operation of the remote equipment and thereby reducing costly site visits. Neon data logger/ rtu units can be configured to read sensors, log data internally to local memory and push data to the central Neon server at user settable intervals such as once a minute, every few minutes, every hour, once a day. Data to be viewed on the Neon Web server in near real time from any browser and can be reported to other systems using email, ftp, and web services.

PHYSICAL SPECIFICATIONS		
MATERIAL:	Powder Coated Aluminium Enclosure	
SIZE:	200mm x 112mm x 50mm (LxWxH)	
WEIGHT:	850 grams (including three batteries)	
OPERATING TEMPERATURE:	-20°C to 60°C. Not affected by humidity	
MODEM:	Sierra HL7650 / Quectel EC21-AU	
ANTENNAE:	Stub SMA antenna, optional whip SMA antenna	
ELECTRICAL SPECIFICATIONS		
BATTERY:	3 x 3.6V 13Ah lithium (non-rechargeable) batteries	
BATTERY LIFE:	up to 5 years (based on daily schedule)	
EXTERNAL POWER:	10.5V to 24V DC input available if required	
INSTRUMENT POWER:	5V unregulated supply (5mA max) plus 2.5V ref (5mA max)	
SDI-12:	SDI-12V 1.3 recorder (1200 baud smart instrument channel)	
MODBUS:	Optional RS485 RTU Protocol, 19200 baud max, Functions 01, 02, 03, 04, 05/15, 06/16	

ETHERNET	1 standard Ethernet port			
1/0:	4 x analog inputs – 12 bit resolution 1 x counter input – 16 bit/3kHz, 3–5V DC signal (included) 3 x counter inputs 8 bit/300Hz, 3–5V DC signal (option) 1 x open collector output, 250mA maximum 1 x HSIO (16 x 16 bit bi-directional, synchronous data) channel 1 x RS232C port / private leased line port			
INTEGRATED LOGGE	R SPECIFICATIONS			
STORAGE MEMORY:	STORAGE 30kB/15,000 readings – non-volatile flash memory			
MEMORY EXPANSION:	8MB/4,000,000 readings – non-volatile flash memory			
SCAN RATE:	Programmable from 1 second to 5 minutes			
LOG RATE:	Programmable from 1 second to 24 hours			
TIME CLOCK:	Crystal regulated, +/- 10 seconds/month – automatically network synchronised			
CPU:	16 Bit, Ultra Low Power			

### **2021** NEON REMOTE TERMINAL ETHERNET AND USB

![](_page_27_Figure_1.jpeg)

MODEL F

![](_page_27_Picture_3.jpeg)

The 2021 Neon Remote Terminal NRT is self-contained data logger/rtu in a compact aluminium case which connects to sensors in the field, collects readings from those sensors and transmits the collected data, as TCP/IP packets to a central Neon server via a standard Ethernet network. Available USB port provides support for additional optional accessories.

All Neon data logger/ rtu units routinely collect and log sensor data and periodically connect to a central Neon comms and web server via an IP network using a push data model to upload the logged data. The central Neon server can be cloud hosted, virtual or physical. The Neon server is offered as a Neon data hosted service using a Unidata Neon server for a monthly fee or customers can purchase Neon server license and run the Neon software on their own server.

The Neon system receives, processes, displays, stores and reports collected data in many ways. The Neon system also can issue control commands based on pre- set algorithms and issue alarms and notifications via several mediums. Alarm set points can be set up on the Neon data logger/ rtu units as well as the Neon central server and alarm notifications can be sent via several methods including email and sms text messages. Alarm triggers

can initiate physical actions in the field such as turning pumps on and off or activating other control functions based on the internal program within the Neon data logger/ rtu.

The Neon system has fully bi directional communications between the Neon data logger/ rtu units and the central Neon server. This allows for remote diagnosis, remote programming and remote firmware updating for operation of the remote equipment and thereby reducing costly site visits. Neon data logger/ rtu units can be configured to read sensors, log data internally to local memory and push data to the central Neon server at user settable intervals such as once a minute, every few minutes, every hour, once a day. Data to be viewed on the Neon Web server in near real time from any browser and can be reported to other systems using email, ftp, and web services.

MATERIAL:	Powder Coated Aluminium Enclosure				
SIZE:	200mm x 112mm x 50mm (LxWxH)				
WEIGHT:	850 grams (including three batteries)				
OPERATING TEMPERATURE:	-20°C to 60°C. Not affected by humidity				
<b>ELECTRICAL SPECIFI</b>	ICATIONS				
BATTERY:	3 x 3.6V 13Ah lithium (non-rechargeable) batteries				
BATTERY LIFE:	up to 5 years (based on daily schedule)				
EXTERNAL POWER:	10.5V to 24V DC input available if required				
INSTRUMENT POWER:	5V unregulated supply (5mA max) plus 2.5V ref (5mA max)				
SDI-12:	SDI-12V 1.3 recorder (1200 baud smart instrument channel)				
MODBUS:	Optional RS485 RTU Protocol, 19200 baud max, Functions 01, 02, 03, 04, 05/15, 06/16				
ETHERNET	1 standard Ethernet port				

I/O:	4 x analog inputs – 12 bit resolution 1 x counter input – 16 bit/3kHz, 3–5V DC signal (included) 3 x counter inputs 8 bit/300Hz, 3–5V DC signal (option) 1 x open collector output, 250mA maximum 1 x HSIO (16 x 16 bit bi-directional, synchronous data) channel 1 x RS232C port / private leased line port		
INTEGRATED LOGGE	R SPECIFICATIONS		
STORAGE MEMORY:	30kB/15,000 readings – non-volatile flash memory		
MEMORY EXPANSION:	8MB/4,000,000 readings – non-volatile flash memory		
SCAN RATE:	Programmable from 1 second to 5 minutes		
LOG RATE:	Programmable from 1 second to 24 hours		
TIME CLOCK:	Crystal regulated, +/- 10 seconds/month – automatically network synchronised		
CPU:	16 Bit, Ultra Low Power		

![](_page_27_Picture_13.jpeg)

### **2022** NEON REMOTE TERMINAL INMARSAT BGAN M2M SATELLITE, USB AND 3G/4G

![](_page_28_Picture_1.jpeg)

MODEL F

![](_page_28_Picture_3.jpeg)

![](_page_28_Picture_4.jpeg)

The 2022 Neon Remote Terminal NRT is self-contained data logger/rtu in a compact aluminium case which connects to sensors in the field, collects readings from those sensors and transmits the collected data to a central Neon server using least cost routing between cellular 3G/4G network and Inmarsat Satellite Network. Available USB port provides support for additional optional accessories.

All Neon data logger/ rtu units routinely collect and log sensor data and periodically connect to a central Neon comms and web server via an IP network using a push data model to upload the logged data. The central Neon server can be cloud hosted, virtual or physical. The Neon server is offered as a Neon data hosted service using a Unidata Neon server for a monthly fee or customers can purchase Neon server license and run the Neon software on their own server.

The Neon system receives, processes, displays, stores and reports collected data in many ways. The Neon system also can issue control commands based on pre- set algorithms and issue alarms and notifications via several mediums. Alarm set points can be set up on the Neon data logger/ rtu units as well as the Neon central server and alarm notifications can be sent via several methods including email and sms text messages. Alarm triggers can initiate physical

actions in the field such as turning pumps on and off or activating other control functions based on the internal program within the Neon data logger/rtu.

The Neon system has fully bi directional communications between the Neon data logger/ rtu units and the central Neon server. This allows for remote diagnosis, remote programming and remote firmware updating for operation of the remote equipment and thereby reducing costly site visits. Neon data logger/ rtu can be configured to read sensors, log data internally to local memory and push data to the central Neon server. Data push can be driven by an event (event mode) or at user settable intervals such as once a minute, every few minutes, every hour, once a day. Built-in watch-dog timer assists data logger to self-recover and reconnect on transmission failure. Transmitted data can be reported to other systems using email, ftp or web services.

PHYSICAL SPECIFIC	ATIONS
MATERIAL:	Powder Coated Aluminium Enclosure
SIZE:	200mm x 112mm x 50mm (LxWxH)
WEIGHT:	850 grams (including three batteries)
OPERATING TEMPERATURE:	-20°C to 60°C. Not affected by humidity
MODEM 1:	Sierra HL7650 / Quectel EC21-AU
MODEM 2:	Inmarsat Satellite Modem 9502 BGAN M2M
ANTENNA 1:	Stub SMA antenna, optional whip SMA antenna
ANTENNA 2:	External Flat Fixed Mount Inmarsat BGAN M2M Antenna with 10m of Cable
ELECTRICAL SPECIFI	ICATIONS
BATTERY:	3 x 3.6V 13Ah lithium (non-rechargeable) batteries
BATTERY LIFE:	up to 5 years (based on daily schedule)
EXTERNAL POWER:	10.5V to 24V DC input available if required
INSTRUMENT POWER:	5V unregulated supply (5mA max) plus 2.5V ref (5mA max)
SDI-12:	SDI-12V 1.3 recorder (1200 baud smart instrument channel)

MODBUS: Optional RS485 RTU Protocol, 19200 baud max, Fu 01, 02, 03, 04, 05/15, 06/16				
ETHERNET	1 standard Ethernet port			
I/O:	4 x analog inputs – 12 bit resolution 1 x counter input – 16 bit/3kHz, 3–5V DC signal (included) 3 x counter inputs 8 bit/300Hz, 3–5V DC signal (option) 1 x open collector output, 250mA maximum 1 x HSIO (16 x 16 bit bi-directional, synchronous data) channel 1 x RS232C port / private leased line port			
INTEGRATED LOGGER SPECIFICATIONS				
STORAGE MEMORY:	30kB/15,000 readings – non-volatile flash memory			
MEMORY EXPANSION: 8MB/4,000,000 readings – non-volatile flash mem				
SCAN RATE:	Programmable from 1 second to 5 minutes			
LOG RATE:	Programmable from 1 second to 24 hours			
TIME CLOCK:	Crystal regulated, +/- 10 seconds/month – automatically network synchronised			
CPU:	16 Bit, Ultra Low Power			

![](_page_29_Picture_0.jpeg)

### MODBUS IMPLEMENTATION IN NEON

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 grown to a widely adopted de facto standard in the Industrial Measurement sector and is now the most common protocol for industrial measurement applications.

It is implemented in the NRT as a partial implementation of the full Modbus protocol.

The Unidata approach to this partial implementation is to provide only two NRT functions

- 1. Function 1 is to extract (get) data from specified registers within a Modbus RTU.
- 2. Function 2 is to place data (put) into a specified register within a Modbus RTU.

The specific register information and its corresponding encoding and decoding information required for interpretation is defined when the NRT logging scheme is created.

There are three ways that this register information can be set up using the NRT logger support software, Starlog V4:

- Generic Modbus Instrument scheme, typically for 25 Modbus Channels. The register entries appear as logger Registers on the Neon Server. New values type into the Neon Server Logger Register fields are transmitted to the logger when it next communicates with the Neon Server. Modbus Read and Writes are both supported.
- Large Modbus Builder schemes, typically for 250 Modbus Channels. Modbus writes are not supported at this time but the arbitrary number (hundreds) of Modbus data channels is supported.
- Modbus TCP Server, typically for 250 Modbus Channels. The Neon Server provides a Modbus TCP Server (Slave) interface that may be written to directly. Written Register values are transmitted to the logger when it next communicates with the Neon Server. Modbus Read and Writes are both supported.

#### NRT MODBUS IMPLEMENTATION

The NRT Modbus implementation follows the recommendations of the Modbus-IDA specifications (www.modbus.org) for the Basic Implementation of a Modbus Master.

#### SPECIFICATION AND IMPLEMENTATION GUIDE V1.02 20/12/ 2006 CHAPTER 5

Modbus Master - Basic Implementation		
RTU Transmission Mode		
Baud rate: 1200, 2400, 4800, 9600, 19200	(CDT adjustable)	
Parity: 8,n,1; 8,e,1; 8,o,1; 8,n,2	(CDT adjustable)	
No Line Termination provided		
No Line Polarisation/Biasing required (or prov	vided)	

The NRT Basic Modbus implementation will Read Coils, Discrete Inputs and Registers (Functions 01, 02, 03, 04) and Write Coils and Registers (Function codes 05/15, 06/16)

Request Timeout:	250 ms	(CDT adjustable)
Failed Request – number of retries:	3	(CDT adjustable)
Frame turnaround delay:	3.5 chars	(fixed in driver code)
Buffer size:	20 bytes	(fixed in Modbus code)
RS-485	3V	(meets specs, could be 5V)

![](_page_30_Picture_0.jpeg)

#### USING THE GENERIC MODBUS INSTRUMENT IN STARLOG V4

RTU Address = Address number of the RTU on the BUS (1..247) Note: Addr = 0 is the broadcast address and is supported by the NRT.

Various sampling interval methods are available:

Log Interval	Modbus registers are read at the scheme log interval
Fixed Interval	Modbus registers are read every "n" seconds
Continuous	Modbus registers are read at the scheme Scan interval
Manual	Modbus register reads are triggered by scheme Events

Refresh Rate (Fixed Interval only) is number of seconds before the next Scheme Log Interval.

This defines the number of seconds between each Modbus interrogation, so that the RTU readings can be collected and placed into the Logger Channels.

WARNING: The Refresh Rate must be modulo scan rate. i.e. if the scan rate is 5 secs then the Refresh Rate must be in units of 5 secs, otherwise NRT MODBUS will not activate.

New Modbus registers are added to the scheme using the "Add" button.

Scheme memory limits the number of registers to a total of 70 bytes, providing 35 registers if integers are used or around 15 registers if they are floats, or a mixture of the two.

#### USING THE MODBUS BUILDER INSTRUMENT IN STARLOG V4

This option does not allow for Writes, however it allows for interrogation of an arbitrary number of (hundreds of) Modbus registers by a Starlog V4 scheme.

The Modbus Builder Instrument uses a wizard to configure the instrument.

A CSV, Comma Separated Variable, text file lists and configures each Modbus register in the scheme. Each line of the CSV file configures and individual Modbus register using the following fields:

### DESCRIPTION, TAG NAME, MODBUS ADDRESS, TYPE, ENG UNITS, READ / WRITE

The meaning of each parameter is as follows.

Description	A textual description of the Modbus register's function The exported Modbus register TAG as it appears on the Neon Servers			
TAG				
Modbus Address	Address number of the RTU on the BUS (1247)			
Туре	Modbus register type. One of {REAL, INT or BOOL}			
Eng Units	The register's Engineering Units. E.g. kPa, deg C, Volts, etc			
Read/Write	Modbus writes are currently not supported by this instrument			

![](_page_30_Picture_17.jpeg)

Initial Generic Modbus wizard screen

MODBUS Builder	8
Import / create large MODBUS data tables	-
Select CSV File	
Import MODBUS channels from CSV file	
MODBUS channel definitions can be imported directly from a CSV file. The Import process expects the data to be in the follow format:	ing
DESCRIPTION, TAG NAME, MODBUS ADDRESS, DATA TYPE, ENG UNITS, READ/WRITE	
Valid Data Types are: INT, REAL or BOOL Valid Read / Write entries are: R or W Lines with no specified MODE/S address are ignored Duplicate TAG NAMES are remaned TAGNAME_LINENUMBER Spaces are removed from TAG NAMES	
Note that this instrument will automatically re-configure the scheme to log the imported MODBUS channe and any specified additional channels. The standard logging sequence is overriden and therefore operat of other instruments carf. be guaranteed	els tion
Only log additional channels via this dialog.	
Select CSV File	
	rowse
Help Back	Next

![](_page_31_Picture_0.jpeg)

mport / crea	ate larg	e MOD	BUS data tables 🛛 💼	Import /	/ create large MODBUS dat	ta table	es 💼
Conversion Options				Import channe Review any er	ls tor messages and then click on Next		
16 bit int conversion	Big Endian to L	ittle Endian	-	Line Number	Problem	Solution	Line
32 bit int conversion	Big Endian to L	ittle Endian	•	Line: 1	No MODBUS Address defined	Line ignored	DESCRIPTION, TAG NAME, MODBUS ADD
32 bit float conversion	MODICON to L	ittle Endian	•	Line: 2 Line: 19	No MUDBUS Address, Data Type or Read/Write defined No MODBUS Address, Data Type or Read/Write defined	Line ignored	Downhole Pump VSD Well #2,VSD2,
unction 01 Mapping	Start Address	End Address	Only send lower part of address	Line: 20 Line: 37 Line: 38 Line: 47	No MODBUS Address, Data Type or Read/Write defined No MODBUS Address, Data Type or Read/Write defined	Line ignored Line ignored Line ignored Line ignored	Buffer Tank VSD,VSD_WTP
inction 02 Manning	1000	1000		Line: 40	No MODBUS Address, Data Type or Read/Write defined No MODBUS Address, Data Type or Read/Write defined	Line ignored	Genset 1,G_001,
nation 02 Mapping	1000	1333		Line: 57	No MODBUS Address, Data Type or Read/Write defined	Line ignored	Genset 2,G_002
Inction US Mapping	40000	49999		Line: 65 Line: 66	No MODBUS Address, Data Type or Read/Write defined No MODBUS Address, Data Type or Read/Write defined	Line ignored	SAM PCP Controller Well #2,PCP2
unction 04 Mapping	30000	39999	V	Line: 72	No MODBUS Address, Data Type or Read/Write defined	Line ignored	
egister Address e. for Function 03, r	ange 40000-4	19999 the low	part of the address 41234 would be 41234-40000 = 1	34			
				] •	199		Save Errors to File
Ush			Cancel Back	Neut	7		Cancel Back New

Second wizard screen

Third wizard screen

The second wizard screen specifies the Modbus data conversion method to be applied to the received data and the Modbus address mappings for each Modbus function.

The third wizard screen summarises the results of processing the input CSV file. Blank lines and comment lines generate errors that may be ignored.

The fourth wizard screen allows for the inclusion of standard scheme data channels into the Modbus Builder scheme. Ticking each instrument allows those data channels to be logged by the scheme.

The fifth wizard screen lists the Modbus registers that have been included into the scheme. This screen is where the Modbus poll rate (Read Rate) and Modbus address are specified.

Pressing the Finish button causes Starlog V4 to generate the Modbus data channels for use with the scheme.

MODBUS Builder	And in case of the local division of the loc	×.	MODBUS Builder		ACCRET OF LOT			×
Import / cre	ate large MODBUS data tables		Import / create	large MODE	BUS data tab	oles		-
Select any additional cl	hannels to log		Generate MODBLIS Instruments					
Change								
Unannel	Patent Instrument		Review imported channels, select	t the default Data Convers	ion and RTU Address and	then click on OK	to generate the require	be
Mag Internal Battery	NRT Baltery		MUDBUS instruments within the	scheme				
External Supply	NRT Battery		Description			Tag Name	MODBUS Address	Data ^
20 T2L	Time till log		Motor Speed			VSD2 SPD	707	32-bi
MB Max	MODBUS Status #1		VSD Output Frequency			VSD2 FB0	709	32-bil
MB En	MODBUS Status #1		Motor Current			VSD2 CUR	711	32-bil
			Motor Torque			VSD2 TOR	713	32-bil ≡
			Motor Power			VSD2 PWB	715	32-bil
			Dc Bus Voltage			VSD2 DCV	717	32-bil
			Status Word 1			VSD2 SW1	208	16-bi
			Bit 15 - Fault	0 = No Fault	1 = Fault	VSD2 FLT	2098	16-bi
			Status Word 2			VSD2 SW2	209	16-bi
			Bit 0 - Alarm	0 = No Alarm	1 = Alarm	VSD2 ALM	2099	16-64
			Bit 1- Maintenance Request	0 = No Maint Reg	1 = Maint Reg Pending	VSD2 MRQ	2100	16-bi
			Fault Word 1			VSD2 FW1	37	16-bi
			Fault Word 2			VSD2 FW2	38	16-bi
			Fault Word 3			VSD2 FW3	39	16-64
			Alarm Word 1			VSD2 AW1	40	16-bil
			Alarm Word 2			VSD2 AW2	41	16-bi
			Motor Speed			VSD3 SPD	723	32-bit
			VSD Dutput Frequency			VSD3 FB0	725	32-64
			Motor Current			VSD3 CUB	727	32-bil
			Motor Torque			VSD3 TOB	729	32-64
			Motor Power			VSD3 PWB	731	32-bil
			Dr. Bus Voltage			VSD3 DCV	733	32-hil *
			•	m				
			RTU Address 1	Wait Scans 30	Channels Imp	orted: 64		
1			Read Rate (s) 600		Bytes required	210	Save summary	to file
Help	Car	ncel Back Next	Help			Cancel	Back	Finish
			C					

Fourth wizard screen

Fifth wizard screen

![](_page_32_Picture_0.jpeg)

#### USING THE MODBUS TCP SERVER INTERFACE

The Neon Server provides a Modbus TCP Server (Slave) interface that may be written to directly by a Modbus Master. E.g. DeltaV.

A standard Generic Modbus Instrument scheme must be operating on the NRT. The logger's Node Type must be set as "Modbus Server" on the Neon Server.

The Neon Server uses the list of data channels in the logger's scheme to pass Modbus register information to the Modbus TCP Server interface.

When polled by a Modbus Master, the Modbus TCP Server interface immediately returns the last value received from the NRT in the data channel. Data channel values are updated as and when the NRT communicates with the Neon Server according to the NRT's Communications Frequency.

Modbus Register values written to the Modbus TCP Server interface are transmitted as custom commands to the logger when it next communicates with the Neon Server according to the NRT's Communications Frequency.

Scheme memory limits the number of registers to a total of 70 bytes, providing 35 registers if integers are used or around 15 registers if they are floats, or a mixture of the two.

Node Name:				
Node ID:				
Display Sequence:	e: (Optional)			
Parent Node:	×			
	Node Selection Helper			
Node Type	Madhus Sanuar			
Node Options:	External Content			
Aquarius:				
Node Icon:	Default Logger kon			
Time Zone:	(UTC+10:00) AUS Eastern Standard Time			
Location:	Latitude -32.0629918145742 Longitude 115.799428224564			
Admin Email:				
Notes:	×			
LOUO:	Browse Upload			
	Sustan Administrator at 20/00/2012 1/52/11 DM			
Created By:	System Administrator at 20/03/2012 1:55:41 PM			

### **2103 & 2104** FIELD TERMINATION STRIPS FOR NEON IP DATALOGGERS

![](_page_33_Picture_1.jpeg)

![](_page_33_Picture_2.jpeg)

![](_page_33_Picture_3.jpeg)

A field termination strip extends a data logger's input signal connections to rows of numbered screw terminals, simplifying on-site installation of a data logging system, particularly for complex applications.

The 2103 & 2104 Field Termination Strips are used with Neon remote terminals and allow for easy connection of the field sensors to Neon loggers. There are two versions available – Standard 2103 and Extended 2104.

The Neon data logger accepts many different kinds of signal. The field termination strip offers terminals for each input and output e.g. analog, SDI-12, Modbus. In addition, using links on the field termination strip, most terminals can be customised offering an even wider range of possible inputs and outputs.

Standard 2103 FTS can be configured to provide field sensor with 5V or 9V power supply.

Model 2104 FTS provides connections for addition of special purpose modules when specific signal conditioning is needed. Special purpose modules include: voltage dividers, current loop references, isolated input amplifier, relay control module and 4-20mA current loop isolator.

The 2104 FTS also allows for transient suppression (gas arrestors) to be placed on the board. This allows the analogue signals to be protected from large electrical spikes being induced by external factors such as lightning.

PHYSICAL SPECIFICATIONS			
DIMENSIONS 2103F:	135 x 35 x 20mm (LxWxD)		
DIMENSIONS 2104E:	160 x110 x 30mm (LxWxD)		
ELECTRICAL SPECIFICATIONS			
ANALOG INPUTS:	4		
COUNTER INPUTS:	4		
EXTERNAL POWER:	12-24V		
INSTRUMENT POWER SUPPLY:	2103F: none 2103F-S5: SYNC 5.1V 2103F-S9: SYNC 9.9V 2103F-05: OUT0 5.1V 2103F-09: OUT0 5.1V 2104F-VOUT: 10.5V and 21V		

![](_page_33_Picture_12.jpeg)

### **2500** NEON REMOTE TERMINAL -LCD DISPLAY UNIT

![](_page_34_Picture_1.jpeg)

neon

#### MODEL E

![](_page_34_Figure_3.jpeg)

The 2500 NRT LCD Display Unit is a compact display and operating button unit designed to connect to existing Neon Remote Terminals (NRTs) and Neon Remote Modules (NRMs) to assist with field operations. The display provides a limited subset of indicators available via the Starlog 4 support software and connects to the RS232 port on the NRT or NRM.

The NRT Display Unit displays NRT info and its Neon Server's corresponding parameters.

Availability of this information is very usefully, especially in the field, when initialising NRT or for troubleshooting and diagnostics purposes.

There are four operational buttons:

- Scheme Data: Indicates general scheme information
- Info: Allows the user to view the Neon Server parameters, NRT serial number and firmware version to make sure these have been entered correctly.
- Signal Strength: Allows the user to view the reception strength parameters
- Initialise: This button is used to initially start communications to the central server, i.e. to initialise the NRT.

PHYSICA			
TITION	LOIL	01110/	110113

MATERIAL:	Polycarbonate Enclosure	
SIZE:	165mm x 85mm x 56mm (LxWxH)	
WEIGHT:	350 grams (including battery)	
OPERATING TEMPERATURE:	-30°C to 60°C. Not affected by humidity	

ELECTRICAL SPECIFICATIONS			
BATTERY:	9V Alkaline (non-rechargeable)		
BATTERY LIFE:	up to 1 years (based on daily schedule)		
DISPLAY FORMAT:	Two lines x 16 Characters		
LCD TYPE:	Supertwist (STN), yellow-green, no backlight		
OPTIMUM VIEWING:	6 o'clock		

### **2504** NEON REMOTE TERMINAL -HSIO LCD DISPLAY UNIT

![](_page_35_Picture_1.jpeg)

![](_page_35_Picture_2.jpeg)

MODEL E

![](_page_35_Picture_4.jpeg)

The 2504 NRT HSIO LCD Display interfaces with all Neon remote terminals and modules. It displays the values obtained from the most recent scan. The Neon's scheme defines which parameters will be displayed.

For example, one of the supplied schemes displays battery supply voltage, analogue and counter channel values or SDI 12 channel values. The 2504 is packaged in a compact weatherproof polycarbonate enclosure.

The display module power supply can be wired to a user installed switch so that it can be switched on only when necessary. The module display is

refreshed every scan (normally 15 seconds) and will display a test message when power is applied until a message from the instrument is received. Pressing the button on the front panel resets the display.

PHYSICAL SPECIFICATIONS		
MATERIAL:	ABS IP65 Sealed Enclosure	
SIZE:	115mm x 70mm x 83mm (LxWxH)	
WEIGHT:	270 grams	
OPERATING TEMPERATURE:	0°C to 50°C. Not affected by humidity	

ELECTRICAL SPECIFICATIONS			
DISPLAY FORMAT:	Four lines x 16 Characters		
LCD TYPE:	Supertwist (STN), yellow-green with backlight		
OPTIMUM VIEWING:	6 o'clock		
POWER SUPPLY:	8 to 18VDC @ 20mA		
SERIAL SIGNAL:	HSIO Standard Synchronous Protocol		
SERIAL PROTOCOL:	ASCII text special commands for formatting		

![](_page_35_Picture_12.jpeg)
### **2502** NEON SERIAL CAMERA SYSTEM



neøn

#### **MODEL E**





The 2502 Neon serial camera system is a Neon camera module interfaced to Neon monitoring module all housed within a rugged security camera case, which can be mechanically adjusted to the required image view. Alternatively the 2502 Neon serial camera module can be supplied as a standalone component to be connected to existing Neon remote terminal or module.

The Neon remote terminal or module can be programmed to send a 'take picture' command to the camera either routinely based on a fixed schedule or on demand.

The camera electronics will take the picture and return the image to the Neon remote terminal or module which will then upload the image to a Neon server.

The view / focus / initial setup of the camera can be performed on site using a laptop computer and companion camera software. This process sets up the actual view needed on site.

Once these initial view parameters are set, the camera will take a picture of the required view when requested to do so by the Neon remote terminal or module.

Typical set up configurations include:

- Daily picture taken and the image sent to Neon Server as a record of the site each day;
- On demand picture taken and image sent at any time when requested by the Neon server if there is an unusual event or activity at the site.

The Neon server applications software has the facility to view, store and recall images in a similar way it does for logged data.

PHYSICAL SPECIFICATIONS	
SYSTEM MATERIAL:	Powder Coated Aluminium Housing
SYSTEM SIZE:	388mm x 110mm x 101mm (LxWxH)
SYSTEM WEIGHT:	1.7kg (including batteries)
CAMERA MODULE MATERIAL:	ABS IP65 Sealed Enclosure
CAMERA MODULE SIZE:	115mm x 65mm x 55mm (LxWxH)
CAMERA MODULE WEIGHT:	235g (including battery)
<b>OPERATING TEMPERATURE:</b>	-20°C to 60°C. Not affected by humidity
MODEM 1:	Sierra MC8548Q (3G)
ANTENNA 1:	Stub SMA antenna, optional whip SMA antenna



ELECTRICAL SPECIFICATIONS					
BATTERY:	1 x 3.6V 7.7Ah lithium (non-rechargeable) battery				
BATTERY LIFE:	up to 5 years (based on daily schedule)				
EXTERNAL POWER:	6V to 24V DC				
INTERFACE:	RS232				
CAMERA SPECIFICATIONS					
JPEG4 RESOLUTION:	80 x 64, 160 x 128, 320 x 240, 640 x 480				

### **2502** NEON HIGH RESOLUTION IMAGE AND VIDEO CAMERAS



nean



The 2502 Neon High Resolution Image and Video Cameras can be set up to take still images in a range of resolutions or to record video clips. When the IP camera is combined with a Unidata Neon Remote Terminal (NRT), these images/video captures are sent to a central Neon Server for viewing, processing and reporting.

A typical system configuration consists of:

- NRT, ether 2018 NRT (Inmarsat M2M Satellite) or 2020 NRT (Ethernet, USB and 3G)
- IP Camera, ether 1MP, 5MP, 10x optical zoom or 360° pan + 30x optical zoom camera
- Optional: PoE injector, Ethernet surge protector and special cable length CAT5 cable

The Neon Applications Software maintains the high resolution images and video files in the same SQL database as standard data logging files. Images and videos be viewed on the web interface and/or reported out of the Neon system, for example, by ftp, email or web services.

Unidata Neon High Resolution Satellite Telemetry Cameras are added to Neon via the Cameras tab on the Loggers tab. The resolution, frame rate and encoding is set via the web interface at a central location, while the equipment is located at the very remote location. Multiple camera buttons may be added so that different resolution images and videos may be captured from the same camera without the need to reconfigure the camera. Simply press the appropriate capture button to take a photograph or video at the required resolution or frame rate.

Photographs and captured videos may be viewed on the photographs tab. An historical list of photographs is presented. Photographs and videos may be previewed on screen or downloaded for viewing at full resolution.

For NRT specifications please refer to 2018 and 2020 NRT brochures

PHYSICAL SPECIFICATIONS 1MP AXIS P1364-E					
MATERIAL:	IP66/IP67 NEMA 4X rated IK10 Impact resistant polymer enclosure				
SIZE:	382mm x 155mm x 120mm (LxWxH)				
WEIGHT:	1.8kg				
OPERATING TEMPERATURE:	-40°C to 50°C. Humidity 10-100% RH				
RESOLUTION:	HDTV 720p 25/30fps (WDR): 1280 x 960 to 160 x 90 HDTV 720p 50/60fps (no WDR): 1280 x 960 to 160 x 90				
FRAME RATE:	Up to 50/60 fps				
PHYSICAL SPECIFICATIONS 5	MP AXIS P1357-E				
MATERIAL:	IP66/IP67 NEMA 4X rated IK10 Impact resistant aluminium enclosure				
SIZE:	404mm x 161mm x 142mm (LxWxH)				
WEIGHT:	3.1kg				
OPERATING TEMPERATURE:	-30°C to 50°C with PoE, Humidity 10-100% RH				
RESOLUTION:	2592 x 1944 (5PM) to 160 x 90				
FRAME RATE:	Capture mode 2MP/1080p@ 25/30 fps Capture mode 3MP@ 16/20 fps Capture mode 5MP@ 12.5/12 fps				

PHYSICAL SPECIFICATIONS 10X OPTICAL ZOOM AXIS P1775-E				
MATERIAL:	IP66/IP67 NEMA 4X rated IK10 Impact resistant aluminium enclosure			
SIZE:	405mm x 140mm x 121mm (LxWxH)			
WEIGHT:	3.6kg			
OPERATING TEMPERATURE:	-40°C to 50°C with PoE, Humidity 10-100% RH			
RESOLUTION:	1920 x 1080 HDTV 1080p to 160 x 90			
FRAME RATE:	Up to 60/50 fps in all resolutions			
PHYSICAL SPECIFICATIONS 30X OPTICAL ZOOM + 360° PAN AXIS P5635-E MK II				
MATERIAL:	IP66 NEMA 4X rated IK10 Impact resistant aluminium enclosure with clear dome			
SIZE:	217mm x 188mm x 188mm (LxWxH)			
WEIGHT:	2.5kg			
OPERATING TEMPERATURE:	-30°C to 55°C with PoE, Humidity 10-100% RH			
RESOLUTION:	1920 x 1080 HDTV 1080p to 320 x 180			
FRAME RATE:	Up to 25/30 fps in 1080p Up to 50/60 fps in 720p			





### SATELLITE AIRTIME PRICING MODELS

This document compares the satellite airtime pricing models with the use of the NRT/NRL from the below satellite providers:

- Globalstar
- Inmarsat BGAN M2M
- Iridium
- Microsatellite

This document is intended as a guide only, it is illustrative only, in US\$, and should not be used to calculate exact costs, as there may be specially priced services for some customers. The data models illustrate the typical airtime costs for two types of application, namely:

- an alert /small data application, e.g. a water level sensor for monitoring tank level, which only transmits the level once or twice per day and therefore requiring a very small amount of data, is well served by message services such as the Iridium or Microsatellite
- a river measurement station or an industrial measurement application with several different instruments measuring routinely, perhaps every 15 minutes needing a larger amount of data is well served by services such as Inmarsat M2M and Globalstar

The data models also assume power is removed from the Inmarsat BGAN M2M for the purpose of modeling, requiring these systems to reestablish a session, with the corresponding session re-establishment overhead each time they communicate. If these systems have power systems dimensioned such that power can remain on, then the session re-establishment overheads will be eliminated.

In broad terms, short burst data services cost in the order of 50 to 100 cents per kilobyte and Inmarsat BGAN services cost in the order of 1 to 3 cents per kilobyte.

#### INDICATIVE MONTHLY DATA VOLUME

#### **SCENARIOS FOR FULL SERVICE DATA**

For the purposes of generating indicative payload sizes and data volumes, the following scenarios are used.

These values account for logger RTD and but no other comms overheads.

- 1. Very Low Data Volume Once a Day: 3 data channels once per day = 222 bytes per day or 7KB per month
- 2. Low Data Volume Once an Hour: 3 data channels every hour = 222 bytes per hour or 164KB per month
- 3. High Data Volume Once every 5 Minutes: 6 data channels every 5 minutes = 2,736 bytes per hour or 2MB per month
- 4. Medium Resolution Serial Camera pictures Once an Hour = 25k per hour or 20MB per month
- 5. High Resolution IP Camera pictures Once an Hour = 110k per hour or 88MB per month

#### **SCENARIOS FOR MESSAGE SERVICES**

For the purposes of generating indicative payload sizes and data volumes, the following scenarios are used.

- 6. Very Low Data Volume Once a Day: 3 data channels once per day = 12 bytes per day or 372 bytes per month
- 7. Low Data Volume Once an Hour: 3 data channels every hour = 12 bytes per hour or 8,928 bytes per month
- 8. High Data Volume Once every 5 Minutes: 3 data channels every 5 minutes = 72 bytes per hour or 107,136 bytes per month

#### COMMUNICATIONS OVERHEAD ASSUMPTIONS

The Neon Remote Terminal and Neon Server Protocol incur packet overheads of 76 bytes per packet.

For Log Data packets, overheads can be proportionately large. E.g. 76 bytes of Header and 6 bytes of Log Data payload equals 82 bytes total.

Each time a Neon Remote Terminal communicates with the server it also sends 64 bytes of RTD with a 76 byte header for a total of 140 bytes.

So, if 3 data channels are being logged, it is not just 6 bytes of data that is sent but rather two packets of total size (82+140) = 222 bytes.

Serial Camera payloads incur overheads of roughly 9.6%

IP Camera overheads incur slightly smaller overheads of roughly 3.7%

An 894 byte packet can contain a maximum 818 bytes of payload.



There will be additional data overheads for establishing the PPP comms session plus acknowledgements etc between the server and the logger.

Note that when using message services like Iridium and Microsatellite the full Neon server protocol is not implemented because these networks have high latency and cost making it impractical, this means that there will be no protocol overheads when these services are used and it will be just encoded logged data that is transmitted.

#### CAMERA PAYLOAD SIZES

#### **STILL VIDEO IMAGES**

The Neon Camera System can be configured to take several different sized resolution pictures. For the purpose of this document we are using only two generalised resolutions.

- Medium resolution: Serial Camera pictures (640x480) are 25K each.
- High resolution: IP Camera pictures (1,280x800) are 110k each.

#### **VIDEO**

• Medium resolution: IP Camera video (800x600x2fps) is 1MB per minute.

#### **GLOBALSTAR MODEL**

Data Charged in Time Increments, not Bytes. Data Charged in 10 second Blocks.

Corporate and Government rate plans provided by Pivotel service provider as an example

Globalstar Plan = Data30	Very Low Data Volume	Low Data Volume	High Data Volume	Medium Res Photo	High Res Photo
Monthly Base Price	\$30.00	\$30.00	\$30.00	\$30.00	\$30.00
Comms Frequency	1 Daily	1 hour	5 minutes	1 hour	1 hour
Bytes per Comms	224	224	230	25,000	110,000
Bytes per second	818	818	818	818	818
Packets per Comms inc. 2 OH	2	2	2	33	136
10 Seconds per Comms	1	1	1	4	14
Comms per Month	31	732	8,784	732	732
First 10 Second Packets Per Month	31	732	8,784	732	732
Next 10 Second Packets Per Month	0	0	0	2,196	9,516
Cents per First 10 Second Packets	4	4	4	4	4
Cents per Next 10 Second Packets	16.67	16.67	16.67	16.67	16.67
Monthly Packet Price	\$1.24	\$29.28	\$351.36	\$395.35	\$1,615.60
Minus Monthly Included Calls	-\$10.00	-\$10.00	-\$10.00	-\$10.00	-\$10.00
Monthly Total Price	\$30.00	\$30.00	\$371.36	\$415.35	\$1,635.60

#### INMARSAT BGAN M2M SERVICE MODEL PLAN BASED - LOWER VOLUME USAGE

Hughes 9502 *Sat. Modem Cycled Every Session.* Data Charged in Bytes, not by Time Comms Session = 28 byte protocol overhead data per packet. 28 byte log data. Billing increments for Standard IP is rounded up to next 1 kilobyte every session.

BGAN M2M 12 Month Plan, Per SIM Card	Very Low Data Volume	Low Data Volume	High Data Volume	Medium Res Photo	High Res Photo
Comms Frequency	Daily	1 hour	10 minutes	1 hour	1 hour
Payload Bytes per Comms	222	222	240*1	25,000	110,000
Billing Bytes per Month	30,500	732,000	4,392,000	31,671,976	136,867,892
Monthly Subscription Cost	\$36.70	\$36.70	\$53.90	\$136.70	\$136.70
Monthly Allowance	2MB	2MB	5MB	20MB	20MB
\$/MB Out of Bundle	\$23.35	\$23.35	\$13.30	\$6.80	6.85
Monthly Total Price	\$37	\$37	\$54	\$216	\$937





#### INMARSAT BGAN M2M SERVICE MODEL PLAN BASED - HIGHER VOLUME USAGE

Hughes 9502 Sat. Modem Cycled Once Per Day

Data Charged in Bytes, not by Time

Comms Session = 28 byte protocol overhead data per packet. 28 byte log data.

Billing increments for Standard IP is rounded up to next 1 kilobyte once per day.

BGAN M2M 12 Month Plan, Per SIM Card	Low Data Volume	High Data Volume	High Data Volume	5 Minute Data + Medium Res Photo	5 Minute Data + Medium Res Photo
Comms Frequency	Daily	5 minutes	1 minute	1 per Day	3 per Day
Payload Bytes per Comms	240	240	240	25,000	25,000
Billing Bytes per Month	1,055,080	2,109,160	10,541,800	2,969,604	5,977,657
Monthly Subscription Cost	\$36.50	\$36.50	\$95.00	\$53.90	\$53.90
Monthly Allowance	2MB	2MB	10MB	5MB	5MB
\$/MB Out of Bundle	\$23.25	\$23.25	\$9.50	\$13.30	\$13.30
Monthly Total Price	\$37	\$39	\$100	\$54	\$67

#### INMARSAT BGAN M2M SERVICE MODEL

Hughes 9502 Sat. *Modem Cycled Every Session* (High SIMS - High Data Pool Based]) Data Charged in Bytes, not by Time.

Assume Fixed \$10.00 per SIM Monthly fee and \$10 per MB (some providers may offer this for large numbers of SIM cards)

BGAN M2M 12 Month Plan, Per SIM Card	Very Low Data Volume	Low Data Volume	High Data Volume	Medium Res Photo	High Res Photo
Comms Frequency	Daily	1 hour	10 minutes	1 hour	1 hour
Payload Bytes per Comms	222	222	240*1	25,000	110,000
Billing Bytes per Month	30,500	732,000	4,392,000	31,671,976	136,867,892
Monthly Subscription Cost	\$10	\$10	\$10	\$10	\$10
Monthly Allowance	0MB	0MB	OMB	0MB	0MB
\$/MB Out of Bundle	\$10.00	\$10.00	\$10.00	\$10.00	\$10.00
Monthly Total Price	\$10	\$17	\$54	\$327	\$1,379

#### INMARSAT BGAN M2M SERVICE MODEL

Hughes 9502 Sat. Modem Cycled Once Per Day (High SIMS - High Data Pool Based)

Data Charged in Bytes, not by Time.

Assume Fixed \$10.00 per SIM Monthly fee and \$10 per MB (some providers may offer this for large numbers of SIM cards)

BGAN M2M 12 Month Plan, Per SIM Card	Low Data Volume	High Data Volume	High Data Volume	5 Minute Data + Medium Res Photo	5 Minute Data + Medium Res Photo
Comms Frequency	10 minutes	5 minutes	1 minute	1 per Day	3 per Day
Payload Bytes per Comms	240	240	240	25,000	25,000
Billing Bytes per Month	1,055,080	2,109,160	10,541,800	2,969,604	5,977,657
Monthly Subscription Cost	\$10	\$10	\$10	\$10	\$10
Monthly Allowance	OMB	0MB	0MB	0MB	0MB
\$/MB Out of Bundle	\$10.00	\$10.00	\$10.00	\$10.00	\$10.00
Monthly Total Price	\$21	\$31	\$115	\$40	\$70

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#### **IRIDIUM MODELS**

Pricing per 10 Byte Block and using the Corporate and Government rate plans provided by Pivotel service provider Data Charged in Bytes, not by Time. Data is charged in 10 byte block increments, below example shows if the data fits within the 10 byte block (8 bytes)

Iridium per 10 Byte Block, SBD Rate Plans	Very Low Data Volume	Low Data Volume	High Data Volume
Comms Frequency	Daily	1 hour	5 minutes
Payload Bytes per Comms	8	8	8
Data Bytes per Month	248	5,952	71,424
Monthly 10 Byte Blocks	248	744	8,928
Monthly Subscription Cost	\$16.50	\$27.50	\$66.00
Monthly Allowance (Bytes/Block)	3,000/300	8,000/800	30,000/3,000
Bytes Out of Bundle	0	0	41,424
\$/10 bytes Out of Bundle	\$0.110	\$0.066	\$0.033
Monthly \$ Out of Bundle	\$0	\$0	\$196
Monthly Total Price	\$17	\$28	\$262

Pricing per 10 Byte Block and using the Corporate and Government rate plans provided by Pivotel service provider

Data Charged in Bytes, not by Time. Data is charged in 10 byte block increments, below example shows if the data is over the 10 byte block (12 bytes)

Iridium per 10 Byte Block, SBD Rate Plans	Very Low Data Volume	Low Data Volume	High Data Volume
Comms Frequency	Daily	1 hour	5 minutes
Payload Bytes per Comms	12	12	12
Data Bytes per Month	372	8,928	107,136
Monthly 10 Byte Blocks	62	1,488	17,856
Monthly Subscription Cost	\$16.50	\$49.50	\$66.00
Monthly Allowance (Bytes/Block)	3,000/300	17,000/1,700	30,000/3,000
Bytes Out of Bundle	0	0	77,136
\$/10 bytes Out of Bundle	\$0.110	\$0.033	\$0.033
Monthly \$ Out of Bundle	\$0	\$0	\$490
Monthly Total Price	\$17	\$50	\$556

#### MICROSATELLITE MODEL

Pricing per Number of Transmissions (Max 144 bytes). Transmission blocks of messages must be purchased before connection is provided/ prepaid model. Typical cost of a block of messages is \$1000. Latency of the service can be several hours, hence the High Data Volume Illustration while included for financial comparison, is technically impractical. Data Charged for number Messages / not by time.

Microsatellite per 10 Byte Block, SBD Rate Plans	Very Low Data Volume
Comms Frequency	Daily
Payload Bytes per Comms	12
Transmissions per Month	31
Monthly Subscription Cost	\$1
Monthly Allowance Transmissions	31
Out of Bundle	0
Monthly Total Price	\$1

## STARLOG



ALC: NO

#### Datalogger Interfaces and Accessories



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### STARLOGGER AND PROLOGGER TRANSITION TO RETIREMENT

After many years of hardworking and reliable service, the Starlog Range of Loggers (Starlogger, Prologger and Micrologger) is now superseded by the new generation Neon Remote Logger Range.

New Neon Remote Loggers have the option of working in Starlog emulation mode making transition from old Starlog Logger to new Neon Remote Logger stress-free.

From now on, if you are looking for Starlog functionalities please refer to new NRL models:

We will continue to provide the normal service and support for the Starlog range.









#### MICROLOGGER IS NOW SUPERSEDED BY NRL 3004A-MC00.

Please see page 11.



### SDI-12 SERIAL DIGITAL INTERFACE STANDARD

The SDI-12 interface (standard datalogger interface 1200bps) was defined by the USGS (USA – Geological Service) to allow the industry to have an agreed interface standard for sensors which measure water and other environmental parameters. There is an SDI-12 institue which defines standards and versions for SDI-12.

The interface standard allows up to ten (10) SDI- 12 compatible instruments (sensors) to be connected to a Data Logger (recorder) which is able to collect readings from the sensor(s) over a two wire, shared communication bus at 1200 bps. The maximum length of the SDI-12 bus (distance between sensor and recorder) is 65 metres. SDI-12 is not practical for connecting simple, low cost sensors; it is designed to be used with microprocessor-controlled instruments.

#### 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: serial data, ground and 12 volts. This figure shows the SDI-12 Bus connecting one data recorder with two sensors. The SDI-12 Bus is capable of having 10 sensors connected to it.

Serial Data Line – The data line is a bi-directional, 3 state, data transfer line. The data line uses negative logic.

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.



#### SDI-12 COMMUNICATIONS PROTOCOL

SDI-12 data recorders and sensors communicate by an exchange of ASCII characters on the data line. The data recorder sends a break to wake up the sensors on the data line. A break is a continuous high signal (5 Volts) on the data line for at least 12 milliseconds. The data recorder then sends a command. The sensor returns the appropriate response. Each command is for a specific sensor. The first character of each command is a unique sensor address that specifies which sensor the recorder wants to communicate with. Other sensors on the SDI-12 Bus ignore the command and return to low power standby mode. When a data recorder tells a sensor to start its measurement procedure, the recorder does not communicate with any other sensor until the data collection from the first sensor is complete.

A typical recorder/sensor measurement sequence is:

Step 1: The data recorder wakes all sensors on the SDI-12 Bus with a break.

Step 2: The recorder transmits a command to a specific, addressed sensor instructing it to make a measurement.

Step 3: The addressed sensor responds within 15.0 milliseconds, returning the maximum time until the measurement data will be ready and the number of data values it will return.

Step 4: If the measurement is immediately available, the recorder transmits a command to the sensor instructing it to return the measurement(s). If the measurement is not ready, the data recorder waits for the sensor to send a request to the recorder, which indicates that the data is ready. The recorder then transmits a command to get the data.

Step 5: The sensor responds, returning one or more measurements.



### **2303** NEON SERVER APPLICATIONS SOFTWARE



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#### **MODEL A**





The Neon Server Applications software is the server-based suite of software that is part of an overall Neon system. This suite of software provides centralised data capture and management for remote field based Neon data loggers and RTU units.

Received data can be viewed on the Neon Web user interface in near real time from any browser or can be disseminated to third party storage or data visualisation systems via several different reporting and interface mechanisms.

The Neon system can also issue control commands based on pre- set algorithms and issue alarms and notifications via several mediums. Alarm set points can be set up on the Neon data logger/ RTU units as well as the Neon central server and alarm notifications can be sent via several methods including email and SMS text messages. Alarm triggers can initiate physical actions in the field such as turning pumps on and off or activating other control functions based on the internal program within the Neon data logger/ RTU.

The Neon system has fully bi directional communications between the Neon data logger/ RTU units and the central Neon server. This allows for remote diagnosis, remote programming and remote firmware updating for complete remote operation of the remote equipment and this minimises costly site visits. Neon data logger/ RTU units can be configured to read sensors, log data internally to local memory and push data to the central Neon server at user settable intervals such as once a minute, every few minutes, every hour, once a day.

The Neon Server Applications software is offered as either a hosted service for a subscription fee, managed by Unidata, or customers can purchase a Neon Server Applications Server License and run the software on their own server.

#### **SOFTWARE ARCHITECTURE**

The Neon Server Applications software is based on industry standard platforms and technologies, including Windows Server Operating Systems, Microsoft SQL, the .NET framework and IP networks.

The software suite encompasses two major components: the Neon Communications Server and the Neon Web Application. The Neon Communications Server handles all communication protocols with the Neon data loggers and RTU units. This includes receiving and storing log data, processing commands and controlling alarms. The Neon Web Application provides the Web user interface, contains the reporting engine plus various data exchange interfaces.

#### SUITABLE FOR

•	Remote data monitoring and acquisition
•	Environmental compliance reporting
•	Metering for utilities
•	Asset monitoring
•	Modbus TCP
•	Industrial Measurement

#### FEATURES

Low communications overhead
Scaleable architecture
Software can be installed on - Windows 2008/2012 server - Physical servers or virtual servers - Scalable server platforms depending on number of loggers / RTUs required
View data from any browser on the internet
Reconfigure Neon remote loggers on-line
Diagnose and reset Neon remote loggers on-line
Upload new logger schemes on-line
Automated FTP/ Web Services/email reports
Data exchange with established third party systems, including Hydstra and Aquarius
Automated email and SMS alarm notifications
True IP services/guaranteed data delivery system
Industry standard Microsoft .net architecture
SQL database: SQL express, SQL standard or SQL enterprise.



#### SERVER PLATFORM SOFTWARE REQUIREMENTS

- Microsoft Windows 2008 R2 Server or 2012 Server
- Microsoft SQL Server 2008 or later, Express, Standard or Enterprise editions

### NEON SERVER APPLICATION SOFTWARE

This software is used to provide communicate between the server and on site loggers. Main functions include:

- 1. Retrieving data from the loggers and storing the data on the server
- 2. Managing logger configuration
- 3. Uploading new programs and logger schemes to the loggers
- 4. Displaying retrieved data in real time
- 5. Sending automated data reports to external systems
- 6. Sending alarm messages via SMS or Email

#### **USER INTERFACE**

The application software has the Neon Web user interface that can be accessed from anywhere on the Internet using a standard web browser.

#### LOGGER / RTU COMMUNICATIONS

- Cellular (2G/3G/4G LTE)
- Satellite (Global Star, Iridium)
- Lora radio



#### LOGGER CAPACITY

The application software is able to handle at least 5000 loggers, assuming that the communication parameters have been appropriately configured.

#### **USER CAPACITY**

There is no specific limit to how many users can be configured but the concurrent usage is dependent on server hardware and internet bandwidth capability.

#### LOGGER CONFIGURATION

All configuration and operating parameters of the loggers can be remotely managed via the application software. Users do not have to visit loggers on location to change their operating parameters.

#### LOGGER NETWORK CONFIGURATION

The application software can group loggers and display data according to an unlimited number of geographic areas and locations.

#### DATA DISPLAY

Retrieved logger data can be viewed in real time, via the following methods:

- 1. Charting
- 2. Data Table
- 3. Excel Export
- 4. Weather Stations
- 5. Schematic diagrams



#### NETWORK MAP DISPLAY

Geographic areas, locations and loggers can be assigned a Latitude and Longitude and then displayed on a geographic map.

#### LOGGER NETWORK STATUS

The application software can display the status of each location in the network and indicate if the logger is inactive, operating normally or has an alarm condition.

This status is also displayed on the Network Map.

### ALARM CONFIGURATION AND NOTIFICATION

Logger alarms conditions can be configured via the software application and can notify users of active alarms via the following methods:

- 1. Web site on screen display
- 2. Email
- 3. SMS

#### **AUTOMATED DATA REPORTING**

Automated data reports can be configured to export logger data from the Neon server to an external system. Reporting formats include, among others:

- 1. CSV files, delivered via FTP, email or web service
- 2. Hydstra files, delivered via FTP
- 3. Aquarius interface, import and export, compatible with Aquarius 3.X and NG versions

#### PHOTOGRAPHS AND VIDEO CAPTURE

The Neon system can automatically capture regular photographs and video from the field using the appropriate logger adaptors. These photographs and videos can then be viewed via the Neon Web user interface or delivered to an external system as JPEG or MPEG files.

#### **USER SECURITY**

The application software can handle any number of security access profiles, which can be configured according to access requirements. These access profiles can control which logger or group of loggers a user can access. System administrators can create users and assign the appropriate security access profile to them.







## 6308**B** AUE STARLOG V4

#### SETUP AND MANAGEMENT SOFTWARE FOR UNIDATA DATALOGGERS / NEON REMOTE TERMINALS / INSTRUMENTS



#### **MODEL B** 104 --Print onfigure Unicad 1 Σ 2 ti 3 1001 Scheme Editor \$777 neon erfigure Initialise Unidata DENT Unicad 1 2 3 1

Starlog V4 is a Windows-based application which allows customers to manage all of the Unidata range of dataloggers, Neon Remote Terminals and Instruments. This software allows fast and easy point and click configuration/setup of the schemes/programs within the Unidata range of dataloggers, Neon Remote Terminals and instruments.

Starlog V4 can be downloaded from the Unidata website for trial purposes, along with the user manual, and a 30 day free trial is offered before a purchase is required.

Having this feature rich and powerful software package to support the Unidata range of loggers and Neon remote Terminals, users can create complicated schemes simply using point and click selection which makes the configuration process fast and efficient.

#### FEATURES

- Supports all Unidata dataloggers, Starlogger, Prologger, Starflow, .
- Micrologger & Neon Remote Terminals / Modules
- Automatic logger configuration
- Comprehensive Instrument Library and Editor ٠
- Scheme and instrument editing ٠
- Logger and scheme testing
- Report and plot creation
- Embedded Scheme Feature to retrieve data from loggers when original • scheme is not available
- Multi-buffer support ٠
- SiteID support program different sites using the same scheme and
- keep data from each site separate using the site ID automatic modem configuration utility
- Phonebook to manage sites, including telephone number and telemetry • switch settings
- Output control instrument in combination with test mode buttons
- Extended support for logging events

A comprehensive instrument library makes it easy to add instruments to your scheme. Saving and programming your logger is as simple as the click of the mouse button.

Presentation of your archived data using the intuitive graphing tools makes it simple to view your data in a text or graph view. And identifying values on the graph is as easy as placing your cursor over the point of interest. You can then print your favourite graphs or tables for reference, or output your data for import into your third party data viewing and analysis software applications.

- Test mode buttons set channel values, control outputs, pause/ restart logging (event schemes only)
- •
- Facility to view and plot data as it is being logged
- Data is stored in robust and accessible CSV (comma separated value) • text file format
- . Open data directly in Excel for basic reporting and analysis
- Remote LCD display support with Starflow and 4EC instruments
- ٠ Support for averages with a sampling time longer than 24 hours
- SDI-12 Transparent Mode
- Logger firmware upgrading
- Event counter instrument
- SDI-12 support of high-resolution conductivity data
- Works with existing V3 schemes
- Multi Buffer Support
- **Telemetry Support Features**

## 6411 SDI-12 LISTENER

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#### MODEL C



The SDI-12 listener is connected to the SDI-12 bus and listens and records traffic. The SDI-12 listener allows more than one master to extract information from an SDI-12 bus with only one master controlling the bus.

When upgrading from a traditional logger system, with a dial up modem to a newer NRT push telemetry system, there may be a need to have the old and new logger on the same SDI-12 bus. In this configuration the newer logger can act as a primary logger, but the existing/old logger can be listening on the SDI-12 bus, and take over the logging operations in the event the primary logger fails.

During the first 6 hours of operation the SDI-12 listener will record the longest pause in traffic on the SDI-12 bus. If there is a break in SDI-12 traffic that is four times greater than the longest pause then the SDI-12 listener will allow the second master access to the SDI-12 traffic.



Configuration in a system with Neon Terminal in Control



#### **SPECIFICATIONS**

PHYSICAL SPECIFICATIONS		
MATERIAL:	ABS IP65 Sealed Enclosure	
SIZE:	115mm x 65mm x 55mm (LxWxH)	
WEIGHT:	230grams	
OPERATING TEMPERATURE:	0°C to 50°C. Not affected by humidity	

#### **FEATURES**

- Stores information from up to 9 independent SDI-12 sensors
- Recorded values with or without CRC can be accessed
- CRC will be appended where required
- Commands supported included aM!, aMC! and aD0!
- Address 9 is tagged with a value of 0 or 1
- Address 9, Value 0 indicates normal listening
- Address 9, value 1 indicated listener has taken control 1
- Listener is always updated with the latest reading
- Power supply 9 30V DC
- Power Consumption 300 uA



## 6412 SDI-12 TESTER

## **(**

#### MODEL A



The 6412 SDI-12 Tester is a portable unit which simplifies the set up and fault finding of SDI-12 sensors in the field and on the laboratory bench. It allows sending a variety of commands enabling sensors to be configured and read.

The 6412 also enables monitoring communications between a logger and sensors(s) on an SDI-12 bus.

It comes with PP3 9V alkaline battery, which should be removed prior to long periods of storage to prevent damage from leaking flat batteries.

#### **FUNCTIONS**

MONITOR BUS	The instrument passively monitors any commands or data on the SDI-12 data bus and displays it to the LCD.
QUERY ADDRESS	Interrogates a sensor to acquire its address.
ACKNOWLEDGE ACTIVE	Interrogates a sensor to ascertain its active status & address.
CHANGE ADDRESS	Assigns a new address to a sensor.
SEND IDENTIFICATION	Interrogates a sensor and reads its identification data.
START MEASUREMENT	Commands a sensor to commence a measurement cycle.
SEND DATA	Commands a sensor to return measurement data.
SEND EXTENDED COMMAND	Sends extended and custom commands to a sensor.
CYCLICAL MEASURE & SEND DATA	Repeatedly instructs a sensor to measure and return data. This is useful for checking and calibrating sensors.

PHYSICAL SPECIFICATIONS		
MATERIAL:	ABS IP61 Sealed fire retardant enclosure	
SIZE:	170mm x 80mm x 30mm (LxWxH)	
WEIGHT:	250grams	
OPERATING TEMPERATURE:	5°C to 55°C. Not affected by humidity	
BATTERY:	PP3 9V Alkaline	
BATTERY LIFE:	Up to 120h continuous usage	

### 6543 BABELSTAR PROTOCOL CONVERTER

**MODEL A** 





The 6543 Babelstar Protocol Converter converts Modbus to SDI-12 requests OR converts HSIO data into Modbus data. SDI-12 is a standard protocol, defined by the USGS, which defines how a sensor must communicate with a datalogger via an SDI 12 bus. HSIO is a Unidata proprietary protocol for connection of Unidata dataloggers to displays and instruments.



#### **MODBUS TO SDI-12 CONVERSION**

The 6543 protocol converter acts as a Modbus slave on a Modbus RTU bus. On receipt of certain Modbus commands the protocol converter module initiates SDI-12 commands – awaits the response and returns the results as Modbus values. The data returned is selectable as either a binary decimal value with a sign delimiter or as an IEEE 32bit floating point value.

#### **MODBUS TO HSIO CONVERSION**

DNMO

The 6543 protocol converter can also act as a HSIO slave on the HSIO connection from a Unidata data logger or Starflow. On receipt of HSIO data the protocol converter module stores the HSIO data into memory. On receipt of certain Modbus commands, the protocol converter returns the requested memory values as Modbus values. The data returned is in Modbus RTU format and is returned as an exact representation of the HSIO value/s received.

The Protocol Converter requires a 5 to 24 volt power source capable of supplying a 15mA load.

#### SPECIFICATIONS

PHYSICAL SPECIFICATIONS	
MATERIAL:	Polycarbonate Enclosure
SIZE:	140mm x 80mm x 65mm (LxWxH)
WEIGHT:	295g
OPERATING TEMPERATURE:	0°C to 50°C. Not affected by humidity
EXTERNAL POWER:	5-24VDC @ 14mA active
I/O:	2 x RS232 A and B 2 x RS485 A and B 1 x SDI-12 1 x HSIO



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### HSIO SERIAL DIGITAL INTERFACE STANDARD

The Unidata HSIO interface is a Unidata standard for connecting sensors, relays and displays to Unidata Neon Remote Terminals and Neon Remote Loggers.

HSIO implementations allow up to sixteen compatible instruments to be connected to a single Unidata data logger.

Each instrument requires one 16 bit channel of bandwidth allocated to the HSIO implementation. Model 3016A and 3004B-M both have single bus consisting of 8 x 16-bit channels.

#### ELECTRICAL INTERFACE

The electrical interface consists of a five wire bus system, allowing a master (data logger) to interrogate up to 16 slaves (instruments). Signal levels are TTL compatible. They are:

#### SYNC

Generated by the master. It is used to indicate to the slave that a bus read is about to begin (active high).

#### **COMMON**

Signal ground.

#### CLOCK

Generated by the master. Clocks in data sent from the slave to the master. The number of clock pulses generated depends upon the number of slaves connected to each bus.

#### DATA

Generated by the slave. 16 bits of data per slave. A read starts with the least significant bit of the least significant byte and each clock pulse reads the next most significant bit.

#### LINK

Used to connect more than one slave instrument to a bus ("daisychaining"). The first slave's data line is connected to the master. The second slave's data line is connected to the link input of the first slave. A third slave's data line would be connected to the link input of the second slave, and so on.

#### COMMUNICATIONS PROTOCOL

Two data types are supported, binary and ASCII. Binary is used with the Model 6541C precision Water Level Instrument and ASCII is used with the 6526LCD.











### **POWER** BATTERY AND SOLAR POWER SYSTEMS FOR STARLOG AND NEON IP DATALOGGERS



To ensure self-contained operation in the field, power for data loggers and some instruments can be supplied by integral battery packs or by 12VDC external power. In case external power is used, we recommend that you also use an internal battery pack, alkaline or lithium, as a backup battery in the event of power failure.

Alkaline battery pack model 6910 is the standard 6 x D cell non-rechargeable internal battery pack for all Starlog dataloggers. The life expectancy of this pack depends on logging scan rate but is typically one year for Prologgers and Starloggers. The Neon remote terminals and modules can be powered from long life Lithium batteries. The battery component is a high quality SAFT LSH20 Lithium cell with high capacity and minimal internal discharge, while providing high inrush current required for some cell phone modules.

Sealed lead acid batteries are maintenance free batteries that come in different capacity ranges. These batteries play an integral part in ensuring reliable performance at unmanned data logging sites and are normally recharged via a solar powered recharge system or via an external source of 12VDC.

If solar recharge or external 12VDC are not available Unidata can offer 6909C-3 lithium battery non-rechargeable and 6909C-4 lithium battery rechargeable packs.

The solar powered system enables the long-term use of 12V sealed lead acid batteries in the field without the need for recharging from the mains. The entire system is designed to be maintenance free once installed.

Solar powered system consists of solar panel 6904 range, sealed lead acid battery 6907B range and 12V 10A solar controller model 6912.

This configuration may be used for externally powering all data loggers, Starflow and conductivity instruments.

In an installation with a prolonged period (more than 10 consecutive days) without sunlight we recommend using the 10W model 6904I-10 solar panel with two 14Ah sealed lead acid batteries 6907B-14 (28Ah). This system will also operate a cellular phone site for up to 5 "sunless" days.

Solar power & relay controller dual relay output Model 6912CR-12 regulates the charging of a 12 volt sealed lead acid battery via a solar panel and provides a supervised 12V modem power output. In addition to this, controller has two 2A relays with capacity to operate either solenoid or small pump. Any Unidata logger can interface with the controller allowing program control of the two relay outputs.

The weatherproof enclosure protects the datalogger from moisture, wind and sun, and would-be vandals. It is constructed of robust, glass-filled polycarbonate which has been UV stabilized for outdoor use model 6701 or powder coated steel model 6703. Both polycarbonate and steel enclosures come in various sizes.

Signal cables generally enter through glands or custom configured SQL connectors in the base of the enclosure. Tamperproof screws and a key are supplied.

Models 6701M and 6703M offer stainless steel pole mounting hardware and fittings. Together with enclosure they provide a complete field installation set.

Radiation gill screen & mount model 6704 provides a good shield against the effects of precipitation, direct radiation and dust particles for a Ambient temperature and humidity sensors that are easily mounted within.

Continued  ${\ensuremath{\,{\rm b}}}$ 





#### **BATTERY SPECIFICATIONS**

BATTERY 6910A	
TYPE:	Alkaline, 6 x D cell, non-rechargeable
CAPACITY:	9V 10 Ah
BATTERY 6907B-7	
TYPE:	Sealed Lead Acid Battery
CAPACITY:	12V 7.2Ah
BATTERY 6907B-14	
TYPE:	Sealed Lead Acid Battery
CAPACITY:	12V 14Ah
BATTERY 6907B-28	
TYPE:	Sealed Lead Acid Battery
CAPACITY:	12V 28Ah
BATTERY 6907B-50	
TYPE:	Sealed Lead Acid Battery
CAPACITY:	12V 50Ah
BATTERY 2901B	
TYPE:	Single SAFT Lithium LSH20 D size Cell
CAPACITY:	3.6V 15Ah
BATTERY 2902A	
TYPE:	Single SAFT Lithium LS 26500 C size Cell
CAPACITY:	3.6V 7.7Ah
BATTERY 2903A	
TYPE:	Single Panasonic Lithium NCR18650B size Cell
CAPACITY:	3.6V 3200mAh
BATTERY 6909C-3-P	
TYPE:	3 X Shrink Wrap LSH20 Lithium Battery Pack
CAPACITY:	10.8V 15Ah
BATTERY 6909C-4-P	
TYPE:	4 X Shrink Wrap NCR18650B Lithium Battery Pack
CAPACITY:	14.4V 3200mAh





#### SOLAR PANEL SPECIFICATIONS

PANEL 6904I-10		
SPECS:	12VDC 10W, 5m single pair instrumentation cable. Hardware for 50mm dia. pole mounting included.	
SIZE:	357mm x 303mm x 35mm	
WEIGHT:	2kg	
PANEL 69041-20		
SPECS:	12VDC 20W, 5m single pair instrumentation cable. Hardware for 50mm dia. pole mounting included.	
SIZE:	300mm x 540mm x 35mm	
WEIGHT:	2.5kg	
PANEL 6904I-50		
SPECS:	12VDC 50W, 5m single pair instrumentation cable. Hardware for 50mm dia. pole mounting included.	
SIZE:	637mm x 540mm x 35mm	
WEIGHT:	4.5kg	
Fittings for different pole diameters are available on request		

#### ENCLOSURE MOUNTING SPECIFICATIONS

MOUNTING 6701M-S			
MATERIAL:	Stainless Steel		
APPLICATION:	SS hardware to suite 50mm pole and 6701B Enclosure		
SIZE:	280mm x 190mm x 130mm		
MOUNTING 6701M-M	MOUNTING 6701M-M		
MATERIAL:	Stainless Steel		
APPLICATION:	SS hardware to suite 50mm pole and 6701B Enclosure		
SIZE:	380mm x 280mm x 130mm		
MOUNTING 6703M-S			
MATERIAL:	Stainless Steel		
APPLICATION:	SS hardware to suite 50mm pole and 6703B Enclosure		
SIZE:	300mm x 300mm x 210mm		
WEIGHT:	7kg		
MOUNTING 6703M-L			
MATERIAL:	Stainless Steel		
APPLICATION:	SS hardware to suite 50mm pole and 6701D and 6703C Enclosures		
SIZE:	380mm x 380mm x 210mm		
WEIGHT:	9.8kg		

Continued over page )



#### ENCLOSURE SPECIFICATIONS

ENCLOSURE 6701B	
MATERIAL:	Grey Hi-impact polycarbonate material
IP RATING:	IP66/67
SIZE:	280mm x 190mm x 130mm
ENCLOSURE 6701D	
MATERIAL:	Grey Hi-impact polycarbonate material
IP RATING:	IP66/67
SIZE:	380mm x 280mm x 130mm 2kg
ENCLOSURE 6703B	
MATERIAL:	Grey powder coated steel
IP RATING:	IP66
SIZE:	300mm x 300mm x 210mm
WEIGHT:	7kg
ENCLOSURE 6703C	
MATERIAL:	Grey powder coated steel
IP RATING:	IP66
SIZE:	380mm x 380mm x 210mm
WEIGHT:	9.8kg
ENCLOSURE 6703D	
MATERIAL:	Grey powder coated steel
IP RATING:	IP66
SIZE:	500mm x 700mm x 250mm
WEIGHT:	29.7kg
ENCLOSURE 6704A	
MATERIAL:	Radiation Gill Screen UV stabilised Luran & Pole Mounting 60mm U & saddle clamps.
SIZE:	125mm diameter x 380mm tall
ENCLOSURE 6704B	
MATERIAL:	Radiation Gill Screen UV stabilised Luran & Pole Mounting 60mm U & saddle clamps.
SIZE:	125mm diameter x 190mm tall



#### 6912D-12 SPECIFICATIONS

PHYSICAL SPECIFICATIONS		
SIZE:	152mm x 55mm x 34mm (LxWxH)	
WEIGHT:	230 grams	
OPERATING TEMPERATURE:	-40°C to 85°C	
ELECTRICAL SPECIFICATIONS		
INPUTS:	12V solar panel, 2 x 12V SLA battery (parallel connection)	
OUTPUTS:	12V regulated, Load current 10A	



#### 6912CR-12 SPECIFICATIONS

PHYSICAL SPECIFICATIONS		
MATERIAL:	UV stabilised polycarbonate, IP67	
SIZE:	125mm x 85mm x 75mm (LxWxH)	
WEIGHT:	250 grams	
OPERATING TEMPERATURE:	-40°C to 85°C	
ELECTRICAL SPEC	FICATIONS	
	12V solar panel, 2 x 12V SLA battery (parallel connection).	
INPUTS:	Charging is thermally limited. Two relay control (open collector or TTL – user can set).	
	Modem power 12V regulated, 500mA limit, shutdown on low battery detect.	
001P015:	Two relays normally open contacts. 12V is supplied to contacts upon closure.	
TERMINALS:	Pluggable terminals for two relay outputs, logger control signals, solar panel, battery and test.	





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## ENVIRONMENTAL



### Monitoring Modules



## **6501** WEATHER TRANSMITTER



#### MODEL D



The weather transmitter 6501 offers a six-in-one solution to measure barometric pressure, humidity, precipitation, temperature, and wind speed and direction - all with one instrument. Compact and lightweight, the 6501 is suitable for weather stations, dense networks, buildings, golf courses, marinas, harbors and hotels - almost anywhere where real time weather data is needed. Accurate and reliable data provided to you early enough can increase safety to life and property.

To measure wind speed and direction, the 6501 incorporates the Vaisala WINDCAP® sensor that uses ultrasound to determine horizontal wind speed and direction. The array of three equally spaced transducers on a horizontal plane is a Vaisala specific design, which ensures accurate wind measurement from any horizontal wind direction without blind

#### angles and corrupted readings. Barometric pressure, temperature, and humidity measurements are combined in the PTU module using capacitive measurement for each parameter. It is easy to change the module without any contact with the sensors. Precipitation measurement is based on the Vaisala acoustic RAINCAP® sensor.

PHYSICAL SPECIFICATIONS		
SIZE:	Diameter 115mm x 238mm tall, IP66	
WEIGHT:	850 grams (including three batteries)	
OPERATING TEMPERATURE:	-52°C to 60°C. Not affected by humidity	
ELECTRICAL SPECIFICATIONS		
WIND SPEED		
RANGE:	0 60 m/s	
RESPONSE TIME:	250 ms	
AVAILABLE VARIABLES:	average, maximum and minimum	
ACCURACY:	±3% at 10m/s	
OUTPUT RESOLUTION:	0.1 m/s, 0.1km/h, 0.1 mph, 0.1 knots	
WIND DIRECTION		
AZIMUTH:	0 360°	
RESPONSE TIME:	250 ms	
AVAILABLE VARIABLES:	average, maximum and minimum	
ACCURACY:	±3% at 10m/s	
OUTPUT RESOLUTION:	1°	
PRECIPITATION		
RAINFALL:	Cumulative accumulation after the latest automatic or manual reset	
COLLECTION AREA:	60cm <sup>2</sup>	
OUTPUT RESOLUTIONS:	0.01 mm (0.001 inches)	
ACCURACY:	5%	

AIR TEMPERATURE		
RANGE:	-52 +60°C (-60 +140°F)	
ACCURACY FOR SENSOR AT +20°C:	±0.3°C (±0.17°F)	
OUTPUT RESOLUTIONS:	0.1°C (0. 1°F)	
RELATIVE HUMIDITY		
RANGE:	0 100 %RH	
ACCURACY FOR SENSOR:	±3 %RH at 0 90 %RH ±5 %RH at 90 100 %RH	
OUTPUT RESOLUTIONS:	0.1 %RH	
PTU MEASURING INTERVAL:	1 3600 s (= 60 min), at one second steps	
BAROMETRIC PRESSURE		
RANGE:	600 1100 hPa	
ACCURACY:	±0.5 hPa at 0 +30°C (+32 +86°F) ±1 hPa at -52 +60°C (-60 +140°F)	
OUTPUT RESOLUTIONS:	0.1 hPa, 10 Pa, 0.001 bar, 0.1 mmHg, 0.01 inHg	
OPERATING VOLTAGE:	6 24 VDC	
TYPICAL CURRENT CONSUMPTION:	3 mA at 12 VDC (with defaults)	
OUTPUTS:	SDI-12, RS-232, RS-485, RS-422	
CABLE:	5m of 8 core cable	



### 6506 TIPPING BUCKET RAIN GAUGE

#### MODEL C



The Unidata 6506 tipping bucket rain gauge uses the tipping bucket principle to record rainfall. The Unidata 6506 can be connected to many dataloggers/ rtus including the Unidata Starlog and Neon Remote Terminal range.

The Unidata 6506 tipping bucket rain gauge is sturdily constructed with stainless steel jacket, copper collector and painted marine grade aluminium base.

The integrated syphon mechanism delivers high levels of accuracy across a broad range of rainfall intensities. Each unit consists of a collector funnel with stainless steel leaf sieve, an integrated syphon control mechanism, an outer enclosure with quick release fasteners, and base which houses the

#### SPECIFICATIONS

PHYSICAL SPECIFICATIONS	
MATERIAL:	SS jacket, copper collector and marine grade aluminium base
SIZE:	300mm H, 230mm Body Diameter, 275mm Mounting Flange Diameter 200mm Collector Diameter (nominal)
WEIGHT:	2.8kg net

tipping bucket mechanism. This ensures reliable rainfall recording in even the highest rainfall intensities.

The unit includes dual output reed switch as well as dual rainfall discharge outlets for water collection and/or analysis. The bucket tips when precipitation 0.2mm has been collected. Each tip is marked by a reed switch closure and transmitted to a datalogger and/or used by a telemetry system.

Optional heater kit and pole mounting bracket are available.

OPERATING TEMPERATURE:	0°C to 60°C without heating, -20°C to 60°C with heating
ACCURACY:	±3.0% to 380mm/hr, ±5.0% to 500mm/hr
BUCKET CAPACITY:	0.2mm
SIGNAL ELEMENT:	Dual reed switch assembly
CABLE:	5m of 2 way instrumentation screened cable - PVC



The 6507 and 6535 temperature probes are designed for many applications of temperature measurement like air, water, soil, snow, ice, etc. They are fully sealed and can be used in fresh and sea water to a depth of 30 metres.

The thermistor temperature probes use a negative temperature coefficient (NTC) thermistor as their temperature sensor. The NTC thermistor is a high quality, precision curve matched element. Its operating temperature is from -100°C to 150°C.

Due to the type of cable being used, the measurement range of the standard thermistor temperature probe is from -30°C to 100°C. Accuracy of these probes is  $\pm 0.1^{\circ}$ C making them ideally suited to measuring temperature profiles in water.

The 6535 linear temperature probe is used for measuring temperatures between -17.8°C and 100°C. It outputs a DC voltage, the value of which is directly proportional to temperature.

The linear temperature probes integrate the LM34 precision Fahrenheit temperature sensor whose output voltage is linearly proportional to the Fahrenheit temperature. Probe operates from 5V to 30V, does not require any external calibration or trimming to provide typical accuracies of  $\pm 1/2^{\circ}$ F (°C) over a full -40°F (-40°C) to 240°F (115.5°C) temperature range. Due to the type of cable being used, the measurement range is ~ -17.8°C to 100°C.

The LM34 draws only 75 $\mu A$  from its supply so it has very low self-heating; furthermore it has low output impedance and linear output making interfacing of this probe very easy.

#### 6507 SPECIFICATIONS

PHYSICAL SPECIFICATIONS		
MATERIAL:	Stainless steel tube epoxy sealed	
SIZE:	Diameter 6.40mm x 50mm long, different tube lengths available on request	
WEIGHT:	350 grams	
ELECTRICAL SPECIFICATIONS		
TEMPERATURE		
RANGE:	-30°+100°C	
ACCURACY:	±0.1°C	
OPERATING VOLTAGE:	5 VDC, from logger	
TYPICAL CURRENT CONSUMPTION:	0.5mA at 5VDC	
OUTPUTS:	1 analog 0-2.55VDC	
CABLE:	10m or 20m 2 core cable shielded. Other cable length available on request	

#### 6535 SPECIFICATIONS

PHYSICAL SPECIFICATIONS		
MATERIAL:	Stainless steel tube epoxy sealed	
SIZE:	Diameter 8mm x 100mm long, different tube lengths available on request	
WEIGHT:	350 grams	
ELECTRICAL SPECIFICATIONS		
TEMPERATURE		
RANGE:	-17.8°+100°C	
ACCURACY:	±1.5°C	
OPERATING VOLTAGE:	5 VDC, from logger	
TYPICAL CURRENT CONSUMPTION:	150µA at 5VDC	
OUTPUTS:	1 analog 0-2120mVDC (18mV/°C)	
CABLE:	10m or 20m 4 core cable shielded. Other cable length available on request	



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### 6508A PRECISION SDI-12 TEMPERATURE INSTRUMENT





#### **APPLICATIONS**

- Aquaculture & hatcheries
- Soil temperature
- Surface water
- Submersible SDI-12 Temperature instrument
- Accurate to less than 0.1°C over the range of -5°C < T < +50°C
- Very Low power
- Precision 24 bit digital temperature sensor
- Stable and factory calibrated

PERFORMANCE SPECIFICATIONS	
RANGE & ACCURACY:	$\pm 0.1^{\circ}$ C over -5°C < T < +50°C $\pm 0.5^{\circ}$ C over -40°C < T < +125°C
RESOLUTION:	0.01°C
RESPONSE TIME:	22s to 63.2% of a step change
OPERATING RANGE:	-10°C to 70°C
MAXIMUM CABLE LENGTH:	200' (60m) as per SDI-12 standard
SUPPLY VOLTAGE:	6Vdc to 16Vdc
IDLE (SLEEP) CURRENT:	340uA
ACTIVE READ CURRENT:	< 4mA while responding to an SDI-12 command

- Streams
- Dams
- Ambient temperature
- Hydroponics
  Stilling wells
  Agriculture & soil science

PHYSICAL SPECIFICATIONS		
MATERIALS:	Stainless steel 304, PVC, Polyurethane Polyethylene cable sheath	
SIZE:	Diameter 0.5" (12.7mm) x 5.7" (145mm) long	
WEIGHT:	~ 220 grams with 10 meter cable	
CABLE LENGTH:	10m standard request	length, custom lengths available on
SDI-12 SUPPORT		
SDI-12 VERSION:	V1.3	crc supported
COMMAND SUPPORT:	a!	acknowledge
	al!	return identification
	aAb!	change address
	aM! aMC!	start measurement
	aD!	return measurement data

### 6533 WIND SPEED AND DIRECTION INSTRUMENT



#### MODEL A



The 6533 Wind speed and direction instrument is a high performance RM young sensor. It combines simplicity and lightweight corrosion resistant construction with a low threshold, fast response, and excellent fidelity.

The wind speed sensor is a four blade helicoid propeller. Propeller rotation produces a sinewave voltage output where frequency is directly proportional to wind speed. Slip rings and brushes are not used.

The wind direction sensor is a lightweight vane with sufficiently high damping ratio and low aspect ratio to ensure excellent fidelity in rapidly fluctuating winds. Vane position is sensed by a precision conductive plastic potentiometer. With a known excitation voltage applied to the potentiometer, the output signal is directly proportional to azimuth.

The instrument is made of UV stabilised plastic with stainless steel and anodised aluminium fittings. All bearings are precision grade stainless steel. A Unidata's micro-power interface circuit, housed in a junction box on the mounting post, converts the sinewave to a 5V signal and potentiometer output to a calibrated 2.50 V signal, suitable for connection to the regular data logger.

An 8 core cable can be used to connect the instrument to the logger. The instrument mounts on standard 1 inch pipe.

PHYSICAL SPECIFICATIONS		
SIZE:	370mm x 550mm tall (HxL), Propeller Diameter 180mm	
WEIGHT:	1kg grams	
OPERATING TEMPERATURE:	-50°C to 50°C. Not affected by humidity	
ELECTRICAL SPECIFICATIONS		
WIND SPEED		
RANGE:	0 100 m/s (224mph)	
ACCURACY:	±0.3% or 1% of reading	
THRESHOLD:	Propeller 1.0m/s (2.2mph)	

OUTPUT SIGNAL:	8 or 16 bit counter channel, 3 pulses per revolution
WIND DIRECTION	
AZIMUTH:	0 360° mechanical, 355° electrical (5° open)
ACCURACY:	±3°
THRESHOLD:	Vane 1.1m/s (2.4mph)
OUTPUT SIGNAL:	1 analog channel. 0 to 2.5V calibrated 0° to 359°
OPERATING VOLTAGE:	15 VDC maximum
MOUNTING:	Standard 1 inch pipe



### 6539 HUMIDITY AND TEMPERATURE PROBE

#### MODEL B





The 6539 humidity and temperature probe is designed for reliable outdoor humidity and temperature measurements. The probe is very accurate, has excellent long-term stability and negligible hysteresis.

The humidity and temperature probe's small diameter allows it to be used in applications with space restrictions, for example, shipping containers or between planks in timber drying kilns. It is designed especially for demanding outdoor applications.

The probe has the proven HUMICAP® 180R humidity sensor that has excellent stability and withstands harsh environments as well as Pt100 RTD temperature sensor. The probe structure is solid and the sensor is protected

#### **SPECIFICATIONS**

PHYSICAL SPECIFICATIONS		
SIZE:	Diameter 40mm x 267mm tall, IP66	
WEIGHT:	350 grams	
OPERATING TEMPERATURE:	-80°C to 60°C. Not affected by humidity	
ELECTRICAL SPECIFICATIONS		
RELATIVE HUMIDITY		
RANGE:	0 100%RH	
ACCURACY:	±1%RH at +15° to +25°C and 0-90%RH ±1.7%RH at +15° to +25°C and 90-100%RH ±(1+0.008 x reading)%RH for -20° to +40°C	

by default with a sintered Teflon filter, which gives maximum protection against liquid water, dust, and dirt.

The 6539 probe is also a warmed probe which reduces the risk of condensation forming on the head of the probe and with that reduces chance of measurement data corruption.

The probe can be used in conjunction with the Model 6704A Radiation Gill Screen & Mount in standalone situations.

TEMPERATURE		
RANGE:	-80 +60°C (-112 +140°F)	
ACCURACY:	±(0.226-0.0028 x temperature)° for -80° to +20°C ±(0.055+0.0057 x temperature)° for +20° to +60°C	
OPERATING VOLTAGE:	7 28 VDC, minimum operating voltage 12V with 0-5V output.	
TYPICAL CURRENT CONSUMPTION:	3 mA at 12 VDC (with defaults)	
OUTPUTS:	1 analog 0-1VDC – Relative Humidity 1 analog 0-1VDC – Temperature	
CABLE:	3.5m of 4 core cable	

### 7241 PYRANOMETER/SOLAR RADIATION SENSOR





The 7241 pyranometer / solar radiation sensor is a compact sensor for solar energy measurements. It compares favourably with thermopile sensors at a lower price point.

The sensor features a fully potted, domed-shaped head making the sensor fully weatherproof, self-cleaning, and impervious to thermal based accuracy fluctuations. The pyranometer sensor is calibrated against precision reference thermopile sensors in natural light conditions.

This generation sensor head design includes:

- Self-cleaning dome-shaped head.
- Excellent cosine response.
- Potted solid to withstand extreme and humid conditions, and reduce thermal based accuracy fluctuations.
- Calibrated silicon-cell photodiode sensor accurate to ±5%, under clear sky conditions.
- Easily integrates with Unidata Starlog loggers and and Neon Remote Terminals.

Unidata can provide mounting assembly that is ideal for mounting Radiation Sensors/ Pyranometers.

Radiation Sensors must be optically levelled to ensure repeat measurements are accurate and to ensure for repeat measurements are at the same level orientation to the sun.

Radiation sensor mounting assembly includes a levelling unit fitted with a bulls eye as well as a mounting arm and mounting hardware for poles to a maximum of 60mm diameter.

#### SPECIFICATIONS

PHYSICAL SPECIFICATIONS PYRANOMENTER		
SIZE:	Diameter 24mm x 27.5mm tall, IP68 Can be submerged under water up to depths of 30m	
WEIGHT:	90 grams with 5m of cable	
OPERATING TEMPERATURE:	-40°C to 70°C. Not affected by humidity	
ELECTRICAL SPECIFICATIONS		
ELECTRICAL SPECIFICA	TIONS	
ELECTRICAL SPECIFICA POWER SUPPLY:	5 24 VDC	
ELECTRICAL SPECIFICA POWER SUPPLY: TYPICAL CURRENT CONSUMPTION:	5 24 VDC 300μΑ	
ELECTRICAL SPECIFICA POWER SUPPLY: TYPICAL CURRENT CONSUMPTION: OUTPUTS:	TIONS 5 24 VDC 300μΑ 1 analog 4mV per 1W/m <sup>2</sup>	

NON-STABILITY:	<2% per year	
NON-LINEARITY:	<1% up to 1750W/m <sup>2</sup>	
RESPONSE TIME:	<1ms	
SPECTRAL RANGE:	360nm to 1120nm	
DIRECTIONAL RESPONSE ERROR:	±2% at 45° and ±5% at 75°	
CABLE:	5m of 3 core cable	
PHYSICAL SPECIFICATIONS MOUNTING ASSEMBLY		
MATERIAL:	Powder coated aluminium	
SIZE:	190mm x 101mm x 120mm (LxWxH)	
WEIGHT:	700grams	
MOUNTING:	Set of two 60mm U-bolts and saddle clamps	



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### 7241 PYRANOMETER/SOLAR RADIATION SENSOR



#### MODEL C-E



The 7241 sensor technology combines the advantages of reference cell and broadband thermopile pyranometers. Compared to the reference sensors it has proper cosine response and it is relatively compact. It benefits from the same characteristics as a PV module i.e. response time, spectral and temperature response.

The ML-01 is an industrial grade solar sensor specially made for performance ratio measurements as well as irradiance measurement applications for the meteorological, agricultural and environmental studies. The compact dimensions of the sensor body make it easy to integrate within any application using it with or without mounting plate. For global horizontal measurement applications the sensor can be mounted in horizontal position with the standard removable mounting plate with spirit level and levelling feet.

The Mono-Silicon detector, with UV resistant diffuser, gives a cosine response also at low solar elevation angles. Besides the effects of soiling or water deposition on top of the diffusor will be minimised due to the cone shape geometry.

#### **SPECIFICATIONS**

PHYSICAL SPECIFICATIONS PYRANOMENTER		
SIZE:	Diameter 22mm x 28.5mm tall	
WEIGHT:	90 grams with 5m of cable	
OPERATING TEMPERATURE:	-30°C to 70°C. Not affected by humidity.	
ELECTRICAL SPECIFICATIONS		
POWER SUPPLY:	None	
OUTPUTS:	1 analog 0-100mV	
SENSITIVITY:	50µV/Wm <sup>-2</sup>	
NON-STABILITY:	±2% per year	
NON-LINEARITY:	<0.2% at 1000W/m <sup>2</sup>	

Unidata can provide mounting assembly that is ideal for mounting Radiation Sensors/ Pyranometers.

Radiation Sensors must be optically levelled to ensure repeat measurements are accurate and to ensure for repeat measurements are at the same level orientation to the sun.

Radiation sensor mounting assembly includes a levelling unit fitted with a bulls eye as well as a mounting arm and mounting hardware for poles to a maximum of 60mm diameter.

RESPONSE TIME:	<1ms
SPECTRAL RANGE:	400nm to 1100nm
DIRECTIONAL RESPONSE ERROR:	<±5% for 0° to ~80°
CABLE:	5m of 3 core cable
PHYSICAL SPECIFICATIONS MOUNTING ASSEMBLY	
MATERIAL:	Powder coated aluminium
SIZE:	190mm x 101mm x 120mm (LxWxH)
WEIGHT:	700grams
MOUNTING:	Set of two 60mm U-bolts and saddle clamps

### NOTES


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### Monitoring Modules

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### 6506 TIPPING BUCKET FLOW GAUGE



#### MODEL G AND H



The 6506 tipping bucket flow gauge is used to measure small volumetric flows which exceed the capacity of common rainfall gauges. Typical applications include: monitoring rainfall under a tree canopy, leakage in water storage dams, seepage and runoff.

Unidata 6506 Tipping Bucket flow Gauge is sturdily constructed from polished stainless steel. The tipping mechanism is manufactured from stainless steel and is of solid construction ensuring that tips are accurate and consistent in volume.

The 6506 is supplied with a single reed switch as a detector. This requires no power and is a simple two wire connection. This is usually the easiest to

connect to dataloggers, including the Unidata Starlog dataloggers and Neon Remote Terminals..

It is pre-calibrated to a 75ml/tip or a 130ml/tip but it can be calibrated to any volume from 75ml to 130ml per tip.

PHYSICAL SPECIFICATIONS		
MATERIAL:	Marine Grade 316 Stainless Steel	
SIZE:	400mm x 300mm x 155mm (LxWxH)	
WEIGHT:	2.7kg net	
OPERATING TEMPERATURE:	-20°C to 60°C	

RANGE:	6506G – up to 3 litres/minute 6506H – up to 4 litres/minute
BUCKET CAPACITY:	6506G – 75ml per tip 6506H – 130ml per tip
SIGNAL ELEMENT:	Single reed switch
CABLE:	5m of 2 way instrumentation screened cable - PVC



### 6526 STARFLOW ULTRASONIC DOPPLER VELOCITY, DEPTH AND FLOW INSTRUMENT

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Unidata ultrasonic Doppler instrument is a compact, easy-to-use system for measuring the velocity and depth of water in rivers and streams, open drainage channels, and large pipes. It is suitable for use in a wide range of water qualities ranging from sewage and wastewater to clean streams, potable water and even sea water. This model incorporates a backup lithium battery for the RAM which allows for logged data to be stored for some months / years until power is restored.

The instrument measures forward and reverse flow conditions and may be programmed to computer flow rate and total flow in pipes and open channels.

The ultrasonic transducer assembly is profiled to reduce flow disturbance. It is designed to be placed at (or near) the bottom of the water channel for upstream measurement. A single cable connects the instrument to a 12V DC power source.

Water velocity is measured by the ultrasonic Doppler principle which relies on suspended particles or small air bubbles in the water to reflect the ultrasonic detector signal. The instrument will not operate in very clean, degassed water. Water depth is gauged by a hydrostatic pressure sensor, referenced to atmospheric pressure through the vented power and signal cable.

#### SPECIFICATIONS

MODEL J

PHYSICAL SPECIFICATIONS		
MATERIAL:	PVC body, Marine Grade 316 Stainless Steel Mounting Bracket	
SIZE:	290mm x 70mm x 30mm (LxWxH)	
WEIGHT:	2kg with 15m of Cable	
OPERATING TEMPERATURE:	0°C to 60°C water temperature	
VELOCITY RANGE:	21mm/s to 4500mm/s bi-directional	
VELOCITY ACCURACY:	2% of measured velocity	
VELOCITY RESOLUTION:	1mm/s	
DEPTH RANGE:	Om to 2.0m and Om to 5.0m	
DEPTH ACCURACY:	Typical ± 0.25%	
TEMPERATURE:	-17°C to 60°C	
TEMPERATURE RESOLUTION:	0.1°C	
FLOW COMPUTATION:	Flow rate, totalised flow	
CHANNEL TYPE:	Pipe, open channel, natural stream	
CABLE:	15 metre, 9 way vented < <sql>&gt; compatible</sql>	
CABLE OPTIONS:	User specified up to 50 metres	

ELECTRICAL SPECIFICATIONS		
POWER SOURCE:	External Battery 12V DC	
POWER USAGE:	11.5V to 15V DC, 50µA standby, 200mA active, 90mA communications	
CONTROL:	1 x CMOS output trigger – water sampler	
COMMUNICATION:	1 x RS232C Baud rates: 300/1200/2400/4800/9600/ 19200/38400	
SDI-12:	SDI-12V 1.3 recorder (1200 baud smart instrument channel)	
INTEGRATED LOGGER SPECIFICATIONS		
STORAGE MEMORY:	Low power CMOS RAM 512k standard	
RAM BACK UP BATTERY:	Lithium Battery 3V, 950mAh	
TIME CLOCK:	Crystal regulated, +/- 10 seconds/month	
SCAN RATES:	Programmable from 5 seconds to 5 minutes	
LOG INTERVALS:	Programmable from 5 seconds to 24 hours	
CPU	900552 microcontroller 14 7456 MHz	
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## STARFLOW ACCESSORIES

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To simplify use and get the most out of the Starflow ultrasonic Doppler instrument, the following components can be added.





Microwire serial to 4-20mA Interface 6122C-S converts a serial signal to a 4-20mA output. Any microwire compatible 3-wire synchronous serial signal channel can be used as an input. It supports two 16-bit resolution channels. The Starflow supports microwire as an alternative use of the SDI-12 channel. This enables the connection of any measured channel to a 4-20mA transmitter.

The 6702S and 6702S-LCD weatherproof polycarbonate enclosures contain mounting hardware for a 12V 14Ah sealed lead-acid battery 6907B-14 and drying tube 6603DT.

There are three SQL connectors mounted in the base of the enclosure. These are wired to enable connection to the Starflow, PC and solar panel/external power. The 6702S-LCD has an LCD mounted on the hinged lid of a large weatherproof polycarbonate enclosure. It displays the values of parameters obtained from the most recent scan as defined by Starflow scheme. The LCD unit communicates with the Starflow via the HSI0 bus. The RS232 interface is available for other purposes such as connecting a modem.

To keep the vent tube in vented cable dry, a drying tube 6603DT containing "silica-gel" desiccant is connected to the Starflow cable using special tygon tubing. The drying tube needs to vent to the atmosphere. Drying tube should be replaced when silica-gel turns pink – (normally blue)

Continued over page )





The Starflow adaptor cable 6603D-SDI is communication cable that allows you connect Starflow to a PC and a 12V battery.

Stainless Steel Mounting Bracket Model 6526M-2 is a clamp used to secure a Starflow instrument into a channel or a pipe. The bracket saddle locks the instrument into its correct position.



The Model 6705 expanding band kit allows you to install a Starflow instrument in pipes of different sizes. The band is flexible enough to fit irregular shapes such as ovoid sections. All components are made from stainless steel and the band fittings are 100mm wide to match the 6526M-2 mounting bracket.



#### **6122C-S SPECIFICATIONS**

PHYSICAL SPECIFICATIONS		
MATERIAL:	ABS IP65 Sealed Enclosure	
SIZE:	115mm x 65mm x 56mm (LxWxH)	
WEIGHT:	200 grams	
OPERATING TEMPERATURE:	-20°C to 60°C. Not affected by humidity	
ELECTRICAL SPECIFICATIONS		
RESOLUTION:	16 bits, ±0.0015%	
ACCURACY:	±0.015%	
INPUT:	16-bit serial	
OUTPUT:	4-20mA	
INPUT CONNECTOR:	7 pin SQL female connector	
OUTPUT CONNECTOR:	7 pin SQL male connector, 2 PG7 Glands	
POWER:	11VDC to 18 VDC 3mA, plus 4 -20mA per channel	

#### 6702S AND 6702S-LCD SPECIFICATIONS

PHYSICAL SPECIFICATIONS		
MATERIAL:	Polycarbonate Enclosure IP66/67	
SIZE:	280mm x 190mm x 130mm (LxWxH)	
WEIGHT:	1kg	
ELECTRICAL SPECIFICATIONS		
CONNECTORS:	1 x male 7 pin SQL PC connection 1 x female 7 pin SQL Starflow connection 1 x male 4 pin SQL External Power connection	
POWER SUPPLY:	8 to 18VDC @ 20mA	
SERIAL SIGNAL:	HSIO Standard Synchronous Protocol and RS232	
SERIAL PROTOCOL:	ASCII text special commands for formatting	
DISPLAY FORMAT 6702S-LCD ONLY:	Four lines x 16 characters	
LCD TYPE:	Supertwist (STN), yellow-green, no backlight	
OPTIMUM VIEWING:	6 o'clock	

#### 6526M-2 SPECIFICATIONS

PHYSICAL SPECIFICATIONS	
MATERIAL:	0.9mm 316 stainless steel
DIMENSIONS:	100mm x 110mm (LxWxH)
SECURING HARDWARE:	Four sets of M4 x 12 Machine screws and nylocks

PHYSICAL SPECIFICATIONS	
MATERIAL:	316 stainless steel
DIMENSIONS AND WEIGHT:	0.5 kg Model 6705A Small expending 100mm to 150mm clamp
	0.6 kg Model 6705B Large expending 150mm to 250mm clamp
	1.2 kg Model 6705D 1800mm long band segment, 100mm wide
	0.2 kg Model 6705F Band joiner 50mm x 100mm

### 6526 STARFLOW HSIO LCD DISPLAY UNIT

#### MODEL LCD-C





The Starflow HSIO LCD display unit interfaces with the 6526 Starflow ultrasonic Doppler velocity, depth and flow Instrument. It displays the values obtained from the most recent scan.

The Starflow's scheme defines which parameters will be displayed. For example, one of the supplied schemes displays water temperature, battery supply voltage, totalised flow and logging status.

The 6526 LCD is packaged in a compact weatherproof polycarbonate enclosure, fitted with pre-wired SQL type connectors. These connectors enable direct connection to a Starflow instrument, and computer/external power supply using a 6603D-SDI cable.

The SQL connections are designed to be 'pass through' so that the computer can connect to the instrument without disconnecting the power or display.

The display module power supply can be wired to a user-installed switch so that it can be switched on only when necessary. The module display is refreshed every scan (normally 15 seconds with a Starflow) and will display a test message when power is applied until a message from the instrument is received. Pressing the button on the front panel resets the display.

PHYSICAL SPECIFICATIONS	
MATERIAL:	ABS IP65 Sealed Enclosure
SIZE:	115mm x 70mm x 83mm (LxWxH)
WEIGHT:	270 grams
OPERATING TEMPERATURE:	0°C to 50°C. Not affected by humidity

ELECTRICAL SPECIFICATIONS	
DISPLAY FORMAT:	Four lines x 16 Characters
LCD TYPE:	Supertwist (STN), yellow-green, no backlight
OPTIMUM VIEWING:	6 o'clock
POWER SUPPLY:	8 to 18VDC @ 20mA
SERIAL SIGNAL:	HSIO Standard Synchronous Protocol and RS232
SERIAL PROTOCOL:	ASCII text special commands for formatting
CONNECTORS:	1 x 7 pin SQL male connector for PC connection and 1 x 7 pin SQL female connector for Starflow connection


## 6527 STARFLOW QSD ULTRASONIC DOPPLER VELOCITY AND DEPTH INSTRUMENT

## $\approx$



The Unidata 6527 Starflow QSD SDI-12 Instrument is used to measure water velocity, depth and temperature of water flowing in rivers, streams, open channels and large pipes. When used with a companion Unidata IP data logger, flow rate and total flow can also be calculated.

6527 Starflow QSD SDI-12 Instrument is robust, reliable and easy to use. It is completely sealed against water ingress, low maintenance – no calibration, low power – no fussy power arrangements needed.

Ultrasonic Doppler Principle in Quadrature Sampling Mode is utilised to measure water velocity. 6527 transmits ultrasonic energy through its epoxy casing into the water. Suspended sediment particles, or small gas bubbles in the water reflect some of the transmitted ultrasonic energy back to 6527 instrument's ultrasonic receiver. instrument than processes this received signal and calculates the water velocity.

Water depth is also measured with an ultrasonic depth sensor. This technology enables the Starflow QSD SDI-12 Instrument to be completely sealed; potted in a solid block of 'ultrasonic-transparent' epoxy and free from any potential leaks that might otherwise occur.

Using an ultrasonic depth sensor also avoids the vulnerability of conventional pressure sensors to damage from water-borne debris and avoids the need for frequent recalibration to maintain accuracy.

6527 instrument is suitable for use in a wide range of water qualities, from sewage to potable water including sea water. However, it may not be as effective in clean, gas-free water.

6527 instrument measures velocity in both directions. With a companion Unidata Starlog datalogger or Neon Remote Terminal the instrument can be programmed to compute flow rate and total flow in pipes and open channels of known dimensions.

Simply mount it on, or near the bottom of the water channel. Starflow QSD SDI 12 Instrument's low-profile form-factor minimises disturbance to the flow it's measuring.

### SPECIFICATIONS

**MODEL A** 

PHYSICAL SPECIFICATIONS	
MATERIAL:	Epoxy-sealed body, Marine Grade 316 Stainless Steel Mounting Bracket
SIZE:	135mm x 50mm x 20mm (LxWxH)
WEIGHT:	1kg with 15m of Cable
OPERATING TEMPERATURE:	0°C to 60°C water temperature
VELOCITY RANGE:	20mm/s to 1600mm/s in one direction 20mm/s to 3200mm/s in one direction (parameter setting) Bidirectional flow capacity (parameter setting)
VELOCITY ACCURACY:	±2% of measured velocity
VELOCITY RESOLUTION:	1mm/s
DEPTH RANGE:	20mm to 2.0m/5.0m*
DEPTH ACCURACY:	Typical ± 1%

TEMPERATURE:	0°C to 60°C	
TEMPERATURE RESOLUTION:	0.1°C	
FLOW COMPUTATION:	Flow rate, totalised flow	
CHANNEL TYPE:	Pipe, open channel, natural stream	
CABLE:	15 metre, 3 way	
CABLE OPTIONS:	User specified up to 50 metres	
ELECTRICAL SPECIFICATIONS		
POWER SOURCE:	External Battery 12V DC	
POWER USAGE:	10V to 24V DC, 50µA standby, 100mA active for 1 sec	
SDI-12:	SDI-12V 1.3 recorder (1200 baud smart instrument channel)	
* Denne is a base of the to 2000 and is set to a it be a set of the to be a dimensional in the top of		

\* Range is above sensor and up to 2000mm in water with heavy sediment and up to 5000mm in water with medium sediment.

## 6528 & 7422 PH DOUBLE JUNCTION AND DISSOLVED OXYGEN PROBES

pH & O<sub>2</sub>



pH double junction probe 6528 have a rugged design and utilises a double junction reference system to minimise the effects of contamination due to clogged pores or ingress of sample. Probe is designed as a low power instrument and includes built-in conditioning electronics for direct connection to a data logger.

The 6528 pH probe consists of a pH sensor with a voltage output that varies proportionately to the hydrogen ion activity between a reference electrode and an electrode immersed in an alkaline (basic) or acidic solution.

These advanced electrodes feature proven flat tip technology which virtually eliminates deposits that can foul the electrode, significantly reducing necessary maintenance.

Each electrode has a built-in potential matching pin. With this feature, electrode fouling due to ground loop current through the reference of the sensor is a thing of the past. These electrodes have been engineered with a replaceable battery to power the amplifier. This feature adds life to the electrode and aids in troubleshooting.

The dissolved oxygen probe 7422 is a galvanic measuring element which produces a millivolt output proportional to the oxygen present in the medium it

is placed in. It consists of an upper part with cathode, anode and cable, and a cap with membrane and electrolyte.

Oxygen diffuses through the membrane onto the cathode, where it reacts chemically and then combines with the anode. This chemical process develops an electric current, which flows through a built-in resistor. The resistor converts the current (microamps) into millivolts. This millivolt signal is led to the data logger via a two core cable.

The probe is virtually maintenance free, requiring only that its membrane be kept reasonably clean. The anode remains fully active through its lifetime of several years. The membrane is very robust and can be wiped clean with a cloth or paper. It is recommended that the membrane be cleaned from time to time to ensure maximum reliability.

#### 6528 SPECIFICATIONS

PH DOUBLE JUNCTION PROBE	
MATERIAL:	PVDF Body
SIZE:	Diameter 25 x Length 141mm
WEIGHT:	400g including cable
PH RANGE:	0-13
JUNCTION:	Double
JUNCTION TYPE:	Teflon
ELECTROLYTE:	Polymer
PRESSURE:	6bar (87 PSI)
TEMPERATURE RANGE:	-5° to 80°C
CABLE:	5m of 2 core

DISSOLVED OXYGEN PROBE	
MATERIAL:	PVDF Body
SIZE:	Diameter 58 x Length 59mm
WEIGHT:	450g including cable
RANGE:	0-50mV (2.5 to 5mV per ppm mg/l)
OUTPUT IMPEDANCE:	1kΩ
TYPE:	Galvanic cell, self-polarising, self-temperature- compensating
TEMPERATURE RANGE:	0 to 40°C
PRESSURE:	Submersible to 100m
CABLE:	7m



## 6529-3 AUTOMATIC EVAPORATION MONITORING SYSTEM

## $\approx$



Unidata 6529-3 automatic evaporation monitoring system measures how much water evaporates from a Class A evaporation pan by measuring the water level in an adjoining stilling well. Use of stilling well reduces fluctuations in the pan's water level caused by wind.

The 6529-3 operates an evaporation pan and records evaporation and rainfall data. The instrument is normally supplied as a complete package with a US Class A evaporation pan and all installation fittings, but it can be connected to any other type of pan.

The 6529-3 system is designed to operate for long periods without maintenance. The water level instrument and data logger operate for one year from internal batteries and water level control system, refill and discharge of water from the evaporation pan, is solar powered. The water supply to refill the evaporation pan is provided by the user from a tank or a reticulated water supply pipe. Rainfall removed from the pan can be recycled if required.

The datalogger included with the unit is fully programmable and has all the STARLOG features. Some of these are: event and time interval recording,

programmable measurement and recording intervals, signal processing such as average, max, min and computations including flow conversions and rating tables.

A water temperature sensor and a range of weather sensors can be added to the system to identify the relationship between pan evaporation and site conditions. These are required for evaporation and evapo-transpiration studies and modelling.

The traditional micrologger can be replaced with the Unidata Neon Remote Terminal that can use ether cellular or satellite communication links to transmit the logged data to a central Neon server and the data can be then viewed on a standard web browser.in near real time.

PHYSICAL SPECIFICATIONS	
MATERIAL ENCLOSURE:	Powder coated aluminium
SIZE:	320mm x 300mm x 750mm (LxWxH)
MATERIAL PAN:	Fiberglass
SIZE:	1208 ID, OD 1290mm x 250mm deep – US Class A compatible
MATERIAL BIRD GUARD:	Stainless steel mesh
SIZE:	Diameter 1215mm x 210mm deep
MATERIAL PAN MOUNTING:	ISPM Treated Pine (IPPC 81gn)
SIZE:	1300mm x 1300mm x 105mm (LxWxH)
WEIGHT:	~52kg net

OPERATING TEMPERATURE:	-20°C to 60°C
RANGE:	30mm to 250mm. Pan empty to full
RESOLUTION:	0.2mm of evaporation or rainfall
ACCURACY:	± 0.4mm
SOLENOID:	0-1000kPa 12V
LEVEL RESET:	Programmable. Default reset to 200mm (± 1mm) at a preset time each day
WATER LEVEL:	6541 Water Level Instrument with 512k Micrologger
POWER SUPPLY:	0.3Ah/day
BATTERY:	Model 6907B 12V, 7Ah sealed lead acid
SOLAR PANEL:	Model 6904I-10 12V, 10W solar panel

## 6536 WATER CONDUCTIVITY INSTRUMENT WITH 6536P PROBE

### MODEL E AND P

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The 6536 Water Conductivity Instrument with 6536 Probe measures the electro-conductivity and temperature of water in streams, rivers, lakes and in the groundwater system, using bore holes.

The temperature is measured within the sensing cell to provide precision correction. Both, temperature corrected and uncorrected, conductivity measurements are available for recording.

A Starlog compatible micrologger with 512KB memory is part of the instrument, providing all the standard Unidata data logger features such

#### SPECIFICATIONS

INSTRUMENT PHYSICAL SPECIFICATIONS	
MATERIAL:	Polycarbonate Enclosure
SIZE:	230mm x 65mm x 80mm (LxWxH)
WEIGHT:	1.5kg (including battery)
OPERATING	0°C to 60°C
TEMPERATURE:	
ELECTRICAL SPECIFICATI	ONS
BATTERY:	6 x 1.5V industrial grade D size Alkaline battery pack 6910A (non-rechargeable)
BATTERY LIFE:	up to 1 year (based on daily schedule)
EXTERNAL POWER:	External battery power 7-15VDC may be connected
COMMUNICATION:	1 x RS232C Baud rates: 300/1200/2400/4800/9600/ 19200/38400
SDI-12:	SDI-12V 1.3 recorder (1200 baud smart instrument channel)
EC OPERATING RANGE	
LOW:	0-200µS/cm
ACCURACY:	±2%
RESOLUTION:	0.2µS/cm
MID:	200-20,000µS/cm
ACCURACY:	±1%
RESOLUTION:	2.0µS/cm
HIGH:	20,000-200,000µS/cm
ACCURACY:	±1%
RESOLUTION:	20µS/cm
TEMPERATURE	
RANGE:	-20°C to 60°C
ACCURACY:	± 0.1°C
RESOLUTION:	0.0612°C
COMPENSATION RANGE:	0°C to 60°C

or 12V battery.
Conductivity: 0 – 200,000 (uncompensated)
Conductivity: 0 – 200,000 (temperature compensated)

as SDI-12, intelligent battery supervision, modem interface and all the

Ultra-low power consumption makes the 6536 ideal for remote, unattended

operation. This instrument will operate for months from a single model 6910A

programmability found in Starlog dataloggers.

CHANNELS	Conductivity: 0 – 200,000 (temperature compensated) Conductivity: 0 – 65,535 (uncompensated) Low resolution (for SDI-12) Conductivity: 0 – 65,535 (temperature compensated) Low resolution (for SDI-12) Water temperature, battery voltage
INTEGRATED LOGGER SP	ECIFICATIONS
STORAGE MEMORY:	Low power CMOS RAM 512k standard
RAM BACK UP BATTERY:	Lithium Battery 3V, 950mAh
TIME CLOCK:	Crystal regulated, +/- 10 seconds/month
SCAN RATES:	Programmable from 5 seconds to 5 minutes
LOG INTERVALS:	Programmable from 5 seconds to 24 hours
CPU:	80C552 microcontroller, 14.7456 MHz
PROBE PHYSICAL SPECIE	ICATIONS
MATERIAL:	Derlin Housing, back epoxy
SIZE:	Diameter 15.3mm x 163mm L
WEIGHT:	500g (including 10m of cable)
OPERATING TEMPERATURE:	0°C to 60°C
IMMERSION DEPTH:	36mm minimum to more than 100m
SENSOR CABLE:	10 metres, 20m & 50m with SQL connector, custom lengths available
SENSOR TYPE:	Four (4) Electrode, cocentric graphite
PRESSURE RESISTANCE:	10 bar
CELL CONSTANT:	0.475cm-1 ±2.0%
THERMISTOR TYPE:	Integrated NTC (30kΩ@25°C)

## 6541 PRECISION WATER LEVEL INSTRUMENT

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#### MODEL C



The 6541 is a high accuracy float and pulley based shaft encoder instrument for measuring the level of water in many different applications. Float-operated instruments can be the most accurate way to monitor water levels, and they are the most common method to measure river levels. The Unidata 6541 precision water level instrument can achieve operating accuracy and resolution of 0.2mm with high stability and minimum drift.

This accuracy is maintained for the service life of the instrument without calibration or maintenance, apart from battery changes. The 6541 has the range to monitor surface and underground waters and the precision to monitor rainfall and evaporation.

The water level instrument is normally connected to the surface of the water by a float system. As the water level changes, the input shaft rotates. An optical encoder is mounted on the input shaft. On installation, the instrument is set to display the water level. The encoder is continuously monitored as the instrument tracks water level changes. These changes update the LCD display and the readings can be recorded by an associated datalogger.

The very low mechanical friction and inertia of the instrument means that it can produce data with high precision and accuracy. A replaceable battery pack powers the instrument for more than twelve months. Practical design and rugged construction ensures easy operation and long service life.

PHYSICAL SPECIFICATIONS		
MATERIAL:	Powder coated aluminium mounting with Polycarbonate Enclosure IP66	
SIZE:	180mm x 140mm x 275mm (LxWxH)	
WEIGHT:	2.7kg (including battery)	
OPERATING TEMPERATURE:	-10°C to 60°C	
ELECTRICAL SPECIFICATIONS		
BATTERY:	6 x 1.5V industrial grade D size Alkaline battery pack 6910A (non-rechargeable)	
BATTERY LIFE:	up to 1 year (based on daily schedule)	
EXTERNAL POWER:	External battery power 7-15VDC may be connected	
RANGE:	Standard 0m-65.5m or -199.999m to 199.999m	
ACCURACY:	1mm, 0.2mm or 0.1inch depending on the chosen float pulley size	
RESOLUTION:	1mm, 0.2mm or 0.1inch depending on the chosen float pulley size	

I/O:	Up to eight instruments can be daisy chained Optional 4-20mA	
SDI-12:	SDI-12V 1.3 recorder (1200 baud smart instrument channel)	
LCD TYPE:	Reflective grey no backlight	
DISPLAY FORMAT:	One line x 6 Characters, 7 segments	
OPTIMUM VIEWING:	6 o'clock	
CABLE:	5m 8 core data cable	
INTEGRATED LOGGER SPECIFICATIONS - OPTIONAL		
INTEGRATED LOGGER S	PEGIFICATIONS - OFTIONAL	
STORAGE MEMORY:	Low power CMOS RAM 512k standard	
INTEGRATED LOGGER S STORAGE MEMORY: RAM BACK UP BATTERY:	Low power CMOS RAM 512k standard Lithium Battery 3V, 950mAh	
STORAGE MEMORY: RAM BACK UP BATTERY: TIME CLOCK:	Low power CMOS RAM 512k standard Lithium Battery 3V, 950mAh Crystal regulated, +/- 10 seconds/month	
STORAGE MEMORY: RAM BACK UP BATTERY: TIME CLOCK: SCAN RATES:	Low power CMOS RAM 512k standard Lithium Battery 3V, 950mAh Crystal regulated, +/- 10 seconds/month Programmable from 5 seconds to 5 minutes	
INTEGRATED LOGGER S STORAGE MEMORY: RAM BACK UP BATTERY: TIME CLOCK: SCAN RATES: LOG INTERVALS:	Low power CMOS RAM 512k standard Lithium Battery 3V, 950mAh Crystal regulated, +/- 10 seconds/month Programmable from 5 seconds to 5 minutes Programmable from 5 seconds to 24 hours	
INTEGRATED LOGGER S STORAGE MEMORY: RAM BACK UP BATTERY: TIME CLOCK: SCAN RATES: LOG INTERVALS: CPU:	Low power CMOS RAM 512k standard Lithium Battery 3V, 950mAh Crystal regulated, +/- 10 seconds/month Programmable from 5 seconds to 5 minutes Programmable from 5 seconds to 24 hours 80C552 microcontroller, 14.7456 MHz	

## **6542** HYDROSTATIC WATER DEPTH AND TEMPERATURE PROBE SDI-12





The 6542 hydrostatic water depth and temperature probe is a pressure sensor based instrument for measuring water depth in many applications. It has a cable with a vent tube for atmospheric pressure compensation. The 6542 Hydrostatic water depth and temperature probes provide accurate long term measurements of water depths of 3m to 50m in standard ranges, with an accuracy of 0.05% full scale. Sensor communicates via SDI-12 v1.3 or Modbus RTU RS485 protocol.

The 6542 is fully sealed and temperature compensated. A hermetically sealed case with a protection type IP 68 allows the pressure sensor to be immersed down to a depth of 200m. The inner vented connection cable makes pressure compensation of the measuring cell against the atmosphere possible and thus hydrostatic pressure measurement. The pressure sensor special for submersible measurement meets the electromagnetic compatibility (EMC) requirements to EN 61326. The mechanical fastening of the pressure sensor

does not require any additional strain relief, as the construction of the cable is suitable to take a maximum tensile force of 1000 N. The cable's individual signal wires are epoxy sealed into the casing to protect against water ingress. This probe is ideal for monitoring drainage, bore depth and river height. It can also be used to measure water with dissolved solids and other liquids.

#### **SPECIFICATIONS**

MODEL D

PHYSICAL SPECIFICATIONS		
MATERIAL:	Marine Grade 316 Stainless Steel or titanium	
SIZE:	Diameter 19mm x 214mm long	
WEIGHT:	400g	
OPERATING TEMPERATURE:	-15°C to 55°C	
ELECTRICAL SPECIFICATIONS		
EXTERNAL POWER:	9-16VDC	
DEPTH		
RANGE GAUGE:	3.5m, 10.5m, 21m of water	
ACCURACY:	±0.05% FS	

RESOLUTION:	±0.0034% FS
MAX OPERATING PRESSURE:	1.1 x full scale
TEMPERATURE	
RANGE:	-15°C to 55°C
ACCURACY:	$\pm 0.5^{\circ}$ C for 0° to 55°C and $\pm 2.0^{\circ}$ C for below 0°C
RESOLUTION:	±0.06°C
MODBUS:	RS485 RTU, output = 32bit IEEE floating point
SDI-12:	SDI-12V 1.3 recorder (1200 baud smart instrument channel)
CABLE:	Custom lengths of ether polyurethane, polyethylene or ETFE cable



## 6547 RADAR WATER LEVEL SENSOR

**MODEL A** 

# $\approx$



The 6547 Radar Water Level Sensor provides continuous water level measurement of water in rivers, streams, open waste water channels, storm water overflow tanks and pump stations. The 6547 is a radar sensor which provides accurate long term measurements of water level up to 8m range from the sensor.

The radar sensor emits extremely short microwave pulses through the antenna. The emitted signal is reflected by the medium/water and then received as an echo by the antenna. The time between the emitted and received signal is proportional to the distance and is outputted as measured value.

The sensor is normally mounted vertically with a bracket mounted on a structure with the sensor pointing downwards.

The 6547 is almost maintenance-free due to non-contact measuring principle and is protected by a IP 68 housing.

Radar readings are unaffected by change in temperature and pressure making this instrument ideal for use in difficult process conditions.

When used with a companion Unidata IP data logger, collected data is transmitter to a central Neon server where data can be viewed on the Neon Web server in near real time from any browser. Same data can be reported to other systems using email, ftp, and web services.



Sample of mounted sensor.

PHYSICAL	
MATERIAL:	Valox PBT or PP Enclosure IP68
SIZE:	Diameter 93mm. Length 243mm
WEIGHT:	~2.00kg
OPERATING TEMPERATURE:	-40°C to 60°C

ELECTRICAL	
EXTERNAL POWER:	12V-35VDC
RANGE:	Standard Om-8m
ACCURACY:	±5mm
FREQUENCY RANGE:	K-band
I/0:	4-20mA two wire
CABLE:	12m or more if required of 2 core + Kevlar relief wire.

## 6548 SUBMERSIBLE LEVEL TRANSMITTER

**MODEL A** 



The 6548 submersible level transmitter measures the height of liquid above the position in the tank, well or bore hole, referenced to atmospheric pressure. The sensor in a slim body design, ideal for narrow space applications like bore holes. It has good chemical compatibility and lightning and surge protection.

The transmitter has a piezo resistive sensing element, encased in stainless steel 316 housing. A bullet nose design protects the diaphragm from damage. The 6548 incorporates lightning and surge protection that utilises dual arrestor technology, grounded to case, which eliminates both power supply surges and lightning ground strike transients. Lightening and surge protection is not guaranteed and is not covered by warranty.

When used with proper intrinsically safe Zener barrier the 6548 is UL approved intrinsically safe for use in hazardous locations. The level transmitter comes equipped with a strong tensile strength shielded and vented cable. The vent tube in the cable automatically compensates for changes in atmospheric pressure above the water level. The vent is protected with a maintenance free filter that stops water droplets or vapour from entering the transducer.

#### SPECIFICATIONS

p78

PHYSICAL SPECIFICATIONS	
MATERIAL:	Stainless Steel 316 Enclosure IP68, bullet nose PVC
SIZE:	Diameter 25.40mm x Length 177mm
WEIGHT:	~1.00kg depending on cable length
OPERATING TEMPERATURE:	-18°C to 60°C

ELECTRICAL SPECIFICATIONS	
EXTERNAL POWER:	12V-35VDC
DEPTH RANGE:	3.5m, 5m and 10m
ACCURACY:	±0.25% FS
MAX OPERATING PRESSURE:	2 x full scale
I/0:	4-20mA two wire
CABLE:	Custom lengths of 3 core + breather tube, submersible cable

## NOTES


## NOTES


DNV GL

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