



# OEM InSight™ Telemetry Offering

## TECHNICAL SPECIFICATIONS

Rev 1.0 13-8-2019

### **Introduction:**

The Enviro One Services InSight Telemetry option module for the E-One Pump Controller provides highly reliable, direct-to-host data monitoring in a single package, aimed at both large water / waste water utilities, councils as well as land developers running sewerage networks in private residential / industrial developments.

The Enviro One InSight Telemetry option module features flexible device configuration that enables direct communication with the E-One Pump Controller to read data for operational monitoring and historical logging purposes, as well as allowing remote configuration of operational parameters, such as remote inhibit, pump station reset, remote setpoint configuration, pump station manual run, pump station pump down to name a few. Also available as standard is the ability to include extra Analog and Digital I/O signals, such as cabinet door alarm, float switch or level transducer.

### **Communications:**

The Enviro One Services InSight Telemetry option module is available in four (4) different ordering options, noting that only one communications option is available at a time, this allows system integrators and solution consultants / architects with maximum flexibility in regard to network topology:

- Part No. T1-001-4G 4G Cellular (Cat-M1 / NB-IoT)
- Part No. T1-001-3G 3G Cellular
- Part No. T1-001-RS RS232 Serial 3-Wire
- Part No. T1-001-ET Ethernet, RJ45, 10/100 Auto Detect

All data is stored internally on non-volatile flash memory. Even when power is lost or upstream communications is interrupted, no historical logged data is lost. Once the field device re-establishes connection with the upstream data host, all historical data is then uploaded, and trends are backfilled. The Enviro-1 InSight Telemetry option module provides support for 2,000 time and date stamped event logs in the event of power failure or communications outage.

The 4G cellular option provides support for the very latest emerging CAT-M1 and NB-IoT networks.

Support is provided for any type of IPWAN / Cellular network with the product proven and in use on all Australian, New Zealand and Pacific Island Telco networks.

### **Power System / Battery Backup:**

The InSight Telemetry module includes an on-board lithium-ion battery pack and battery charger, ensuring communications from the SCADA host system is still possible with the telemetry module even if onsite mains power is lost for one reason or another. Internal backup battery life is approx. 1-7 days, depending on the device configuration.

The InSight Telemetry module will report loss of mains power and return of mains power, allowing the authority to make decisions on site attendance or other operational changes etc.

### **SCADA Network Connection:**

Host compatibility is ensured with modern Water Utility SCADA systems thanks to integrated support for the industry standard DNP3.0 data protocol. The InSight telemetry module operates in DNP3 "Real-time" mode and can be "polled"

for data updates at any time, in real-time, equally, new configuration parameters and control data can be issued remotely from the SCADA Server in real-time.

Remote configuration and device management is supported via leading industry SCADA applications, such as ClearSCADA, remote firmware download capability is provided via FTP file transfer.

Connection direct to a utility SCADA host system such as ClearSCADA provides the water authority / council with complete device management from a central location, without the need to visit field devices to change operational parameters, set points, device configuration elements etc...

### **Cloud Based Data Visualisation:**

For smaller-scale deployments, or for clients without their own wide area SCADA Host system, the Enviro One Services InSight telemetry option module can report directly to a Cloud / web based data visualisation package, allowing the user to still benefit from all of the data logging, trending and SMS / Email alarming functionality from the pump station to provide clarity of wide area system operation and performance, without the remote control / device management option.

Data is then available for access from any internet connected device such as phone, laptop, tablet, pc etc...

### **Mounting:**

The InSight Telemetry device mounts inside the standard pump controller enclosure. Pump Controllers ordered with the telemetry option feature the module fitted in the factory, retrofit kits are supplied with all required items to complete the retrofit of the telemetry module into existing controllers in around 15 minutes per site.

### **Factory Supplied Accessories / Replacement Parts:**

The InSight Telemetry option module is supported by a range of standard, off the shelf accessory options to enhance the deployment as required, please see ordering options for further information on available accessories.

The InSight Telemetry option module is supported by a range of standard, off the shelf replacement parts to support ease of field maintenance, please see ordering options for further information on available replacement parts.

### **Factory Programming Options:**

The InSight Telemetry option module is available as a factory programmed and tested module, ready for direct deployment in the field, without the need for any specialised programming contractors / integrators to configure the field devices before deployment.

The factory programming option is highly recommended and is generally ordered by many clients to ensure that when the Pump Controllers arrive in the field, they are ready to "go live" from the time they are powered up.

Factory programming options are available on new pump controllers ordered with the telemetry option module, or available on telemetry retrofit kits ordered after initial deployment.

### **Equipment Design:**

The InSight Telemetry option module for the E-One Pump Controller is designed and manufactured exclusively for Enviro One Services by 37South Pty. Ltd.

37South Pty. Ltd. is the Australian product designer behind the industry leading Site Sentinel® and Metermade® brands of utility grade advanced low power DNP3 cellular data loggers.

Clients with existing deployments of Site Sentinel® and Metermade® products can take comfort in knowing that the same technology and high reliability that is engineered in all Site Sentinel® and Metermade® products is also contained within the InSight Telemetry option module for the E-One Pump Controller.

New clients gain the benefit of using the same equipment favoured by leading water authorities and councils throughout Australia and New Zealand.

InSight Telemetry option module for the E-One Pump Controller is proudly designed and manufactured in Australia and supported by a network of authorised Enviro One Services distributors.

General	
Supply Voltage	<ul style="list-style-type: none"> <li>Input Supply Nominal 12V DC, powered from pump controller internal power supply.</li> <li>Internal 7.4 Volt / 2.6 Ah (19.2 Wh) Lithium-Ion battery pack (field replaceable)</li> <li>Built in lithium-ion battery charger maintains battery pack.</li> </ul>
Current Draw	<ul style="list-style-type: none"> <li>50 <math>\mu</math>A sleep</li> <li>5 mA active</li> <li>20-200 mA cell communications</li> <li>2 A (peak) cell network detect</li> </ul>
Real Time Clock	<ul style="list-style-type: none"> <li>Internal – Year, month, date, hour, minute, second</li> <li>1 second time stamp resolution</li> <li>DNP3 - Automatic DNP3 time synchronisation from DNP3 master</li> <li>FTP - Automatic cellular network time sync or NTP time sync when using FTP data export mode</li> </ul>
System Watchdog and Brownout Detection	<ul style="list-style-type: none"> <li>Internal processor watchdog timer guards against hung processor due to abnormal condition and gracefully warm starts device and logs diagnostic restart code if restart occurs.</li> <li>Built-in brown-out detection guards against faulty or low power supply voltage to prevent unstable operation.</li> <li>User configurable “DNP3 Master Server Watchdog” timer allows device to gracefully close down cellular connection and force a restart cellular network session to guard against SCADA host network fault such as stuck IP socket, upstream cellular network issue etc... watchdog timer configurable from 1 minute to 250 minutes.</li> </ul>
Temperature	-20°C to +65°C Celsius
Humidity	0 to 90% relative humidity, non-condensing
Programming	<ul style="list-style-type: none"> <li>Windows based Configurator M+ configuration software</li> <li>Remote device management via DNP3 (Requires ClearSCADA)</li> <li>Remote firmware download via FTP (Requires ClearSCADA)</li> <li>Local Programming / Real-Time Diagnostics Port</li> </ul>
Mounting	<ul style="list-style-type: none"> <li>140 mm (long) x 49 mm (wide) x 20mm (deep)</li> <li>Designed for mounting inside existing pump controller enclosure.</li> </ul>
Environmental	IP67 when installed inside Enviro One Services Control Panel Enclosure to recommended standards.

I/O Interfaces	
Digital Input	<ul style="list-style-type: none"> <li>2 x low-current dry-contact binary inputs (non-isolated)</li> <li>Each input supports pulse counting, up to 3Khz (sleep/wake mode dependant), 32-bit rollover</li> </ul>
Analogue Input	<ul style="list-style-type: none"> <li>1 x Input, 0–20 mA, 0–2.048V DC or 0–5V DC (user selectable)</li> <li>15-bit resolution (non-isolated)</li> <li>4 x user-configurable alarm limits per channel</li> </ul>
System Input	Internal measurement of: <ul style="list-style-type: none"> <li>Cell Network RSSI</li> <li>RTU temperature</li> <li>RTU battery voltage</li> <li>RTU Session Status code</li> </ul>
Wake Pushbutton	Onboard “Wake” pushbutton allows field technician to initiate communications to upstream data host.
Sensor DC Out	Supplies up to 80 mA to power external sensors such as level sensors (Battery Volts)
Serial Comms	1x 3-wire Serial port, (TTL Level) for communications with E-One Pump Controller Board

<b>Telemetry (Cellular Product Variants)</b>	
T1-001-4G *	3G Cellular - Supports 3G B1 (2100), B5 (850), B8 (900), Class 3 output power (+24dBm)
T1-001-3G *	4G Cellular - Supports 4G/LTE CAT-M1/NB-IoT, B28 (700), B3 (1800), Class 3 output power (+23dBm)
Antenna	SMA female antenna connector, supplied with Internal antenna (2dBi Gain), user configurable
SIM Card	1.8 and 3V UICC (Standard size SIM card)
Data Protocols	DNP3.0 Slave unsolicited (sleep mode) or Polled (real-time) mode, or FTP data export to Cloud Server
Host Support	<ul style="list-style-type: none"> <li>• True TCP support to DNP host</li> <li>• Supports three DNP3 Master IP addresses / Servers</li> </ul>
Security	<ul style="list-style-type: none"> <li>• CHAP or PAP authentication</li> <li>• SIM credentials</li> <li>• Configurable username, password and APN</li> <li>• Built in IP firewall</li> <li>• 512-Bit AES Encrypted firmware download</li> </ul>

\*Specify Comms option when ordering.

<b>Telemetry (Serial / Ethernet Product Variants)</b>	
T1-001-RS *	RS232 Serial 3-Wire – Suits connection to existing digital data radios / terminal servers etc...
T1-001-ET *	Ethernet, RJ45, 10/100 Autosensing, TCP, UDP
Data Protocols	DNP3.0 Slave Polled (real-time) mode

\*Specify Comms option when ordering.

<b>Approvals</b>	
Build	RoHs
Standards	RCM (AUST/NZ), EMC compliance, other export standards on request
Production	Proudly Designed and Manufactured in Australia

<b>Product Ordering Options</b>	
	<p>Each ordering option below is provided as a factory fitted option at time of controller ordering, or available as a kit to allow retrofit to compatible controller enclosures. Each kit is supplied with the following hardware:</p> <ul style="list-style-type: none"> <li>• 1 x Telemetry Option board</li> <li>• 2 x PCB Mounting stand-offs</li> <li>• 2 x PCB Mounting Screws</li> <li>• 1 x Lithium-ion battery pack</li> <li>• 1 x Telemetry PCB to Pump Controller PCB Data cable</li> <li>• 1 x DC Power supply cable</li> <li>• 1 x Internal Antenna (Cellular Versions)</li> <li>• 1 x 240 Volt to 12 Volt DC DIN Rail Power Supply</li> </ul>
T1-001-4G	4G Cellular (Cat-M1 / NB-IoT) Comms Option – see specs above. (AU / NZ)
T1-001-3G	3G Cellular Comms Option – see specs above. (AU / NZ)
T1-001-RS	RS232 Serial 3-Wire, DNP3 Slave, No Cellular - see specs above. (AU / NZ)
T1-001-ET	Ethernet, RJ45, 10/100 Auto Detect, DNP3 Slave, No Cellular, No Serial - see specs above. (AU / NZ)

**Accessory / Replacement Part Ordering Options**

TPGC-001	USB Device Programming Cable, for local onsite programming and diagnostics, 1.5 metre length.
TPGS-001	Windows based Device Programming Software (per customer licence, unlimited users, lifetime free upgrades).
TCST-001	ClearSCADA Standard Outstation Template Examples – FREE DOWNLOAD UPON REQUEST.
TBAT-006	Replacement 7.4 Volt / 2.6 Ah (19.2 Wh) Internal Lithium-Ion Battery Pack.
TANT-009	Replacement Internal Antenna, Right Angle with SMA Male Connector.
TANT-002	High Gain External Antenna, stud mounted with 10m cable and SMA Male connector.
TANT-004	External Antenna, stud mounted with 1.25m cable and SMA Male connector.
TSWT-001	Pump Controller Cabinet Door Access Switch, Reed type with 300mm cable.

**Factory Programming Ordering Options**

TFPG-000	No Programming, unit supplied with base configuration only, client completes configuration.
TFPG-001	Cellular Product variant supplied factory programmed and remotely tested to Clients SCADA system; client supplied SIM Card. Client provides IP addressing information and DNP3 Master / Slave Addressing information.
TFPG-002	Cellular Product variant supplied factory programmed and remotely tested to Clients SCADA system; factory supplied SIM Card. Client provides IP addressing information and DNP3 Master / Slave Addressing information.
TFPG-003	RS232 Product variant supplied factory programmed and tested to Factory SCADA system ready for connection to clients new or existing Digital Data Radio. Client provides baud rate and DNP3 Master / Slave Addressing information.
TFPG-004	Ethernet Product variant supplied factory programmed / tested to Factory SCADA system ready for connection to clients new or existing Ethernet backbone / Digital Data Radio. Client provides IP addressing information and DNP3 Master / Slave Addressing information.

**Cloud Hosted Data Visualisation Ordering Options (Cellular Product Variants Only)**

THST-001	Initial Per Site Setup Fee, includes supply of Managed SIM Card connected on the Telstra 3G / 4G Network. (AU)
THST-002	Initial Per Site Setup Fee, includes supply of Managed SIM Card connected on the Spark 3G / 4G Network. (NZ)
THST-003	Initial Per Site Setup Fee, includes supply of Managed SIM Card connected on the Vodafone 3G / 4G Network. (NZ)
THST-004	Initial Per Site Setup Fee, includes supply of Managed SIM Card connected on a Global Roaming Network that permits use on all participating networks worldwide.
THST-005	Cloud Hosted Data Access Fee, per site, per month, including network access charges, up to 30 SMS per site per month, includes unlimited Email Alarms, billed 12 months in advance, no lock in contract. (AU / NZ)