

## Origo XMS Series - Monitoring Station

The Origo XMS series, the Monitoring Station has been tested in some of the harshest environments in regional and remote Australia. It uses the Origo X2 Series Industrial Internet of Things (IIoT) Processors Boards and the Z2 with three and Z2b Interface board with 12 ports. It is supplied as a complete package, including sensors installed in the Origo factory, ready to be installed.

The core of Origo XMS is the X2 Series Industrial Internet of Things (IIoT) Processors build on five years of development; this is an industrial Processor board with integrated power management systems, protections and flexibility for industrial, agricultural and utility applications. Its elevated antenna position makes it well suited for challenging radio signal conditions.

The industrial design ensures that all wires and cables are protected inside aluminium or conduit. Also, the electronics and Lilon battery is always protected from direct sunlight using aluminium for heat dissipation.

### Product Overview

The core of the Origo XMS Monitoring Station is the Origo X2 Processor; it builds on the Atmel® SMART™ low-power microcontrollers. Secondly, the X2 series boards have 128MBytes flash memory non-volatile, which means they can store months of sensor data in case of network or power outages.

Data update frequency is by default 15 minutes and down to 1 minute when using a private network.



### Communication

Two options are available for communication, and one is planned:

- ✓ Telstra or any mobile carrier approved IoT network (LTE Cat-M1), default data update frequency 15 minutes.
- ✓ Digimesh, Private Low Power Wide Area Network (LPWAN) using the ISM radio band, default data update frequency 1 minute.
- ✓ Planned Low Power Satellite Communications using established Argos/Kinéis, maximum update frequency 3 hours.
- ✓ Mix and Match, use one or all communication options to create a cost-efficient solution.

### Sensors

Sensor ports

- ✓ XMS supports up to 12 physical ports, in addition to this sensor in bus configuration using 1-Wire or SDI-12 standards.

A wide range of sensors are available; use cases include:

- ✓ Tanks, silos and bins. Liquids and solids. This includes ultrasonic and pressure sensors.
- ✓ Dam and flood monitoring using reliable ultrasonic or radar sensors.
- ✓ Temperature and humidity. Ambient, liquids and grain.
- ✓ Flow meters and sensors. Current sensors are certified for water with varying degrees of particles,

- includes turbine flow and ultrasonic sensors.
- √ Pressure. Current sensors are certified for liquids.
- √ Power Monitoring, DC and AC currents, certified electrical installation is required, and our Service Partners hold such certifications,

A range of water quality sensors are being evaluated and certified; these include:

- √ Conductivity. Option for monitoring salinity of water used in agriculture.
- √ Planned sensors are pH, turbidity, vibration, residual chlorine, and other sensors as required by use cases.

Origo will certify new sensors for use in our systems as per our lab testing and integration procedures.

## Installation and Mounting Options

Origo supplies the XMS series stations based on an aluminium pole mounting system. We also designed the systems to make it easy to use off-the-shelf brackets and clamps. In addition to this, we are supplying standardised mounting kits and brackets, e.g. for installation on flat surfaces, such as tanks. The XMS series stations have been tested and used successfully under cyclone conditions.

Installation depends on the number and type of sensors, and how they are used, our certified Service Partners are available to assist you with the installation. For certain simple types of installations, you can be trained to install the XMS and XMS or certified to be your own Service Partner. A range of installations require official governmental certifications and our Service Partners hold such certifications.

## Key Business Benefits

The Origo XMS provide superior services integration and agility. Designed for scalability, the platform's modular architecture enables you to grow and adapt to your business needs.

<b>Service Flexibility</b>	<ul style="list-style-type: none"> <li>√ Device health and remote system monitoring and management of every Origo Station included.</li> <li>√ Origo offers increased levels of services integration with data, security, wireless, and mobility services, enabling greater efficiencies and cost savings.</li> <li>√ Flexible utilisation of networks according to data frequency requirements. Bidirectional communication.</li> <li>√ Standards for data transport and metadata.</li> </ul>
<b>Sensors and Controls</b>	<ul style="list-style-type: none"> <li>√ With its support for open and de-facto standards supporting and certifying sensors and controllers as required.</li> </ul>
<b>High performance</b>	<ul style="list-style-type: none"> <li>√ Low-power and efficient Processor</li> <li>√ Best-of-class and tested radio network support in regional and remote areas.</li> </ul>
<b>Integration</b>	<ul style="list-style-type: none"> <li>√ Open standards for data transfer and systems integration.</li> </ul>
<b>Networks</b>	<ul style="list-style-type: none"> <li>√ Elevated antenna position.</li> <li>√ Digimesh is a mature ISM band technology utilised in millions of devices worldwide.</li> <li>√ LTE-M, supporting Cat-M1 and NB-IoT, select one network or auto-switch.</li> <li>√ ISM band, currently using Xbee Digimesh. Other modules are easily integrated based on the business case.</li> <li>√ Satellite, KIM1 chosen as preferred based on module, price/performance, other satellite modules can be integrated based on the business case.</li> <li>√ Mix and Match network technologies in your solution; use one or all technologies.</li> <li>√ Modular interfaces offer you increased bandwidth, a diversity of connection options, and network resiliency.</li> <li>√ Communications protocol standards utilised, such as MQTT with network security features.</li> </ul>
<b>Energy Efficiency</b>	<ul style="list-style-type: none"> <li>√ Origo X2 utilises the highly efficient Atmel® SMART™ SAM D21 series of low-power microcontrollers with quality Lilon batteries with around 1000 complete charge cycles, solar power and USB interface that can be used for any standard USB charger. Standard 6V 10W (270x270mm) solar panel used by default.</li> </ul>
<b>Future Proof</b>	<ul style="list-style-type: none"> <li>√ Utilising Arduino compatible chipsets, such as the Atmel® SMART™ SAM D21 series with Open standards firmware coding.</li> <li>√ Modularity and standardisation of radio modules utilising the popular Xbee form factor and interface, enabling easy implementation of radio modules as required by business cases and your application.</li> <li>√ Scalability to grow from hundreds to millions, only limited by the data, Cloud and network services.</li> </ul>

## Origo Service Level Agreement and XDASH Software

Every Origo XMS come with our Service Level Agreement (SLA), this includes:

- √ Origo software for storing, viewing, and accessing your data on smartphones, tablets, laptops, and PCs.
- √ Data is owned by you, the customer, stored on an Australian Cloud Service (AWS) or a local server.
- √ Third-party licenses for hardware and peripherals are available, if provided, from the manufacturer.
- √ Software Maintenance & Upgrades - All your equipment is regularly updated to the latest software and firmware versions & security patches, as well as a perpetual license for the Origo Dashboard web application, including upgrades to new releases.
- √ Provision of Cloud hosting for your Data and the Origo Dashboard. All your data is stored securely in an Australian Hosting Centre and available through the Origo Dashboard, and all data can be downloaded at any time.
- √ Customer Support - Phone, email and support ticketing system for any support you may require for your installed Origo equipment.
- √ Monitoring & Diagnostics – Our Operations Centre systems monitor your on-farm equipment 24/7, and we respond to faults or outages within agreed service hours.
- √ Scheduled Servicing - This includes planning and scheduling on-site maintenance of your equipment conducted by our Service Partner network on a paid callout.
- √ Remediation – Our technicians work remotely to resolve hardware or software issues with your equipment. Often issues can be resolved remotely. Any callouts of technicians are pre-approved by and charged to customers.
- √ Third-party licenses for hardware and peripherals are available, if provided, from the manufacturer.

## Origo and Partner Services

Services from Origo and our certified partners can help you reduce the cost and complexity of deployments. We have the depth and breadth of experience across technologies to architect a blueprint for an IIoT solution to meet your needs. Planning and design services align technology with business goals and can increase deployment accuracy, speed, and efficiency. Technical services help maintain operational health, strengthen application functions, solve performance problems, and lower expenses.

## Summary and Conclusion

As businesses strive to lower the Total Cost of Ownership in managing industrial or agricultural systems and assets and increase their overall employee productivity with more centralised management of all parts of their operation, more intelligent and mature Industrial Internet of Things platforms are required. The Origo XMS Series Products offer these solutions enhanced performance and increased modular density to support multiple services. The Origo X2 Series IIoT processors used in the XMS are designed to consolidate separate devices' functions into a single, compact system that can be remotely managed.

## Product Specifications - Origo XMS Series Monitoring Stations

General	
<b>Certification and Compliance</b>	Origo X2 version 1.5: AS CISPR 11:2017, ISO 26262 (ASIL B), IEC 61508 (SIL 2) and IEC 60730 (Class B) functional safety standards. Digi XBP9B-DMUT-022 and XBP9X-DMUS-021: ACMA Radiocommunications (Short Range Devices) Standard 2004, Radiocommunications (Electromagnetic Radiation-Human Exposure) Standard, March 2003. UBLOX, SARA-R410M-83B, Telstra LTE CAT-M1 and NB-IoT in 4GX network 24 March 2021 KIM1 (planned satellite module): ITU Recommendation SA.2045, ITU Filing for the satellite systems, both Argos Legacy and Kinéis constellation. EN 301 489-20 v2.1.2 (EMC). EN 62311: 2008 (human exposure), EN 62368-1: 2014 (safety).
<b>Dimensions, Weight</b>	Origo XMS series: 290x310x1200mm at 10kg packaged, 280x310x1800 mm typical installed station with a total weight depending on sensors ranging from 5.7kg including aluminium poles and solar panel and brackets.
<b>Warranty</b>	1-year limited liability warranty.
Power	
<b>Power Supply</b>	Solar panel 6VDC 10W (included), reverse polarity protected, and any USB charger providing more than 1.1A may be utilised via Origo adapter cable.
<b>Battery</b>	XMS: 26650 Lithium-ion cells, protection integrated, Max. 1000 complete recharge cycles, 3-5 years battery life, depending on data transmission frequency. XMM: 18650 Lithium-ion cells, protection integrated, Max. 1000 complete recharge cycles, 3-4 years battery life, depending on data transmission frequency.
Processor and Memory	
<b>Processor</b>	Origo X2 Version 1.5 IIoT Processor using ARM® Cortex®-M0+ MCU
<b>Memory</b>	256KB in-system self-programmable Flash 32KB SRAM Memory
<b>USB Flash memory</b>	128 MB internal non-volatile Flash, storing up to ~1.3 million data points, calculated as 100 bytes per measurement. If the data sampling frequency is minutely, it can store 30 months of data.
<b>Programming</b>	USB Micro B
I/O and Peripherals	
<b>Exposed pins/ports Interface Boards</b>	Origo XMS using Origo Z2a or Z2b Interface boards: 12, including 1-Wire and SDI-12 bus support.
<b>Protection</b>	ESD and input protection for all sensors and peripheral ports.
<b>Sensors</b>	Please see the list of Origo Certified Sensors.
Communication	
<b>Mobile Network</b>	'M1' - LTE-M, default Cat-M1 on licensed mobile carrier networks. Optional NB-IoT for small data and low frequency with more extensive coverage areas.
<b>Private LPWAN</b>	'DM' - DigiMesh, ISM band 900MHz. DigiMesh is a proprietary wireless mesh networking topology developed by Digi.com which allows for time synchronised sleeping nodes and low-power operation.
<b>Satellite</b>	'KM' - KIM1 (Planned) module developed by Kinéis is a low-power transmitter module based on Argos-2 standard. Based on the Argos satellite constellation, global footprint and coverage are now being expanded by the French Kinéis.
<b>Antenna options</b>	Default: Stubby, robust low profile, NMO connector, 3dBi Optional: Omni Load Coil, NMO connector, 5dBi
Environmental Conditions	
<b>Enclosures</b>	XMS, X2c enclosure IP66, Junction Box Z2 IP54 (capillary action drainage), Optional IP66, 3000m Max Altitude, condensing conditions XMM, X2b enclosure and junction box IP54 (capillary action drainage), Optional IP66, 3000m Max Altitude, condensing conditions All systems are protected from direct sunlight by solar panel, heat sink provided through aluminium components.
<b>Electronic Components</b>	AEC-Q100 Grade 1: -40°C to 125°C

### For More Information

For more information about the Origo XMS series, contact your local Industry Partner or Origo representative. Please send inquiries to [info@origo.ag](mailto:info@origo.ag)