

Ibexis Monitoring Service Point (MSP) Series 4 Data Sheet

The Ibexis Monitoring Service Point (MSP) is a highly sophisticated data logger that collects and transmits data via GPRS to the Ibexis gateway, where users can access and download their data remotely via the internet. The MSP is the hardware that is integral to our cost effective remote monitoring solution.

The MSP incorporates into a single unit analogue, digital and serial sensor interfaces, a 22 channel data-logger, local data storage, smart power management, batteries, a solar regulator, a GPRS modem, antenna and a SIM card. The MSP is a highly intelligent unit that supports a wide range of interfaces and protocols, and can intelligently control and power many sensors.

The MSP is rugged and designed to last in the field for at least five years. It consumes very little power, operating from an internal re-chargeable lithium battery and supplemented by solar power. Data is transmitted from site to Ibexis central servers via the integrated GPRS modem. It uses an optimized and secure protocol which is proven to be both robust and reliable, unlike alternatives such as SMS messaging.

Our remote monitoring solution includes a range of data services and web applications. Included in the monthly data charge are all cellular data charges, sensor data hosting and archive along with a range of web based configuration, analysis and reporting applications. The MSP can be remotely configured from the Ibexis website where both live and historic sensor data can be viewed. Secure web based applications include tabular and graphical data, charting, maps, SMS and email alerting tools. There are also facilities for data export in a variety of formats including CSV, Excel and XML.



Product Overview	Key Features	User Benefits
<ul style="list-style-type: none"> • 5-10 Analogue sensor channels • 8 Digital Input/output channels • Up to 4 Serial channels • 6 sensor power supplies • Precision current source • GSM/GPRS modem • 5Ah Battery • Solar regulator • Auto location detect • IP65 weather proof enclosure 	<ul style="list-style-type: none"> • Sensor data collection, filtering, dispatch and alerting • Sensor device management • Mains free and optimized for ultra low power management. Can be powered by internal or external battery + small solar panel • Smart power (can intelligently provide power to sensors and instruments) • Internal diagnostics include internal & external battery/ solar voltage, temperature, GSM signal strength & data volumes • Supports Modbus 	<ul style="list-style-type: none"> • Real time information from remote sensors and instruments • Enables organizations to incorporate sensor information into enterprise applications • Low power and mains free • Data available on the web • A hosted solution therefore no IT infrastructure required • A complete solution to enable rapid implementation • Flexibility to start small and grow to global enterprise scale deployments • Low cost remote monitoring solution • Ease of installation & use

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ANALOGUE CHANNELS

Inputs can be single-ended, differential or floating. The following maximums apply:

- Single ended common referenced 2-wire: 10 inputs
- 2-wire floating or differential: 5 inputs
- 3-wire and 4-wire differential or floating: 5 inputs

ANALOGUE SENSORS

Supports a wide range of sensors including, but not limited to those listed below:-

Resistor Temperature Dependant (RTD) <ul style="list-style-type: none"> • PT100, PT1000 • Resistance range: 10Ω to 8KΩ 	Monolithic Temperature Sensors <ul style="list-style-type: none"> • LM34 - 60, AD590, 592, TMPxx • LM135, 235, 335 	Strain Gauge and Bridge Sensors <ul style="list-style-type: none"> • Configurations: ¼, ½ & full bridge • Excitation: voltage or current
Thermocouples Types: B, E, K, J, N, R, S, T	4-20mA Current Loop <ul style="list-style-type: none"> • Internal 100R shunt or external shunt resistor • 2, and 3-wire 	

INPUT RANGES

The MSP's fundamental inputs are voltage, current, resistance and frequency. All measurements are derived from these.

Voltage Full Scale/ Resolution	Current Full Scale/ Resolution	Resistance Full Scale/ Resolution
20 mV 3 Uv	200 uA 0.3 uA	80 Ω 1 mΩ
40 mV 3 uV	400 uA 0.3 uA	160 Ω 1 mΩ
80 mV 3 uV	800 uA 0.3 uA	320 Ω 1 mΩ
160 mV 3 uV	1.6 mA 0.3 uA	640 Ω 1 mΩ
320 mV 5 uV	3.2 mA 0.5 uA	1.25 KΩ 2 mΩ
640 mV 10 uV	6.4 mA 1.0 uA	2.5 KΩ 4 mΩ
1.25 V 20 uV	12.8mA 2.0 uA	5 KΩ 8 mΩ
2.5 V 40 uV	25.6 mA 4.0 uA	8 K Ω 16 mΩ

Notes on Input Ranges

1. Voltage or current mode is selectable and 2, 3 or 4-wire.
2. Resistance measurement with 250uA current source.

ACCURACY

Accuracy is up to ±0.05% of full scale for a calibrated instrument.

Measurement Examples	5°C to 45°C	- 40°C to 85°C
2.5V Single ended (2.5V range)	1mV	2mV
1mV Differential * (20mV range)	50uV	100uV

*e.g. for K thermocouples the MSP is able to measure accurately to +/- 1 °C

SAMPLING

- Digital filtering for 50/60Hz noise rejection
- Maximum analogue sample rate: 10 seconds
- Effective resolution: 16 bits
- Common mode rejection: 100dB typical
- Line series mode rejection: >90dB
- Input impedance: >1GΩ
- Linearity: 0.01%

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OUTPUT POWER SUPPLIES (SENSOR EXCITATION)

- Includes 6 regulated, upgradable power supplies
- Scheduled on/off times to meet sensor requirements
- Standard configuration (included)
 - 2 x 3.3V regulated DC (for serial instruments)
 - 3 x 3.3V regulated DC (for analogue sensors)
 - 1 x Always on 3.3V regulated DC (for digital sensors)
 - 1 x precision current-source 250uA
- All power supplies can be optionally upgraded using power plug-ins (5V, 12V and 24V available)

DIGITAL CHANNELS

There are 8 digital channels, all of which are software configurable as inputs, outputs or counters.

Input/Output

- Digital inputs: logic level (max 5V without voltage divider)
- Digital outputs - logic output (3.3V @ 1mA)
- Built-in pull-up resistors for dry-contact/voltage-free relays
- Can log sub-second asynchronous state changes

Counters

- **Low speed event counter:** 16 bit, max 50 Hz. Operates continuously, accumulating event counts. Applications include tipping bucket rain-gauge
- **High speed frequency counter:** 16 bit, max 10 KHz, spot frequency sample measurement. Applications include wind speed and RPM
- **Accuracy:** 0.05% (5°C to 45°C) 0.1% (-40°C to 85°C)

SERIAL CHANNELS

Used for data-logging with instruments and smart sensors. The permutations below are all possible:

- Four RS232 (without flow control)
- *Or* two RS232 (with flow control)
- *Or* one RS485 and two RS232 without flow control
- *Or* one RS485 and one RS232 with flow control
- Supports Modbus protocol (master)
 - Sub second scan rate
- In-built switchable serial power supply
- Baud rate of 300 to 115200
- Ethernet available as a plug in upgrade (Q3 2010)
- Downloadable extra protocol upgrades (e.g. planned future releases for Canbus and SDI12)

VIRTUAL CHANNELS

Create additional derived or calculated channels using mathematical functions

- Combine values from analogue, digital and serial sensors using expressions involving variables and functions.
- Currently available as supplier provided upgrade, user configurable functions are planned future upgrades.

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FIRMWARE FEATURES

Input Processing

Independently configurable processing of all input sources, including:

- Calibration (slope/offset)
- Filtering of analogue and digital sensors
- Minimum and maximum range checking
- Configurable settling (warm-up) time before sample taken
- All data, events and alarms are time-stamped
- Readings can be compensated, derived or transformed using expressions involving variables and built functions. *Advanced user configurable functions are planned for future releases*

Integration Options

- Data export (Excel, CSV, XML)
- Web service data export (XML)
- Scheduled FTP file transfer
- *Other options are available – please contact Ibexis*

Location Services

- Automated location detection using cell triangulation. Accuracy is typically 500m
- Location latitude and longitude logged

Enhanced Network Diagnostics

- Remote GPRS/ GSM and SMS configuration facilities
- Enhanced cellular network information available to assist network trouble-shooting
- Automated or manual cellular provider selection
- Dial-in wake up on demand

Scheduling

- **Standard:** automatic scheduled sampling at intervals between 1 minute and 1 day
- **Extended averaging:** continuous sampling and averaging as often as every 10 seconds. Reading logged at intervals between 1 minute and 1 day
- **On demand:** Samples can be requested, and returned outside the schedule. “Take a sample now”

Alarms

- Each device’s alarms can be independently enabled or disabled
- All alarms are stored locally as well as passed to and logged on the central servers
- Each device has four configurable “reading alarm” thresholds: Critical-High, Critical-Low, Warning-High and Warning-Low. In addition, there is a “service-due” alarm for maintenance management
- Appropriate, time-stamped “Alarm” messages are passed to the central server when the corresponding thresholds are exceeded
- “Alarm Clear” messages are only sent when the reading returns below the “Warning” threshold level, providing a hysteresis “dead-band”

Alerting

- Using the Central Alerting software, users can individually and selectively, “subscribe” to be notified of particular alarm conditions.
- Notifications can be SMS, email or web service calls
- The message content can be tailored to individual needs

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Configuration

- Remote configuration and non-volatile storage of static configuration data
- Includes: sampling interval, upload interval, calibration and range settings, modem settings, alarm and event thresholds, etc.

Included Accessories	Optional Accessories
<ul style="list-style-type: none">• USB cable• Global SIM card• GSM/GPRS antenna• 5Ah lithium-ion battery• 1mb micro SD card	<ul style="list-style-type: none">• Power supply plug-ins. 5V, 12V and 24V.• Internal battery upgrades to 10Ah and 15ah• Heavy duty solar regulator for 25W+ solar panels• High gain antennas• GPS

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SYSTEM INFORMATION

<p>Features</p> <ul style="list-style-type: none"> • ARM 926 32bit processor, 32mb flash • Real-time multi-tasking operating system • 3 x LEDs for activity, GSM and battery indication • Firmware upgradeable via USB host port • New protocols available via local firmware upgrades using USB • Dedicated separate data logger processor 	<p>Physical and Environment</p> <ul style="list-style-type: none"> • Temperature range: -40°C to 85°C industrial grade (reduced battery life outside range - 20°C to 50°C) • Humidity: 0-100% non-condensing • Construction: ABS, IP65 Weather proof enclosure • Dimensions: 166 x 160 x 118 mm • Weight: <1kg • ROHS compliant • CE compliant
<p>Real Time Clock</p> <ul style="list-style-type: none"> • Internal battery backup • Accuracy: ±1 min/year (5°C to 45°C) ±4 min/year (-40°C to 85°C) 	<p>Local Host Communications</p> <ul style="list-style-type: none"> • USB 1.1 (virtual COM port)
<p>Input Protection</p> <ul style="list-style-type: none"> • All inputs have electrostatic protected to IEC61000-4-2. • +/- 15KV contact and air discharge • Overvoltage protection. Inputs clamped to 10V 	<p>Power Supply</p> <ul style="list-style-type: none"> • Internal battery: 3.6Vdc 5Ah lithium ion • Optional internal battery upgrade to 10Ah • Peak power: 12W (3.6Vdc 1.5A) • 1, 2 or 3x 5Ah internal battery support • Can support solar, primary (non rechargeable) and secondary cells (rechargeable)
<p>Data Storage Memory</p> <ul style="list-style-type: none"> • 1Gb removable SD Card (included) • Non-volatile local storage of measurement data, events, alarms and system configuration • 1Gb SD can store >100 million data points • Optional 2GB is supported 	<p>External Supply</p> <ul style="list-style-type: none"> • (Optional) external supply 5-30Vdc
<p>GSM/GPRS Modem</p> <ul style="list-style-type: none"> • Built-in Quad Band GSM 900/1800/850/1900 MHz • GPRS class 10 • Sensitivity Rx -102dBm / TX +33/30dBm • Approvals: R&TTE, CE, GCF, FCC, PTCRB, RTE, AT&T • Enhanced protocol efficiency and throughput 	<p>Solar Regulator</p> <ul style="list-style-type: none"> • Built-in solar regulator for the internal battery • Supports solar panels up to 30W • Solar regulator plug-in for 30W+ panels (<i>optional</i>)

Ibexis MSPs are covered by a 1 year warranty for parts and labour
 Ibexis Ltd reserves the right to change product specifications at any time without notice
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