



microSpider2 lite

User Manual

Models HML-021 – HML-037 (see §1.4)

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1. Introduction

1.1 Overview

The microSpider2 lite is a compact 4G low power logging and alarm system designed for remote monitoring applications. Cat-M1 variants are also available. It features an IP68 sealed enclosure with integrated long-life lithium batteries and a mobile modem — no external power supplies, enclosures, or solar panels are required. The unit is configured and operated via a built-in web server accessible from any standard web browser.

The microSpider2 lite supports a range of native and intelligent sensor inputs, automatic data reporting via email, FTP, and HTTP, and 16 configurable alarms with SMS and email alerts. Data is stored in non-volatile flash memory and can be downloaded locally or transmitted automatically to a remote server.

1.2 Package Contents

Item	Notes
microSpider2 lite unit	With internal battery (disconnected)
8-pin I/O mating connector	Loose — wire up to your sensors
Halytech Comm Port sealing cap	Fitted to Comm Port
4 hex screws and nuts	Case fasteners (fitted)
O-ring	Pre-greased, fitted in lid groove

External antennas, mounting brackets, LANlink cables, and HLink dongles are ordered separately. See Section 1.4 for variant details.

1.3 Typical Applications

- Environmental monitoring
- Automatic Meter Reading (AMR)
- Irrigation and bore monitoring
- Agriculture
- Water treatment
- Traffic monitoring

1.4 Variants

The microSpider2 lite is available in multiple hardware configurations. All variants share the same firmware and web interface.

Standard variants — 2 digital inputs, 2 analogue inputs, system monitors, open collector output, low voltage out:

Item code	Modem	Antenna
HML-021	4G	Internal
HML-022	4G	External connector
HML-023	Cat-M1	Internal
HML-025	Cat-M1	External connector

Pulse metering variants (HML-026 to HML-029) are a separate product — a metering-only build with a 4-pin connector, two digital inputs on a flying lead, no analogue inputs and no outputs. They are covered by their own guide.

Modbus variants (HML-030, HML-031, HML-034, HML-036, HML-037) are a separate product with a 7-pin RS-485 connector, 1 digital + 1 analogue input and no open collector output. They are covered by the **microSpider2 lite Modbus User Manual**. RS-485 is fitted at manufacture and cannot be added to a standard unit.

External antenna variants do not include an external antenna — order separately.

Software options:

Item code	Description
FML-001	Standard — included with all units
FML-005	DNP3 — enables DNP3/SCADA communication

Accessories:

Item code	Description
HML-006	Stainless steel pipe mounting bracket — includes 4 screws

2. System Overview

2.1 Inputs

The microSpider2 lite has up to 8 configurable input channels. All channel types — native inputs, intelligent sensor channels, system monitors, and super channels — share a single channel pool. Users choose how to allocate channels across input types.

Native input types:

Type	Description
Switch	Detects open/closed state. Logs each state change and ON duration. Minimum stable state: 3 seconds.
Switch State	Like Switch, but logs state at each logging period rather than on each change. Does not log ON duration.
Counter	Counts pulses up to 100 Hz. Range: 0–999,999.999, rolls over to 0.
Event	Records each pulse with a timestamp. Suitable for pulses less frequent than once per 30 seconds.
Analogue (Voltage)	Records voltage at each logging period. Range: 0–2.5 V. External resistors required for 0–5 V or 0–10 V.
Analogue (Switch)	Connects a switch or digital sensor to an analogue input when no spare digital input is available. ON if < 1.25 V, OFF if 1.25–2.5 V.
Difference	Records the difference between two counter inputs. Range: ±999,999.999.

4–20 mA sensors. The microSpider2 lite has **no Analogue (4–20 mA) input type and no internal shunt**. Fit the supplied 110 Ω ¼ W resistor across the AIN pin and Ground, select **Analogue (Voltage)** as the input type, then scale the channel using the **4-20mA Calibration** method on the Calibration page — enter the engineering value at 4 mA and at 20 mA.

⚠ **Loop power.** The microSpider2 lite cannot power a 4–20 mA loop — it has no switched power output and no external power input, and the low voltage output (3.3 V or 5 V) is not a loop supply. The loop must be powered by a **self-powered (externally powered) sensor** or by a **separate power supply** fitted in the loop.

⚠ **SDI-12 is not supported on the microSpider2 lite.** There is no SDI-12 option, variant or accessory path — the lite has no Intelligent Interface and cannot supply the 12 V most SDI-12 sensors need. For SDI-12 applications the answer is the **microSpider2 Environmental**. The shared firmware still exposes SDI-12 channel types and help text, but firmware exposure is not product support.

Super channels (virtual calculations derived from other inputs):

Type	Description
Rating Table	Linear or logarithmic interpolation from a lookup table.
$Ax + By + C$	Sum, difference, or scaled combination of two channels.
Evapotranspiration	Hargreaves model calculation.
Wind Speed / Direction	Vector average, angular average, or Sigma Theta.
SWL	Standing Water Level: $SWL = OFFSET - Head$.

There is no galvanic isolation between inputs or between inputs and internal circuitry.

2.2 System Monitors

Built-in monitors that can be logged and used to trigger alarms:

Monitor	Description
System temperature	Internal enclosure temperature
Battery voltage	Voltage of the internal battery
Internal moisture sensor	Detects moisture inside the enclosure

2.3 Controls (Outputs)

The microSpider2 lite has two controls. The available control types depend on the variant.

Standard variants (HML-021, HML-022, HML-023, HML-025):

Control	Description
Open Collector	Creates a connection to ground through a 440 Ω resistor. Nominal 10 mA.
Low Voltage Out	Provides 3.3 V or 5 V (selectable). Current limited to approximately 100 mA. Powered by internal battery.

Controls can be operated manually via the web interface, triggered by alarms, or used as sensor warmups (powering a sensor for a set duration before each reading).

The microSpider2 lite does not have a switched power output.

2.4 Alarms

Up to 16 alarms can be configured. Each alarm can:

- Monitor a channel value (above, below, rate of change, switch state, or event)
- Trigger at a scheduled date/time or at a periodic interval
- Combine the state of other alarms (Super Alarm — AND/OR logic)
- Send SMS alerts to up to 3 phone numbers
- Send email alerts to up to 3 email addresses
- Activate or pulse a control output
- Increment or reset a virtual counter
- Force an immediate log of another channel
- Initiate fast logging and/or fast reporting while active

Alarms are acknowledged via the web interface, or automatically after a configurable time.

2.5 Logger

Parameter	Value
Capacity	300,000 records
Storage	Non-volatile flash memory
Time resolution	1 second
Time synchronisation	Automatic daily via NTP
Clock drift (without NTP)	Up to 30 seconds per month

The logger records channel readings, control state changes, alarm events, SMS and email transmissions, NTP sync events, and system events. Data is reported automatically via email, FTP, or HTTP POST, and can also be downloaded locally via the web interface.

Daylight saving is not supported. Always set the clock to standard (non-DST) time.

2.6 Web Server

The microSpider2 lite has a built-in web server accessible from any standard web browser. No special software is required.

The web interface is used to:

- View current input readings, alarm status, and control states
- Configure all device settings
- Download logged data
- Calibrate sensors
- Run modem diagnostics and signal tests
- Update firmware

Two connection methods are available: LAN (via LANlink cable) and Wi-Fi (via HLink dongle). See Appendix A for connection procedures.

3. Installation

Audience: Installer

3.1 Opening the Case

A new microSpider2 lite is shipped with the battery disconnected. The case must be opened to install the SIM card and connect the battery.

1. Undo the 4 hex screws holding the two halves of the case together.
2. Carefully separate the two halves, taking care not to put strain on the cables connecting them.

3.2 SIM Card Installation

Most SIMs ship with no PIN enabled. If yours does have one, insert it into a mobile phone first and disable the PIN in the phone's settings before installing it in the microSpider2 lite.

1. If the battery is connected, disconnect it by squeezing the locking latch and gently pulling the connector upwards.
2. Push the SIM tray into the receptacle until it clicks and springs out.
3. Place the nano SIM card into the tray — gold contacts facing down, observing the notched corner orientation.
4. Push the tray back into the receptacle until it clicks into place.

If the SIM card has previously been used in an iPhone, disable iMessage before installing. See Appendix B.

3.3 Battery Connection

1. Connect the battery lead by pushing it onto the battery connector on the circuit board until it clicks into place. The battery slides into the case behind the circuit board.

The microSpider2 lite has no on/off switch — it starts operating as soon as the battery is connected.

To disconnect the battery: press the white tab and pull the connector off.

3.4 Closing the Case

1. Insert the O-ring into the groove of the top half of the case. Hold one corner in and run a finger around the groove a few times.
2. Align the two halves, ensuring the antenna cable is not caught between them. Pinch the flange at both ends with thumb and forefinger and squeeze gently until the halves slide together.
3. Insert the four hex screws and nuts. Do not over-tighten — force is not required to maintain the seal.

The O-ring is pre-greased when shipped. If more lubrication is needed, use tap grease (e.g. "Fix-a-tap", available from hardware stores).

If the O-ring is pushing the halves apart, the assembly is incorrect — remove the O-ring and repeat from step 1.

3.5 Mounting

The microSpider2 lite has an integrated mounting bracket built into the enclosure.

An optional stainless steel pipe mounting bracket (HML-006) is available for installation on vertical or horizontal pipework.

3.6 I/O Connector and Sensor Wiring

The microSpider2 lite has a single 8-pin circular IP68 waterproof connector at the bottom of the case.

Standard variants — I/O connector pinout:

Pin	Function	Notes
1	Switch 1 / Counter 1	Active = short to Ground
2	Analogue 1	0–2.5 V range
3	Ground	
4	Switch 2 / Counter 2	Active = short to Ground
5	Analogue 2	0–2.5 V range
6	Ground	
7	Open Collector Output	Nominal 10 mA
8	Low Voltage Sensor Power Supply	3.3 V or 5 V selectable; max 100 mA

Pin numbers are as viewed from the back (solder) end of the connector with the notch facing up.

Wiring by input type:

- **Switch / Counter / Event:** Connect between the digital input pin (1 or 4) and a Ground pin (3 or 6). Active state = shorted.
- **Analogue (Voltage):** Connect sensor output to the analogue pin (2 or 5) and sensor ground to a Ground pin (3 or 6). Native range is 0–2.5 V. For sensors with 0–5 V or 0–10 V output, external voltage divider resistors are required — consult Halytech for resistor values.
- **4–20 mA sensors:** Fit the supplied **110 Ω ¼ W** resistor across the analogue pin and Ground, then connect the sensor current loop across the same two points. The loop must be powered by a self-powered sensor or a separate power supply — the microSpider2 lite cannot supply loop power. Set the input type to **Analogue (Voltage)** and scale it with **4-20mA Calibration**. The microSpider2 lite has no internal shunt, so the external resistor is required.

3.7 Antenna Installation

Internal antenna variants: No installation required.

External antenna variants:

1. After closing the case, connect the SMA antenna to the connector on the bottom of the case.
2. Hand-tighten only — do not use tools.
3. Seal the connection with self-vulcanising rubber tape.

For sites with poor signal, Halytech offers directional and high-gain antenna options. Contact Halytech for advice.

3.8 Protecting Connectors

Before leaving site, ensure the Halytech Comm Port and any unused I/O connectors are fitted with the supplied sealing caps to prevent contact contamination.

4. System Configuration

Audience: Installer / advanced user

4.1 Connecting for the First Time

See Appendix A for detailed connection procedures (LAN via LANlink or Wi-Fi via HLink).

After connecting, open a web browser and navigate to the device's IP address:

- **LAN (LANlink):** `http://192.168.0.177`
- **Wi-Fi (HLink):** `http://192.168.2.177`

Log in with the default credentials:

Field	Default value
Username	<code>user</code>
Password	<code>changeme</code>

Change the default password immediately after first login. If credentials are lost, contact Halytech for assistance.

4.2 Change Setup Mode

Click **Change Setup** in the left navigation menu to access configuration pages. While in Change Setup mode:

- Logging and alarm activation are suspended. Events that would have occurred during this time are not recorded.
- All controls are turned off by default (this can be changed in Advanced Settings).
- Change Setup mode exits automatically after 20 minutes of inactivity.

Recommended configuration order for a new unit:

1. Set location name
2. Configure network settings (APN, primary network method)
3. Test mobile connectivity (signal strength test, test SMS)
4. Configure inputs

5. Configure controls
6. Configure alarms
7. Configure reports and email
8. Set up automatic software upgrades (optional)
9. Save setup to disk as a backup
10. Reset report starting point to exclude test data

4.3 Setting Location Name

Navigate to **Change Setup → Location**.

- **Location (short):** Appears in SMS messages, report subject lines, and the About page. Maximum ~16 characters.
- **Location (long):** Used in report content. Can be longer and more descriptive.

4.4 Setting Date and Time

Navigate to **Change Setup → Time and Date**.

- Click **Set from computer** to synchronise the device clock from the browser's system time.
- Or enter the date and time manually.
- NTP synchronisation runs automatically once per day. Default NTP server: `time.google.com`.

Clock drift without NTP is up to 30 seconds per month.

Daylight saving is not supported — always set the clock to standard (non-DST) time.

4.5 Setting Username and Password

Navigate to **Change Setup → User and Password**.

Three access levels are available:

Account	Default username	Default password	Access
Administrator	user	changeme	Full control — view and change all settings
Service	service	changeme	View readings, run diagnostics, calibrate inputs, save setup, manual software upgrade — cannot change report or alarm settings
User (read-only)	user	user	View settings and status only

Change all default passwords to prevent unauthorised access.

4.6 Configuring Inputs

Navigate to **Change Setup** → **Input Setup**.

For each channel, set:

- **Type** — select the input type (see Section 2.1 for available types)
- **Source** — physical input connector or system monitor
- **Name** — user-defined channel name (used in reports and the web interface)
- **Units** — engineering units for display and calibration
- **Logging** — how often to log data. Set to "General" to use the shared logging period.

Always name channels before configuring alarms that reference them. An unnamed channel appears as "New Channel" in all dropdown menus.

Use the **Options** icon (cog) for additional per-channel settings:

Option	Description
Log Difference	Log the change since last log instead of the absolute value. Options: Any / Positive only.
Minimum Change	Minimum change required before logging. Combined with Force Log interval.
Periodic Reset	Reset accumulated value at a set interval (1, 3, 6, 12, or 24 hours).
Sampling Period	How often readings are taken. Enables averaging or integration over the logging period.
Log Min/Max	Log minimum and maximum sampled values in addition to the average.
Filter Type	Average (all types) or Integrate (SDI-12, RS-232, Modbus/RS-485, Rating Table, Ax+By+C only).
Warmup Source	Activate a control before each reading to power the sensor.

Use the **Examine** icon (magnifying glass) to request a new reading from the sensor. For counter and event inputs, enable test mode to verify pulses without affecting accumulated counts.

Global logging settings (bottom of the page):

Setting	Description
General logging period	How often channels set to "General" are logged
General fast logging period	Logging rate during alarm-triggered fast logging
Logging offset	Shifts logging time from on-the-hour (e.g. offset 20 min → logs at :20 past each hour)

All channels are also logged automatically at midnight, regardless of logging period.

4.7 Calibrating Inputs

Select a channel from the **Select Input to Calibrate** dropdown on the Change Setup page.

Analogue inputs — calibration formula: `calibrated = (raw × scaler) + offset`

Method	Description
Change Offset Only	Adjust zero point without changing scale
4–20 mA Calibration	Enter the real-world value at 4 mA and 20 mA
2-point Calibration	Apply two known inputs and enter expected outputs. The two points must be separated by at least 1000 raw counts.
Manual Calibration	Enter scaler and offset directly

Counter and Event inputs:

Method	Description
Change Desired Value	Enter the correct current reading — device adjusts offset
Manual Calibration	Enter Pulses per unit and Desired value directly

4.8 Configuring Controls

Navigate to **Change Setup** → **Controls**.

For each control, set:

- **Custom name** — a descriptive name (e.g. "Sensor Power", "Pump Control")
- **Warmup time** — how long the control stays active before a sensor reading, if used as a warmup source

Low Voltage Out has an additional setting:

- **Voltage** — select 3.3 V or 5.0 V output

4.9 Setting Up Alarms

Navigate to **Change Setup** → **Alarms** and select an alarm to configure.

Each alarm has:

- **Alarm name**
- **Trigger source** — channel value, date/time, periodic, or Super Alarm
- **Trigger condition** — above, below, change of, rising, falling, event, or switch state

- **Qualifying time** — how long the condition must persist before the alarm activates
- **Control action** — turn a control on/off, or pulse for 1–999 seconds (optional)
- **Counter action** — increment or reset a virtual counter (optional)
- **Log action** — immediately log another channel (optional)
- **Perform actions** — when actions execute (once until reactivated / once until acknowledged and reactivated / on each log while active)
- **Fast logging** — enable faster logging rate while alarm is active
- **Fast reporting** — send additional reports while alarm is active
- **Message** — text included in SMS and email alerts (maximum ~32 characters)
- **SMS alerts** — up to 3 phone numbers (digits only, no spaces or brackets)
- **Email alerts** — up to 3 email addresses
- **Auto acknowledge time** — time after triggering when the alarm is automatically acknowledged (default: 1440 minutes / 24 hours)

How alarms work:

- An alarm is **active** when its trigger condition is met, **inactive** when not met.
- An alarm **triggers** (sends alerts, performs actions) only when active AND unacknowledged.
- After triggering, the alarm will not re-trigger until it is acknowledged AND has gone inactive then active again.

SMS alert format: `[location]: [message] / Time: HH:MM:SS DD/MM/YY`

Email alert format: `[device] at [location] / [message] / Generated by Alarm: [number]
([name])`

4.10 Network Configuration

Navigate to **Change Setup → Network**.

Primary Network — used for reports, emails, NTP clock sync, and software updates:

1. Set **Method** to Mobile Internet (Modem) for mobile deployments.
2. Enter the **APN** for the SIM card — contact your carrier for the correct value.
3. Enable **Authentication** only if required by the SIM.
4. Set a **Data limit** (MB per day). No further reports are sent once the limit is reached until the next day.
5. Optionally enable **Report signal strength** to log signal quality with each connection.

6. Enter the **Modem phone number** in the field provided — this is not read automatically from the SIM.

Secondary Network — used for report failover only (not for emails, NTP, or updates).

Easy Connect: Enabled by default for direct computer-to-device connections. Disable when connecting the device to a network.

SMS Recovery: When enabled, the modem stays active for up to 3 minutes at a scheduled time (daily or weekly) to receive queued SMS messages. Enable this if SMS commands are used.

Modem Diagnostics (Change Setup → Modem Diagnostics):

- **Signal Strength Test** — turns the modem on and displays signal strength continuously. Click Enlarge Signal for a large display useful when positioning the antenna.
- **SMS Test** — sends a test SMS to a specified phone number.

Signal level	Threshold	Action
Excellent	≥75%	No action required
Good	≥50%	No action required
Acceptable	≥40%	No action required
Poor	<40%	Reposition antenna — connection may be unreliable

4.11 Email Configuration

Navigate to **Change Setup → Email**.

Email must be configured before the device can send email alerts or reports.

Field	Description
"From" email address	Address the device uses to identify itself. Failure notices are sent here.
SMTP mail server	Outgoing mail server. Recommended: <code>mail.smtp2go.com</code> .
Authentication	Enable only if required by the mail server.
Username / Password	Required only if Authentication is enabled.

Port selection:

- Without authentication: port 25 (standard SMTP)

- With authentication: port 587 (submission port)

SSL/TLS is not supported. Mail servers that require only encrypted connections (e.g. Gmail) are not compatible.

Testing email: Use the Email Test section on the email settings page — enter an address and click Send Test Email to verify the configuration.

If the modem is not already on, a diagnostic test will first power up the modem. Allow 30–60 seconds for the modem to establish a connection, and up to ~75 seconds total before expecting a result.

4.12 Configuring Reports

Navigate to **Change Setup** → **Reports**.

Report destinations:

Destination	Details
Email	Up to 3 email addresses
FTP Server 1 / 2	Set server, username, password, directory
HTTP / HTTPS	POST to a URL

Two independent automatic report slots. Settings per slot:

Setting	Description
Period	1 minute to 1 day
Send report	Always, or only when new data is available
Offset	Delay from the start of each period
Enable recovery	Unsent data included in next report (up to 30,000 records)
Format	See Appendix D
Time order	Oldest first or newest first

Reset Report Starting Point: After initial setup and testing, click this to mark all existing logged records as sent — prevents test data from appearing in the first real report.

Daily Heartbeat Report: An optional daily status report sent once per day regardless of logging activity.

4.13 Advanced Settings

Navigate to **Change Setup** → **Advanced Settings**.

Setting	Description
Turn all controls off on entry to Change Setup	Default: enabled. Disable to leave controls active during configuration (e.g. to calibrate a sensor powered by a control).
Minimum auto-acknowledge time	Default: 60 minutes. Configurable down to 5 minutes. Times under 60 minutes increase SMS frequency and power consumption.
Store messages with channel data	When disabled, information messages are stored separately — increases channel data capacity.
Enable 4–20 mA error handling	Escalates out-of-range 4–20 mA readings from warnings to errors, enabling alarm triggering.
Use long location name	Uses the Long Location field in reports instead of the short Location.

4.14 Saving and Loading Settings

Navigate to **Change Setup** → **Manual Setup Management**.

- **Save setup to disk** — downloads the current configuration as a `.cfg` file. Use as a backup or template for similar units.
- **Load setup from disk** — loads a configuration file. The file must be from the same product type and from the same or earlier firmware version. Loading overwrites all current settings.
- **Email setup** — sends the current configuration file as an email attachment.
- **Restore to Factory Defaults** — resets all settings. Log file data is not affected.

Some browsers flag `.cfg` files as potentially harmful during download. This is a false positive.

4.15 Exiting Change Setup

Click **Home** or navigate to any page outside Change Setup. Logging, alarms, and timer schedules restart immediately.

5. Normal Operation

Audience: End user

5.1 Connecting via Web Browser

See Appendix A for connection procedures. After logging in, the Alarms page is displayed.

The left navigation menu provides access to:

- **Alarms** — current alarm status
- **Inputs** — current channel readings
- **Controls** — manual control of outputs
- **History** — download logged data
- **View Setup** — view current configuration (read-only)
- **Change Setup** — access configuration pages (Administrator only)
- **About** — device information, serial number, firmware version

5.2 Alarms Page

The Alarms page is the home page after login. It displays the current status of all configured alarms.

- **Active** (red) — alarm condition is met and alarm is unacknowledged.
- **Active** (green) — alarm condition is met but alarm has been acknowledged.
- **Inactive** — alarm condition is not met.

Click an unacknowledged (red) alarm to acknowledge it, or click the link at the bottom to acknowledge all alarms.

5.3 Inputs Page

Displays the current reading for each configured input channel. Readings are taken at the time the page loads — click **Update** or **Update All** to refresh.

5.4 Controls Page

Displays the current state of each control. Click **ON** or **OFF** to manually activate or deactivate a control, then click **Save** to apply.

Multiple controls can be changed before clicking Save.

5.5 History (Logged Data)

Download logged data from the History page:

1. Set **End Date** and **End Time** for the data range.
2. Set **No. of Records** to download.
3. Select a **Format** (see Appendix D).
4. Select **Direction** (oldest first or newest first).
5. Click **Download**.

5.6 Automatic Reports

Automatic reports are sent according to the schedule configured in Section 4.12. Report delivery status is logged and visible in the History page (Raw or Diagnostic format).

6. Maintenance

6.1 Battery Replacement

Expected battery life is up to 5 years under the standard reference scenario (1-hour logging, daily reports, good signal, self-powered sensor, 1 alarm/month). Actual life varies with reporting frequency, signal conditions, sensor power draw, and temperature.

Monitor battery voltage via the Battery Voltage system input. When replacement is required:

1. Carefully open the case (see Section 3.1) — do not lose nuts or screws.
2. Keep the O-ring clean and free of debris.
3. Disconnect the battery lead by pressing the white tab and pulling the connector off the circuit board.
4. Remove the old battery pack and insert the replacement.
5. Connect the new battery lead (see Section 3.3).
6. Close the case (see Section 3.4).

See Appendix C for battery safety information.

6.2 Firmware Updates

Manual upgrade:

1. Navigate to Change Setup → Manual Software Upgrade.
2. Click Choose File and select the upgrade file (`.hal`).
3. Click Upgrade Now.
4. Wait up to 5 minutes, then reconnect to the web interface.

No progress indicator is shown during upgrade.

Automatic upgrade:

The device can check for new software once per day after a report is sent. Configure via Change Setup → Automatic Software Upgrades. Two methods are available:

- **Halytech Upgrade Server** — managed by Halytech, no user intervention required
- **Self-Managed FTP Server** — upgrade files named `msf[serial].hal`

Automatic upgrades require reporting to be enabled.

7. Specifications

Hardware

Parameter	Value
Configurable input channels	8 (shared pool — native, intelligent, system, and super channels)
Native analogue inputs	2
Native digital inputs	2
System monitors	System temperature, Battery voltage, Moisture sensor
Analogue input range	0–2.5 V (native); 4–20 mA via supplied 110 Ω external shunt
Analogue resolution	12-bit
Digital input	Voltage-free switch contact
Counter max frequency	100 Hz (5 ms min pulse width)
Counter range	0–999,999.999
Controls	2 (types vary by variant — see Section 2.3)
Alarms	16
Logger capacity	300,000 records
Logger storage	Non-volatile flash memory

Communications

Parameter	Value
Modem (4G variants)	4G LTE
Modem (Cat-M1 variants)	LTE Cat-M1
LAN (LANlink)	Via Halytech Comm Port. Default IP: 192.168.0.177
Wi-Fi (HLink)	Via Halytech Comm Port. Default IP: 192.168.2.177
Reporting protocols	HTTP/HTTPS POST, FTP, Email; DNP3 (paid software option)
SMS alerts	Up to 3 numbers per alarm
Email alerts	Up to 3 addresses per alarm

Physical

Parameter	Value
Dimensions	165 (W) × 80 (H) × 85 (D) mm
Weight	800 g
Enclosure	ABS, IP68
Operating temperature	−20 °C to +60 °C
Mounting	Integrated bracket; optional stainless steel pipe bracket (see §1.4 Accessories)
I/O connector	8-pin circular waterproof (IP68)
Antenna (external variants)	SMA male connector

Power

Parameter	Value
Power supply	Internal non-rechargeable lithium battery
External power input	Not supported
Expected battery life	up to 5 years (1-hour logging, daily reports, good signal, self-powered sensor)
Warranty	12 months

8. Appendices

Appendix A — Connecting to a microSpider2 lite

Option A — LAN connection (LANlink cable)

1. Connect the LANlink cable between the Halytech Comm Port on the device and a USB port on your computer.
2. Open a web browser and navigate to `http://192.168.0.177`.
3. Log in with your username and password (default: `user` / `changeme`).

Easy Connect must be enabled (default) for direct computer-to-device connections. If connecting to a network, disable Easy Connect and configure the IP address to suit the network.

Changes to LAN settings take effect after the LANlink cable USB connector is disconnected and reconnected.

Option B — Wi-Fi connection (HLink dongle)

1. Connect the HLink dongle to the Halytech Comm Port on the device.
2. On your computer or mobile device, open Wi-Fi settings.
3. Connect to the network named `192.168.2.177_MS1_[serial]` (where [serial] is the serial number from the side of the unit). Password: **Halytech**.
4. Open a web browser and navigate to `http://192.168.2.177`.
5. Log in with your username and password.

Changes to Wi-Fi settings take effect after disconnecting the HLink dongle, waiting for the LEDs to turn off, then reconnecting.

Appendix B — SIM Cards and iPhones

If a SIM card has been activated in an iPhone, Apple may have registered that number for iMessage. When iMessage is active, SMS messages sent to the device will be intercepted by Apple and never delivered.

Before installing a SIM that has been used in an iPhone:

1. On the iPhone, go to **Settings** → **Messages**.
2. Turn off **iMessage**.
3. Remove the SIM from the iPhone, then install it in the device.

If the iPhone is no longer available:

Use Apple's online deregistration tool at **selfsolve.apple.com** to remove the number from iMessage.

Appendix C — Battery Safety

The microSpider2 lite uses a non-rechargeable lithium-thionyl chloride (Li-SOCl₂) battery.

Warning: Incorrect use or mishandling of batteries may result in fire or explosion.

Battery contents are flammable, corrosive, and extremely irritating to the lungs and respiratory system. Lithium metal and thionyl chloride cause chemical burns on contact with skin.

Safe handling guidelines:

- Do not short-circuit
 - Protect wiring from damage
 - Do not attempt to recharge
 - Do not open, crush, deform, or disassemble
 - Do not expose to water
 - Do not solder anything to the battery
 - Do not incinerate
 - Do not leave discharged batteries in the unit
 - Do not drop or subject to mechanical shocks
 - Spare batteries are supplied in individual packaging — keep the packaging and store used batteries in it until disposal
 - Lithium batteries (charged or discharged) are classed as Dangerous Goods for transportation — declare them as such when shipping
-

Appendix D — Report Formats

Format	Description
Raw	Date, time, primary ID, secondary ID, value
Diagnostic	As Raw, plus running total for "log difference" channels and debug info
Filtered	Channel name, date/time, value — no debug messages
Multi-column	One column per channel; one row per timestamp
Multi-column (aligned)	As Multi-column but records snapped to logging period — useful for SDI-12/Modbus
User ID	Uses user-defined channel IDs instead of default IDs
User ID (with controls)	As User ID, plus control on/off events
Custom format 1	Counter channels with log difference only — period start/end, difference, units
NSW DPIE eagle.io	NSW water metering framework compliant

Appendix E — Log Codes

System log codes appearing in Raw and Diagnostic reports:

Code	Event
POWERON	Device turned on
SRAMRST	Settings reset to defaults
LOGERASE	Log file erased
REBOOTRQ	Device rebooting
CLKCHG	Clock changed
UPG OK / UPG FAIL	Software upgrade result
CFG OK / CFG FAIL	Setup file install result
NTP OK / NTP FAIL	Clock sync result
LANON / LANOFF	LAN connected / disconnected
AL ACT / AL DEACT	Alarm activated / deactivated
AL ACK / AL ATTACK	Alarm acknowledged (manual / automatic)
ALSMS OK / ALSMS FL	Alarm SMS sent / failed
ALEML OK / ALEML FL	Alarm email sent / failed
R FTP OK / R FTP FL	Report FTP upload result
R EML OK / R EML FL	Report email result
MODEMON / MODEMOFF	Modem turned on / off



Halytech Pty Ltd

Unit 11, 22 Lexington Drive
Bella Vista, 2153
NSW, Australia

ABN 51 094 853 068

+61 2 8814 5235

support@halytech.com.au

sales@halytech.com.au

halytech.com.au

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