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Technical Bulletin Series

Magnetic Flow Meters

TBWFP – 037

ISSUE: V7
DATE: July 2025
ECRO:

500 Series Flowmeter – analogue card setup guide

Scope

This document describes the equipment and setup procedure for Analog outputs on the I500 and M500 Electromagnetic Flowmeter only.

Equipment

1. 500 Series Analog Option Card (Part #625054)
(6V supply use 625054-1, 12V supply use 625054-2, 24V supply use 625054-3)
2. I500 Electromagnetic Flowmeter
3. PC with current version of Magmate software (optional – available from www.aquamonix.com.au)
4. Digital Multimeter set to measure current in mA range



Be careful not to create short circuits when using a multimeter in current mode.

It is recommended the Multimeter is always secured to wires using insulated clips.

Ensure the 'Input' value printed on the card matches the site voltage.

For example, an M/i500 with 12VDC source will be 9.0V-18VDC.

For an M/i500 on 24VDC, the card should read 18-36VDC.

For an M500-M on 6VDC, the card should read 4.5-8VDC.

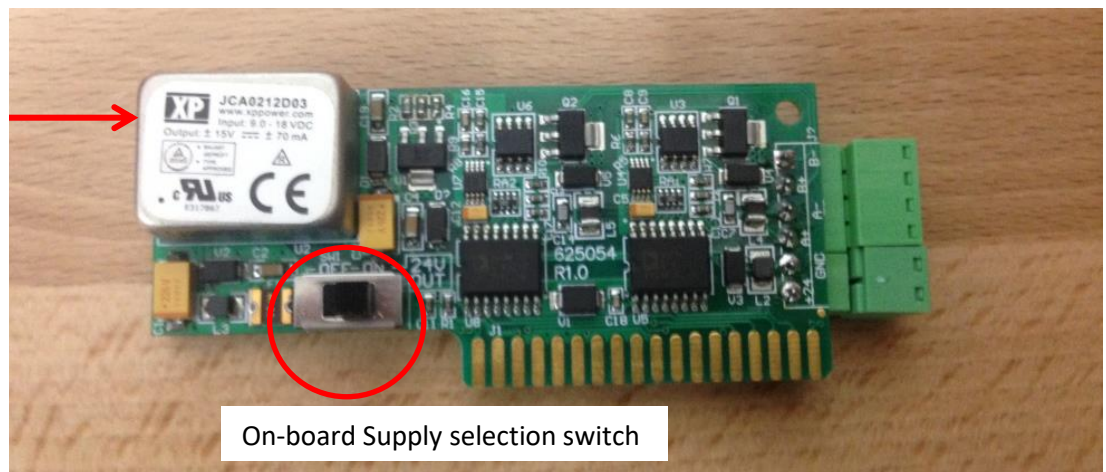


Fig.1: Analog Card.



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Procedure:

Step 1 Fitting the Analog Card

- Always plug the card into Slot #3 (upper) or Slot #2 (middle) as per figure below.
- Always ensure the I500 is unpowered when fitting or removing the Analog Card.

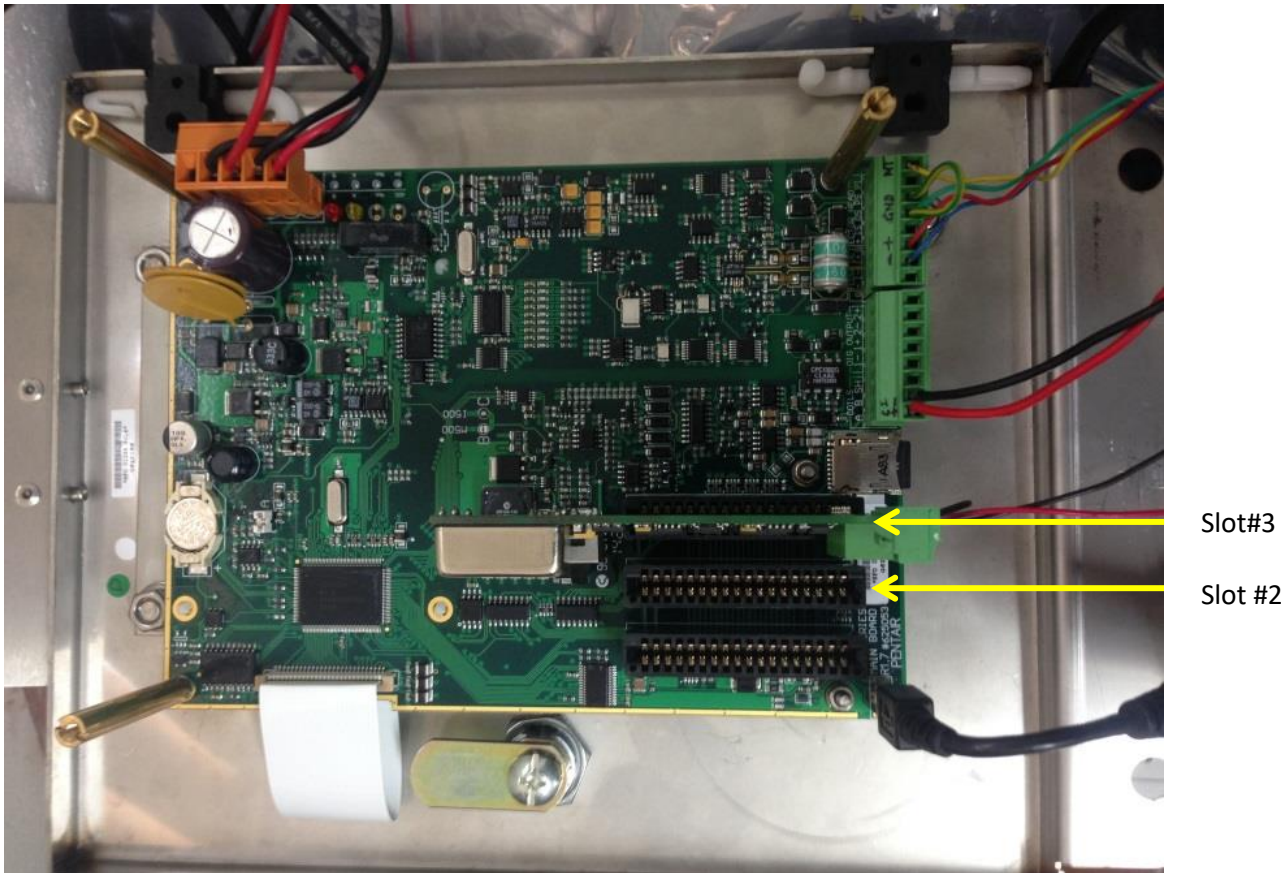


Fig.2: Correct location for the Analog option card.



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Step 2 Wiring

The 500 Series Analog Option Card (Part #625054) provides for two individually isolated current sinking or current sourcing 4-20mA circuits, Loop A and Loop B.

Current sinking/sourcing is selected via the on-board supply selection switch shown in Fig 1:

In current sourcing mode, the switch is used in the ON position, and the supply voltage from the 500 series device is utilised via the 24+ and GND pins on the card, as per Fig 3 below.

In current sinking mode, the on-board supply switch is used in the OFF position, and an external isolated 24VDC power supply is utilised in series, as per Fig 4 below.

When the switch is in the off position there is no power consumed by the 24V DC regulator which results in a reduction in operating current of the I500.



Note: The power supply voltage rating of the 500 Series Analog Option Card must encompass the supply voltage of the 500 series device. Eg, for a nominal 12VDC battery supply, Analogue Option Card Part #625054 (9-18VDC) should be utilised. See Fig 1 for location of voltage rating.



Note: Current sourcing mode increases I500 power consumption. Use of current sourcing mode (supply selection switch in ON position) is only recommended where the I500 supply power budget allows for the additional current consumption.”



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Source mode wiring

For current source mode the connections are as follows. Note that the 24VDC supply switch SW1 must be in the ON position.

If the screen printing on the card does not match Figure 3, please contact Aquamonix for assistance.

Pin No	Pin	Connection
1	Loop: B (-)	To PLC or Controller I/P-B
2	Loop: B (+)	To 24Vdc
3	Loop: A (-)	To PLC or Controller I/P-A
4	Loop: A (+)	To 24Vdc
5	GND	To PLC or Controller Com
6	24VDC (+)	Loop to A+ &/or B+

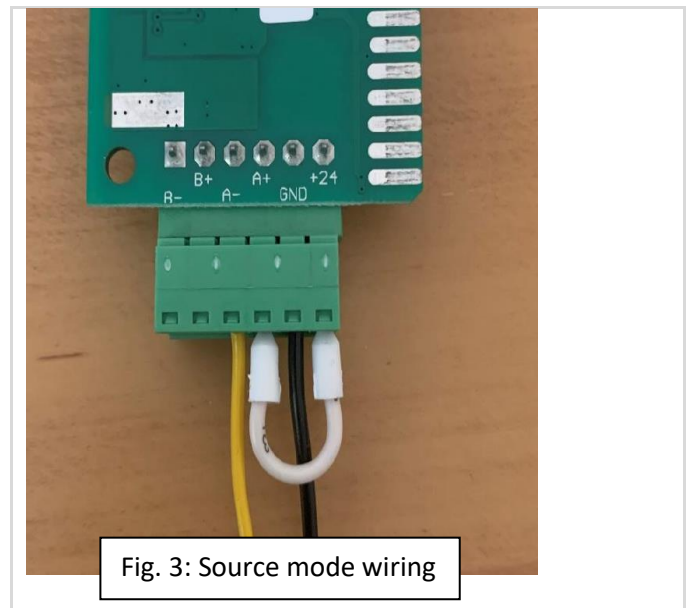


Fig. 3: Source mode wiring

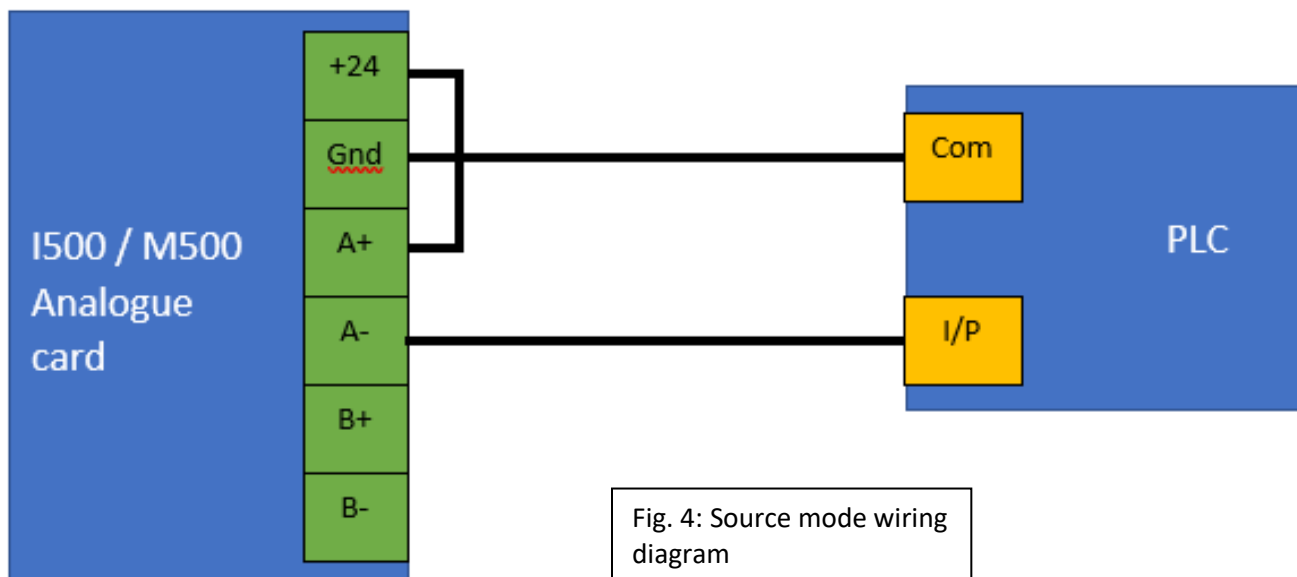


Fig. 4: Source mode wiring diagram



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Sink mode wiring

For current sink mode the connections are as follows. The on-board supply switch is used in the OFF position, and the 24+ and GND pins for the on-board supply are not utilized.

Pin No	Pin	Connection
1	Loop: B (-)	To PLC or Controller Com
2	Loop: B (+)	To PLC or Controller I/P-B
3	Loop: A (-)	To PLC or Controller Com
4	Loop: A (+)	To PLC or Controller I/P-A
5	GND	NC
6	24VDC (+)	NC

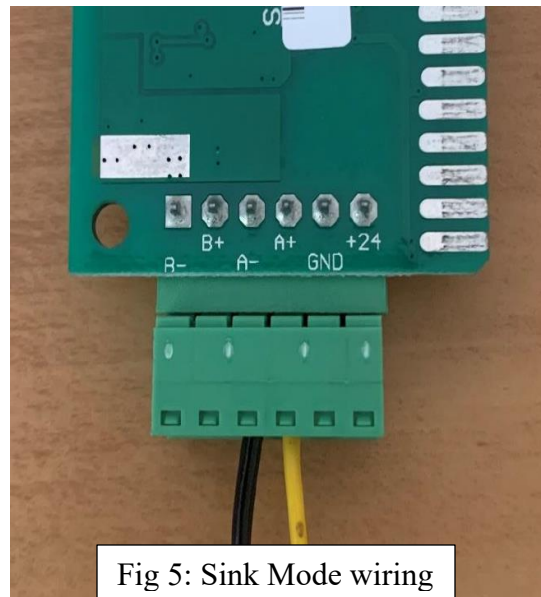


Fig 5: Sink Mode wiring

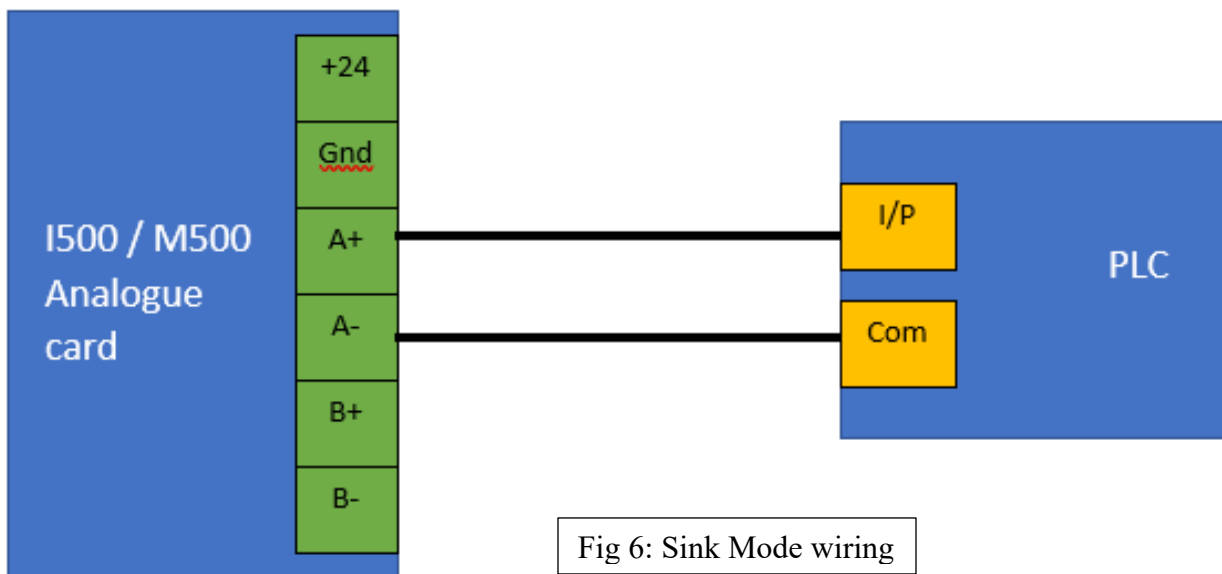


Fig 6: Sink Mode wiring



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Step 3 Output Current Check

Connect a digital multimeter (see dashed line in figure 4) in series with the current loop A or B. Ensure the multimeter is set to read current in mA and that the meter internal fuse is in working condition.

Connect the I500 battery and solar power cables after checking that the input voltage is within the range specified above. The I500 will power up.

Step 4 Configuration

The following parameters are configurable on the I500 through the front screen, or via Magmate.

Ensure all parameters are set correctly. Refer to Examples on Page 5.

Follow TBWFP-036 for security measures – which states that an i500 security dongle, or a laptop with a mini-USB converter cable must be plugged into the i500 mini-USB port on the PCB. For passcode enquiries, please contact your supervisor or Aquamonix Service Representative

Output mode: Output mode can be used to configure the meter for the type of flows expected at the metering site. These flows can be forward, reverse or bi-directional.

- i. Off (current output from loop a/b disabled).
- ii. Forward (4-20mA will measure from low positive flow to high positive flow – forward flow direction only)
- iii. Reverse (4-20mA will measure from low negative flow to high negative flow – reverse flow direction only)
- iv. Bi-direct (center around 12mA when there is no flow)

Refer to Figure 5 for a more detailed illustration of output modes.

Output channel: Selects which physical parameter to be monitored:

- i. Velocity (speed of the water stream)
- ii. Flow (volumetric flow rate of the water stream)
- iii. Mass flow (mass flow rate of the water stream)

Zero: The I500 will output 4mA when it measures the 'zero' value (menu 8.4). When the output channel is 'flow', this number is entered in units of Litres per Second (L/S).

Span: The I500 will output 20mA when it measures the 'span' value (menu 8.5). The span is not offset by the zero. Set the output channel before adjusting the span. When the output channel is 'flow', the span is entered in units of Litres per Second (L/s).

Damping factor: The damping factor utilizes a smoothing algorithm to limit the rate of change of the output current.



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Step 5: Test

Power cycle the I500. Check Initial current during power-up is equal to 12mA DC using the multimeter.

Step 6: Connect to the PLC / Load resistor

Follow specific instructions in the third party device manual.

Output mode, span and zero examples

Fig. 6: Output mode, span and zero examples.

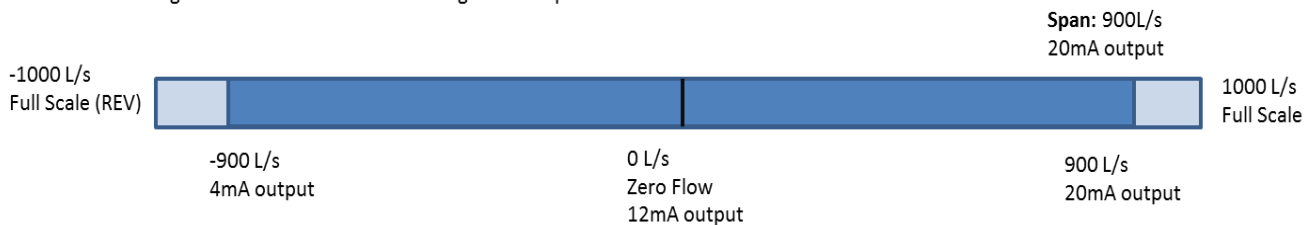
Case 1: Measuring a known flow range where Zero is not Zero Flow and Span is not full scale.



Case 2: Zero equal to Zero Flow. Span equal to Full Scale.



Case 3: Measuring a known Bi-directional flow range where Span is not full scale.



Case 4: Measuring Bidirectional flow where Span is equal to full scale

