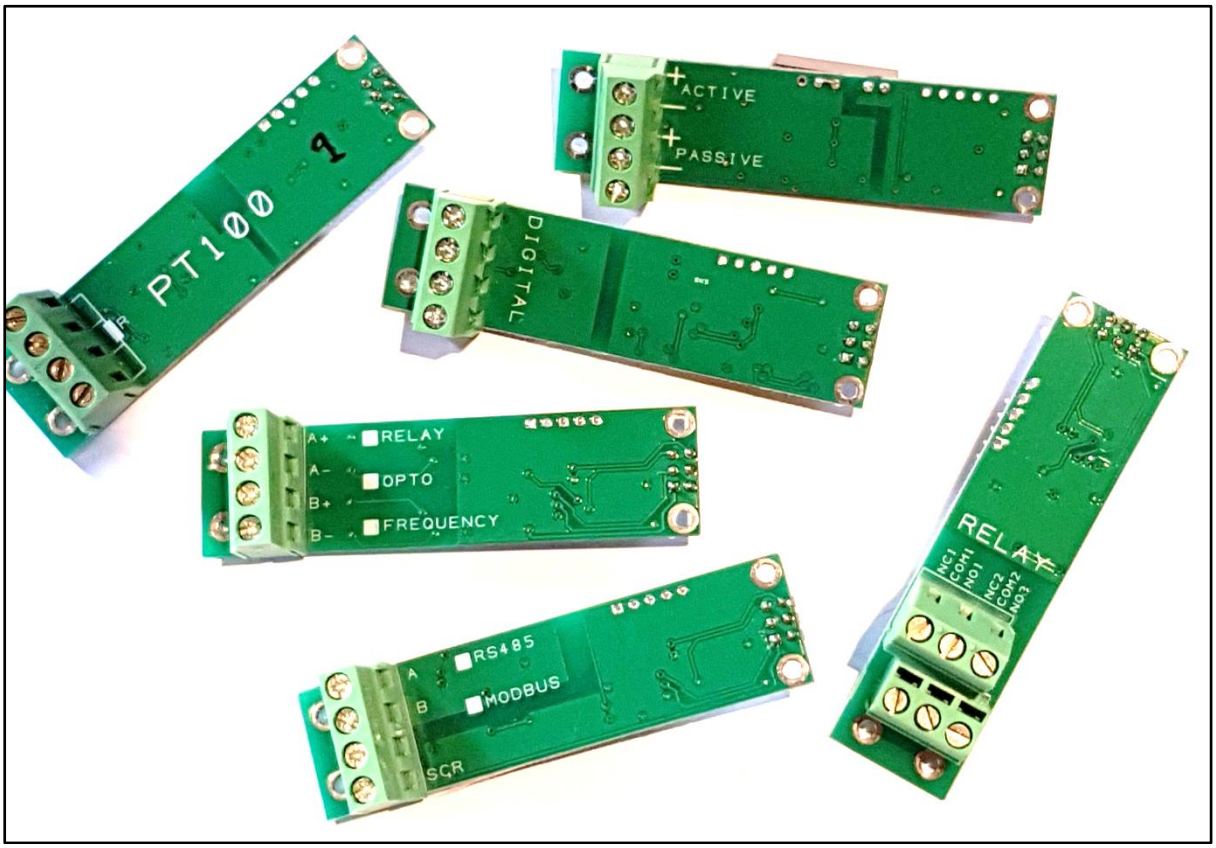
Sonic Driver

Made in Britain

FIXED-UFM Ultrasonic Flowmeter - Plug-in Modules

Connections and Pinouts

Version 3.0



1st July 2024

Contents

1.0 Introduction

The Sonic Driver FIXED-UFM (and MODBUS WALL-UFM) can be fitted with a range of input/output plug-in modules to suite many applications.

Linear modules such as the 0/4 to 20 mA input and output have 16 bit resolution.

Modules are galvanically and optically isolated from the UFM and each other.

Connection is via screw terminals designed to accept wire sizes 28 to 12 AWG.

The tightening torque requirements for screw terminals are 0.5 Nm minimum to 0.6 Nm maximum.

Select field wiring rated for 5 degC above the maximum ambient temperature when it is possible that the temperature will exceed 55 degC.

2.0 Active/Passive 0/4 to 20 mA output

The Active/Passive 0/4 to 20 mA output module, figure (1) has screw terminals for;

- Active 4 to 20 mA output with internal 30 Vdc supply.
- Passive 0 to 20 mA output with external 24 Vdc supply.

NOTE: Only one pair of screw terminals can be used at any time. Active and Passive modules can only use ACTIVE OR PASSIVE connections not both at the same time.

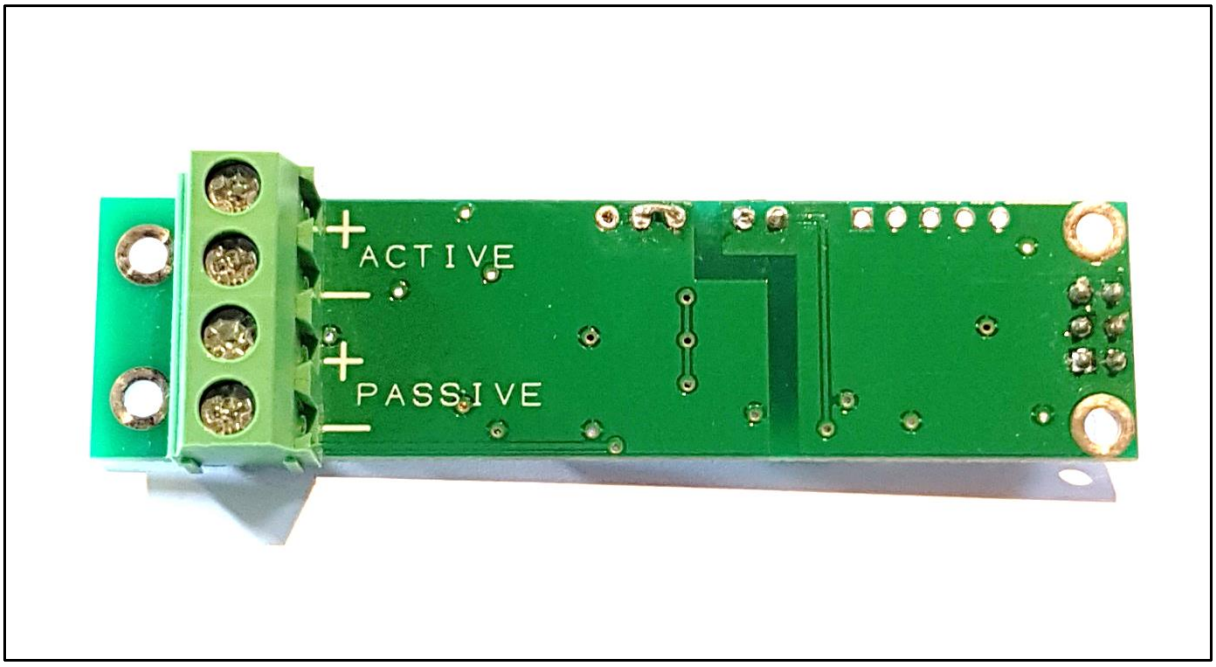


Figure (1) Active/Passive 0/4 to 20 mA output module screw terminals

- + ACTIVE - 4 to 20 mA Current output
- - ACTIVE - 4 to 20 mA Current out ground
- + PASSIVE - 0 to 20 mA Current output
- - PASSIVE - 0 to 20 mA Current out ground

Accuracy is 0.1 % of reading ± 15 µA. Load resistance Rext < 500 Ω.

Namur standard levels 3.8 and 21.0 mA are available for error and fault signalling.

3.0 Open collector

The Open Collector Relay module, see figure (2) gives a pair of control outputs requiring external supply and pull-up resistor. The pair act in opposition.

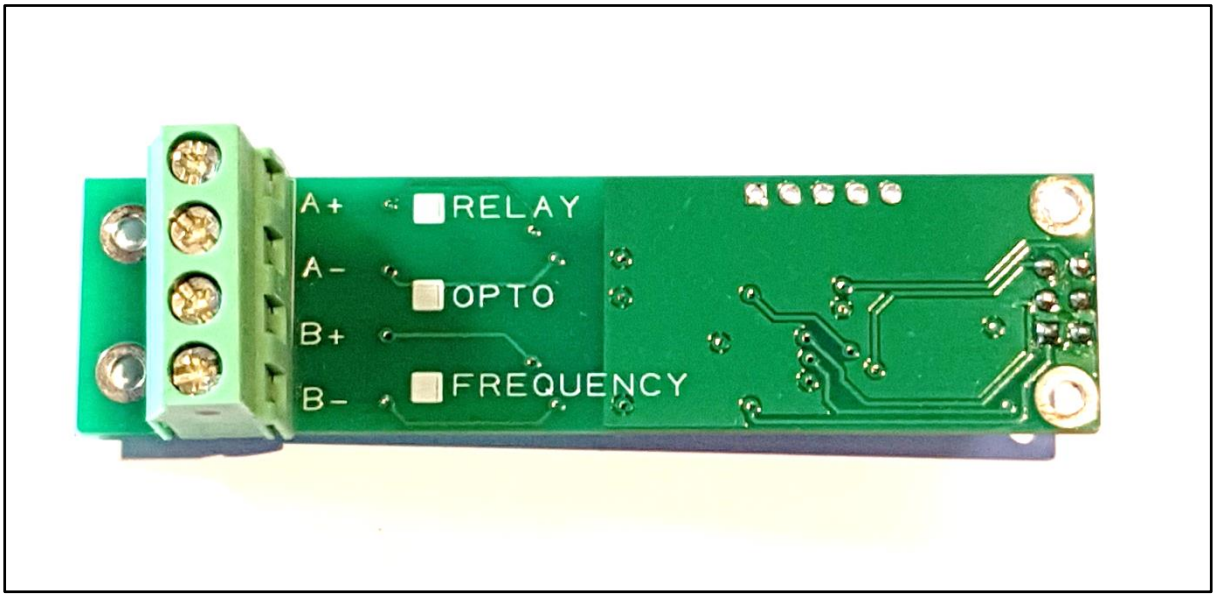


Figure (2) Open collector relay module screw terminals

For alarm or pulse output.

- A+ Control Output #1
- A- Ground
- B+ Control Output #2
- B- Ground

Uext = 5 to 24 Vdc.
Rc = Uext / Ic.
Ic = minimum 3 mA.

Frequency output functionality is not currently implemented on this module.

4.0 Opto relay

The Opto module, see figure (3) gives a pair of control outputs requiring external supply and pull-up resistor. The pair act in opposition.

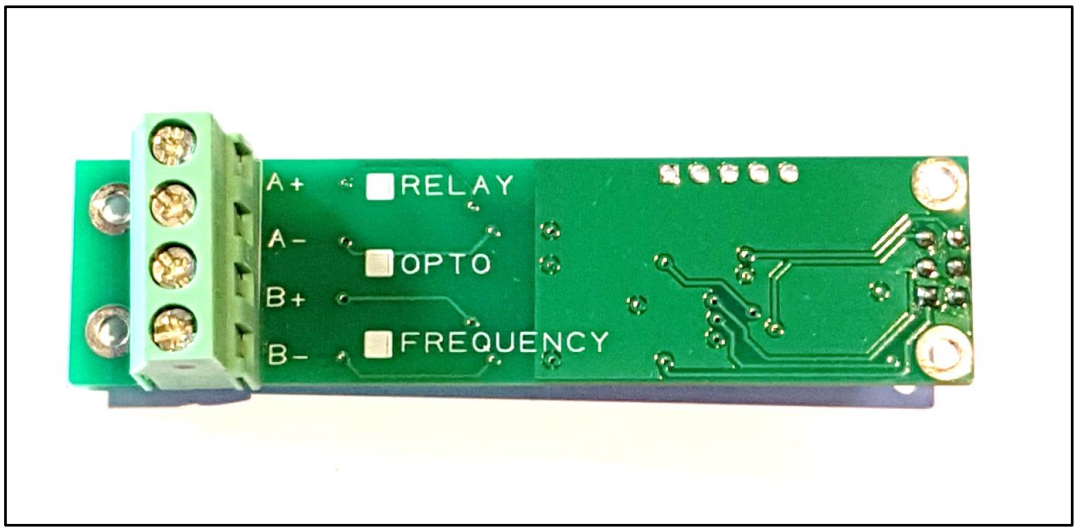


Figure (3) Opto relay module screw terminals

For alarm or pulse output.

- A+ Control Output #1
- A- Ground
- B+ Control Output #2
- B- Ground

Opto Relay Current = 400 mA MAX and 48 Volt DC MAX.

Frequency output functionality is not currently implemented on this module.

5.0 Mechanical relay

The Mechanical relay module, see figure (4) gives a pair of normally open (NO), common (COM), normally closed (NC) relay contacts. The pair act in opposition.

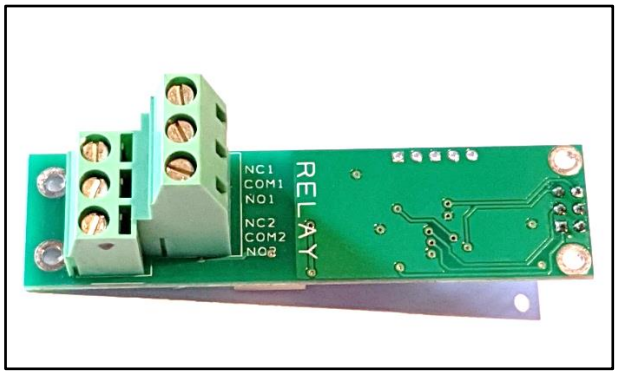


Figure (4) Mechanical relay module screw terminals

For alarm or pulse output.

The plug in module has a double height, 2 row by 3 way, screw terminal block.

- NC1
- COM1
  - NO1
- NC2
  - COM2
- NO2

Umax = 240 Vac/dc.

6.0 Active/Passive 0/4 to 20 mA input

The Active/Passive 0/4 to 20 mA input module, see figure (5) has terminals for;

- Active 4 to 20 mA internal 30 V dc.
- Passive 0 to 20 mA external 24 Vdc supply.

NOTE: Only one pair of screw terminals can be used at any time. Active and Passive modules can only use ACTIVE OR PASSIVE connections not both at the same time.

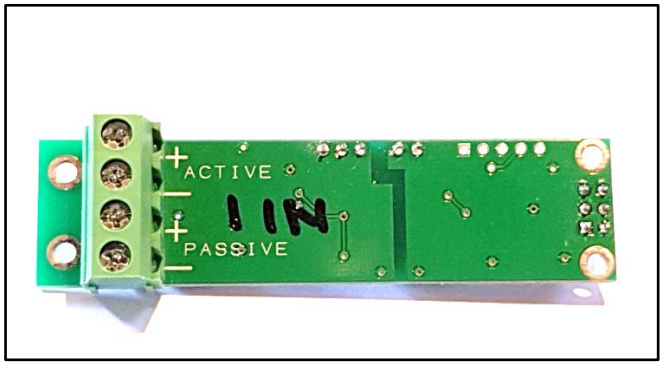


Figure (5) Active/Passive 0/4 to 20 mA input module screw terminals

- + ACTIVE - 4 to 20 mA Current input
- - ACTIVE - 4 to 20 mA Current in ground
- + PASSIVE - 0 to 20 mA Current input
- - PASSIVE - 0 to 20 mA Current in ground

Accuracy is 0.1 % of reading ± 15 µA.

7.0 Modbus RTU

Physical connection to the 2-wire bus is via the 4 way screw terminal block on the end of the plug-in board. The terminals are labelled 'A' and 'B', see figure (6).

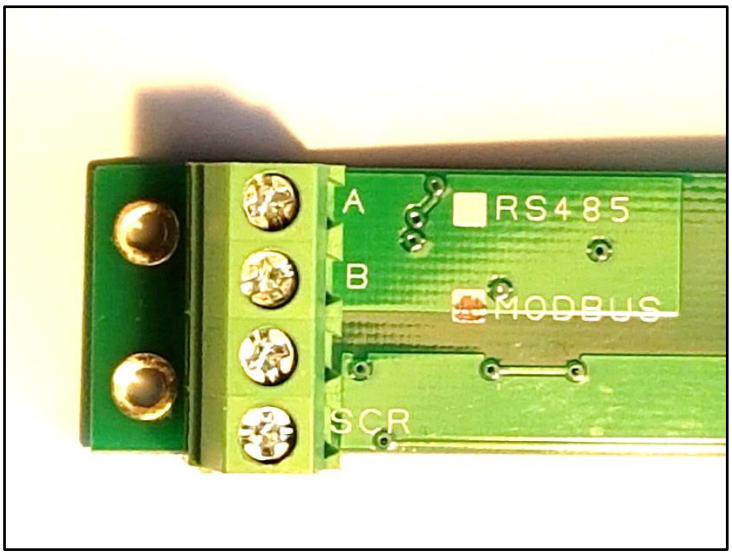


Figure (6) Modbus RTU module screw terminals

Note that some equipment manufacturers label their terminals in other ways, e.g. ‘+’ and ‘-‘ so the exact order that the wires are connected may be reversed.

There is also a screw terminal for connection of cable screen. This may be connected at the Master or the Slave UFM if necessary.

End of line should have a 120 Ω termination resistor fitted.

8.0 PT100 4-Wire temperature Input

The PT100 input module, see figure (7) accepts 4-wire PT100 inputs, -40 to 200 degC.

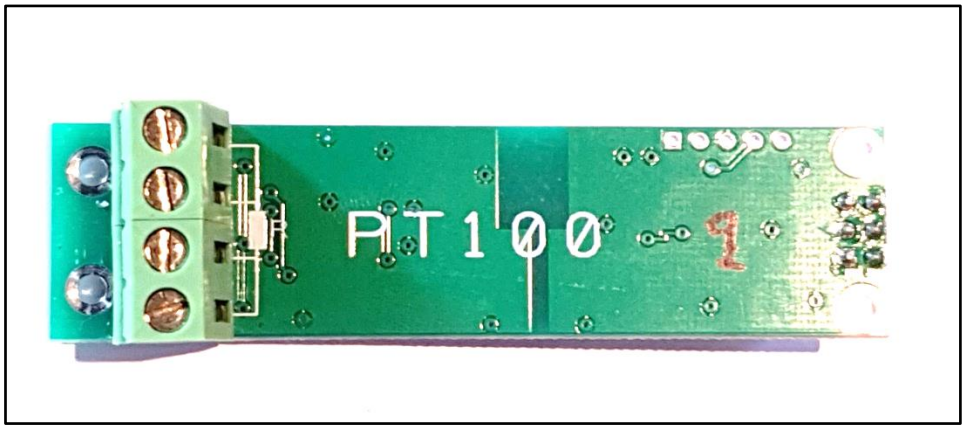


Figure (7) PT100 4Wire temperature input module screw terminals

- RTD Ex +
- RTD Sense +
- RTD Sense -
- RTD Ex -

9.0 Digital input

This plug-in module accepts a digital input signal to start the batch totalise function, see figure (8).

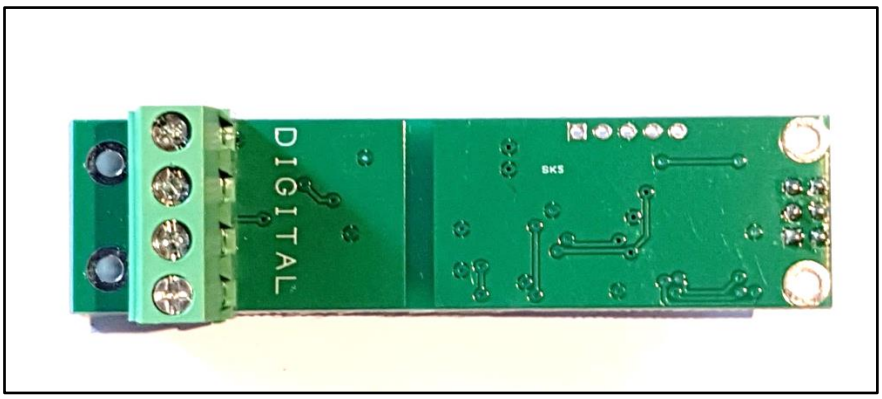


Figure (8) Digital input module screw terminals

- V+ - 5 Vdc
- NC - IN1
- NO - IN2
- COM - Ground

10.0 RS232 serial communications

RS232 serial communications, see figure (9) is via the 3 way screw terminal block labelled;

- RX - Receive
- TX - Transmit
- G - Ground

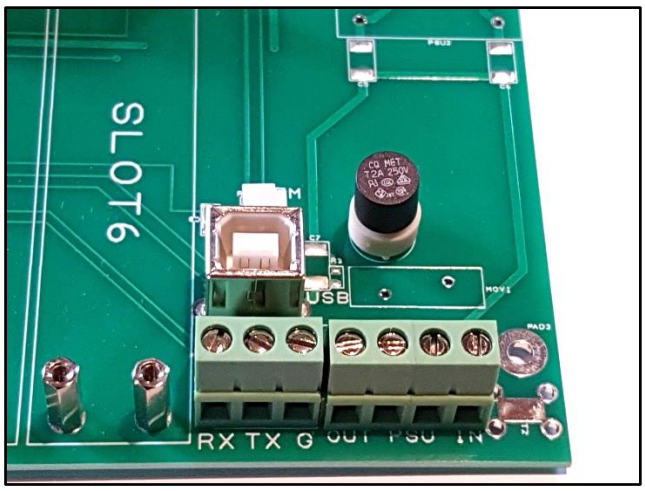


Figure (9) RS23 serial communications screw terminals

11.0 USB serial communications

USB serial communications is via a standard USB A/B cable, see figure (9) to a laptop or PC. The port is powered by the remote device and appears as a virtual com port. Details can be found in Windows Device Manager.

12.0 Flow sensors

Flow sensors connect to the 4 way screw terminal block on the Time of Flight Module (TOFM), see figure (10). This module is installed in the left most slot in the screw terminal area.

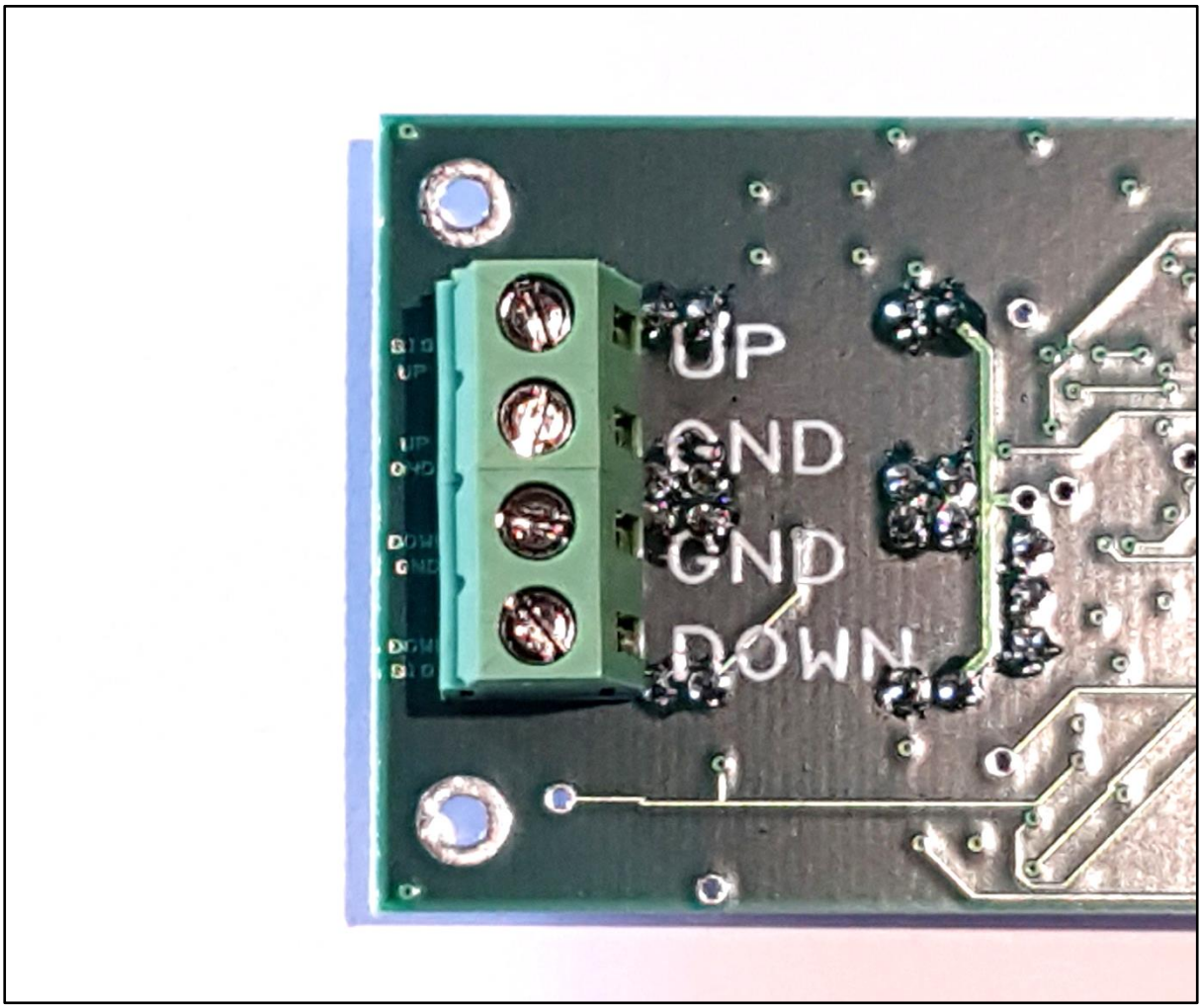


Figure (10) TOFM module screw terminals

Connect the upstream and downstream sensors as below;

UP - Downstream Signal (Red)

GND - Downstream Internal Shield

GND - Upstream Internal Shield 

DOWN - Upstream Signal (Black) 

Observe the direction of the arrowhead and flights printed on the sensor labels. Align the arrow in the direction of flow.

13.0 DC power

A DC powered UFM has input rated 12 to 24 Vdc at 10 W.

Connect the DC to the supply 4 way screw terminal block on the right hand side in the screw terminal area labelled PSU IN, see figure (11);

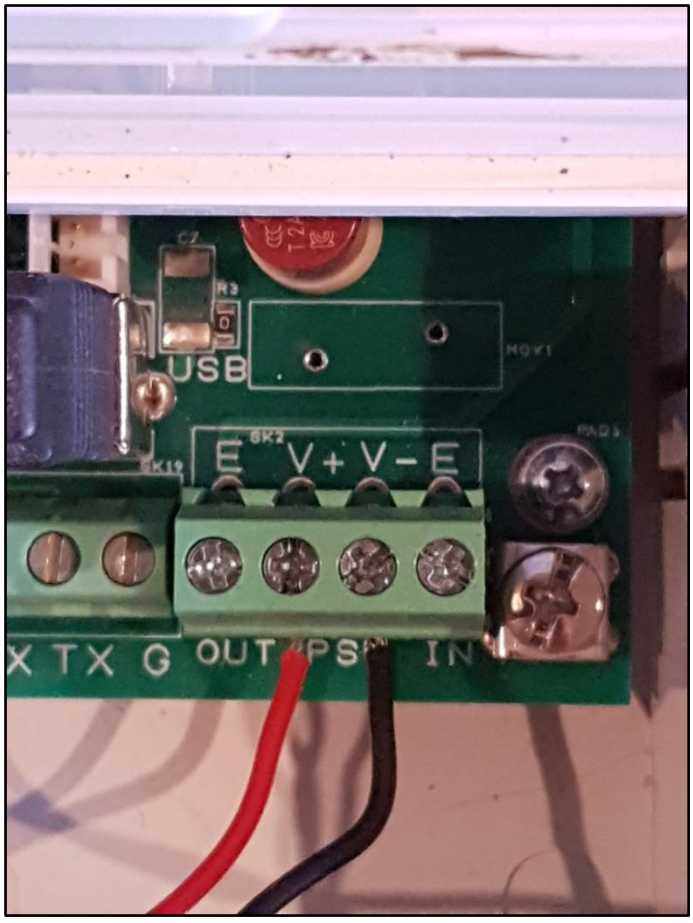


Figure (11) DC Power

- E - Not Connected
- V+ - Positive
- V- - Negative
- E - Not Connected

14.0 AC power

An AC powered UFM has input rated 85 to 264 Vac 48 to 63 Hz 10 W.

Connect the AC to the supply 4 way screw terminal block on the right hand side in the screw terminal area labelled PSU IN, see figure (12);

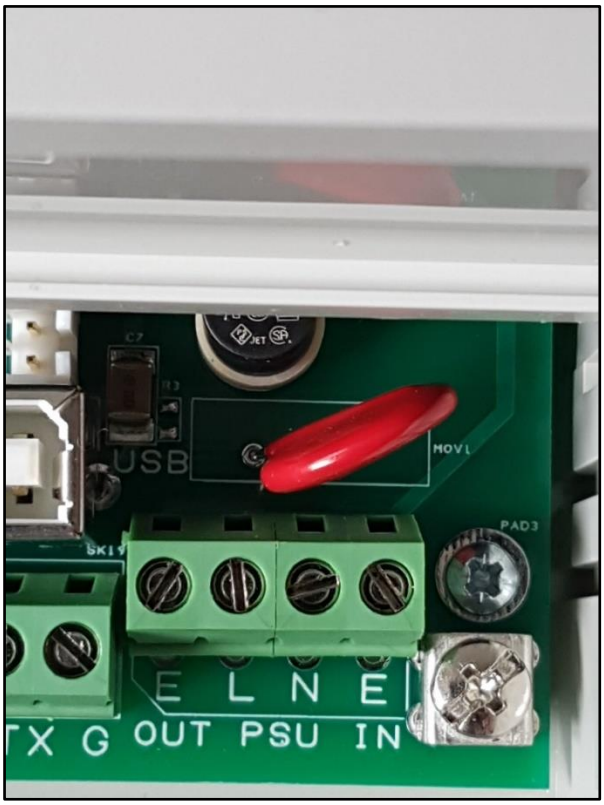


Figure (12) AC Power

- E - Earth
- L - Live
- N - Neutral
- E - Earth

In addition a Protective Earth clamp point is available.

Notice that between DC and AC versions the screw terminal block is positioned high or low on the PCB so that the appropriate labels are shown on the silk screen.