

## FREQUENCY/PULSE COUNTER MODULE

### FEATURES

- 1 Pulse Inputs
- 0.1 Hz - 1 kHz
- Counter value stored in EEPROM
- RS-485 MODBUS RTU Compatible

### DESCRIPTION

The F1 module can be used to interface with any sensor that produces a pulse output, to both measure the frequency and keep track of the total count. Typically this would be used with a flow sensor to measure liquid flow rate and volume, and anemometers to measure wind speed. It can be controlled by any Modbus-compliant server over RS-485.



### CONNECTOR DETAILS

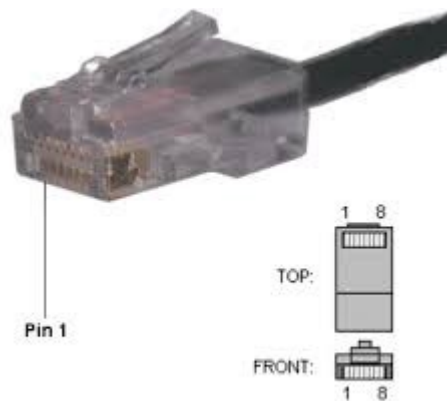
Pin	Name	Description
1-4	NC	Not connected
5	5V	5V output. This can be used to power the sensor if it does not consume more than 100 mA
6	GND	Ground
7	PULSE	Pulse input to measure. This would typically be a square wave of 0-5V
8	NC	Leave this unconnected.

## MODBUS INTERFACE

This module is Modbus RTU compatible. It requires a baud rate of 9600 bps, no parity, and 1 stop bit for correct operation. The default slave ID of this module is set to 1 but can be changed via a Modbus register.

The two RJ45 sockets are connected in parallel, and are used for providing power and interfacing with the RS-485 bus. Devices can be daisy chained together easily using this method. When used in conjunction with the Wattmon controller any standard Ethernet patch cable (straight through) can be used to connect with the Wattmon master. One connector has two LED indicators. One indicates that the module is powered, and the other blinks when a packet is send or received. The second LED will start blinking slowly if Modbus communication stops for over 30 seconds.

When using this device with a third party Modbus master, use the following table for proper connection.



*Figure 1: RJ-45 Pinouts*

<b>PIN</b>	<b>Description</b>
1,2	GND
3	Not connected
4	A (-)
5	B (+)
6	Not connected



# IF1 Datasheet

7,8	5V DC
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## MODBUS PROTOCOL

This device supports the following functions:

- FUNCTION 3, READ HOLDING REGISTERS
- FUNCTION 4, READ INPUT REGISTERS
- FUNCTION 6, WRITE SINGLE REGISTER
- FUNCTION 16, WRITE MULTIPLE REGISTERS
- FUNCTION 17, REPORT SLAVE ID

## MODBUS INPUT REGISTERS

Address	Name	Description
3000	FREQ	Frequency Measured. This is an input register and needs to be read using Function 4. The value is already calibrated using the holding register settings.
3002	MILLIONS	Million units counter
3003	THOUSANDS	Thousand units counter
3004	UNITS	Units counter

## MODBUS HOLDING REGISTERS

4000	W_MILLIONS	Set Millions counter value
4001	W_THOUSANDS	Set Thousands counter value
4002	W_UNITS	Set Units counter value
4003	TICKSPERUNIT	Set the number of pulses to counter before incrementing the unit counter
4004	FREQMUL	Frequency Multiplier value. Set this value to 1 for the actual frequency in Hz. If you wish to have a finer



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		accuracy, multiple this by 10 to get a frequency in 1/10ths of a Hz
4005	FREQDIV	Divide frequency by a fixed amount. Leave this at 1 unless required.
10000	ADDR	Slave Address. This can be set using WRITE SINGLE REGISTER (Function 6) to set the slave address and is Write Only. To read the slave address, use the REPORT SLAVE ID function.