Rapidlogger Systems

Setting up Rapidlogger with Flowmeters

This tech note describes the process to interface and configure a flowmeter with the Rapidlogger System.

Flowmeter Signal Types

Flowmeters come in various types including turbine, magnetic (magflow), ultrasonic, Coriolis, and others. Most flowmeters provide a frequency-type output signal for interfacing with a totalizer or external data acquisition system. The Rapidlogger uses this frequency output to measure and record flow rate.

Coriolis, magflow, and ultrasonic flowmeters generate a square wave frequency signal using internal electronics. The output is typically an active square wave with a separate power supply, signal, and ground connection. This signal is directly compatible with the Rapidlogger frequency input.

Turbine flowmeters use a sensor fitted near a rotating impeller or propeller. As the impeller spins with the flow its blades pass near the sensor generating a frequency signal proportional to flow rate. Turbine flowmeters are available with different output types:

- 3-wire or 4-wire amplified magnetic pickup — generates a square wave output. Compatible with Rapidlogger.
- 3-wire or 4-wire inductive (proximity) sensor — generates a square wave output. Compatible with Rapidlogger.
- 2-wire passive magnetic pickup — generates a sine wave output. NOT supported by the Rapidlogger.

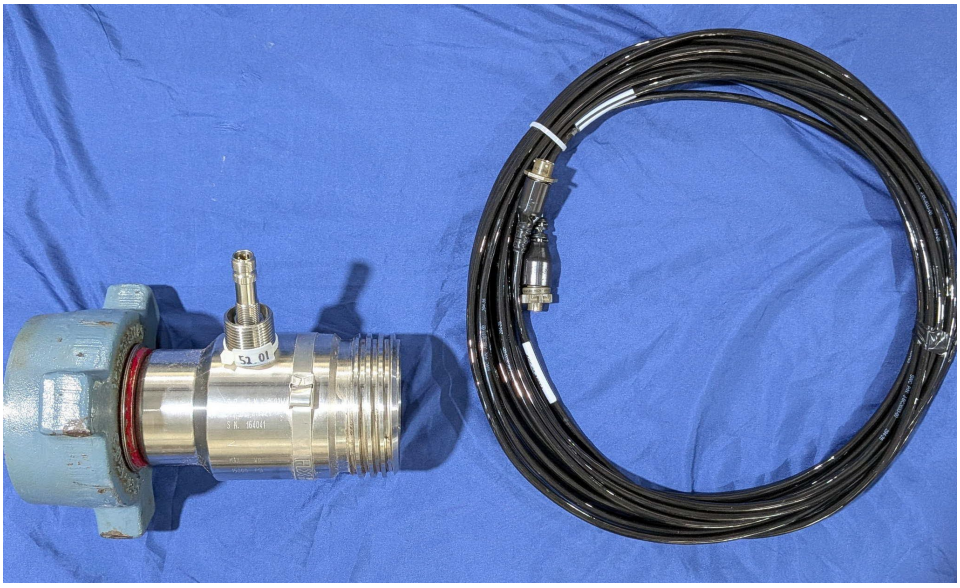
WARNING: The Rapidlogger does not support 2-wire passive magnetic pickup (sine wave) outputs. If your turbine flowmeter uses a 2-wire mag pickup a signal conditioner must be used to convert the sine wave to a square wave before connecting to the Rapidlogger.

Flowmeter K-Factor (Calibration Factor)

All flowmeters provide a K-factor (also called calibration factor or flow factor) for converting the measured frequency to a flow rate. This factor is specific to each flowmeter and is typically expressed as:

- Pulses per US gallon (most common)
- Pulses per barrel (less common)

The K-factor is usually found on a tag or label attached to the flowmeter body or on the calibration certificate supplied with the unit.



NOTE: *Always use the K-factor specific to the flowmeter being installed. Do not substitute a generic value.*

Wiring the Flowmeter to the Rapidlogger

Connect the flowmeter frequency output signal to the Rapidlogger as follows:

Flowmeter Terminal	Rapidlogger Terminal
Signal Output (+)	J5-3 (Frequency Input 3)
Ground / 0V	J5 Ground terminal (adjacent to J5-3)
Power Supply	Separate supply per flowmeter specification (do NOT power from Rapidlogger)

NOTE: *Refer to the Rapidlogger wiring diagram for the exact J5 terminal block location and pinout on your specific unit.*

Calculating the Rapidlogger Multiplier

The Rapidlogger multiplier converts the raw frequency (Hz) measured at the input into engineering units. To display flow rate in barrels per minute (BPM) calculate the multiplier as follows.

If K-Factor is in Pulses per US Gallon:

There are 60 seconds per minute and 42 US gallons per oil-field barrel therefore:

If K-factor = 52.01

Multiplier = 60 / 42 / K-factor

Or equivalently: Multiplier = 1.4286 / K-factor

Example (K-factor = 100 pulses per US gallon):

Multiplier = 60 / 42 / 52.01 = 0.02746724

Enter 0.014286 in the Multiplier field in the Rapidlogger System Utility.

If K-Factor is in Pulses per Barrel:

Multiplier = 60 / K-factor

Setting up the Flow Rate Variable in Rapidlogger System Utility

Once the multiplier has been calculated use the Rapidlogger System Utility to configure the flow rate variable. Version 4.1.40 or newer of the Rapidlogger System Utility is required.

1. Connect the PC to the Rapidlogger System over Ethernet. Refer to Tech Note #9 for network setup.
2. Open the Rapidlogger System Utility and click 'Ping Rapidlogger' to verify communication.
3. Click 'Read All from Unit' to load the current variable configuration from the Rapidlogger.
4. Locate the flow rate variable in the variable list (e.g. 'Flow Rate'). If it does not exist add a new variable.
5. Set the following fields for the flow rate variable:

Field	Setting
Variable Type	Frequency
Input Number	3 (Frequency Input 3 / J5-3)
Units	BPM (Barrels Per Minute)
Multiplier	Calculated value from Section 4

Offset	0

6. Click 'Write All to Unit' to send the updated configuration to the Rapidlogger.
7. Verify the flow rate reading on the Rapidlogger front panel LCD or in RapidVu.

NOTE: *Save the variable file to your PC using the 'Write Vars File' button before and after making changes. This allows recovery of settings if needed. See Tech Note #13 for details.*

Setting up the Volume Totalizer Variable

In addition to flow rate a volume totalizer variable can be configured to accumulate the total volume in barrels. The Rapidlogger counts the total number of pulses received on the frequency input and applies a multiplier to convert to volume.

Totalizer Multiplier Calculation:

If K-Factor is in Pulses per US Gallon:

If K-Factor is 52.01

Totalizer Multiplier = 1 / 42 / K-factor = 0.00045778

If K-Factor is in Pulses per Barrel:

Totalizer Multiplier = 1 / K-factor

Example (K-factor = 52.01 pulses per US gallon):

Totalizer Multiplier = 1 / 42 / 52.01 = 0.019227

In the Rapidlogger System Utility add or locate the volume variable and set the following fields:

Field	**Setting**
Variable Type	Total (Frequency Total / Pulse Counter)
Input Number	3 (Frequency Input 3 / J5-3)
Units	BBL (Barrels)
Multiplier	Calculated totalizer value from above
Offset	0

8. Click 'Write All to Unit' to apply the configuration.