

Rapidlogger Systems

Frequency Inputs and Pump Rate Variable Mapping

This tech note describes how the frequency input terminals on the Rapidlogger System relate to the pump rate and pump total variables set up in the Rapidlogger System Utility, and how to correct the assignment when a pump sensor reads on one input but shows nothing when wired to another.

How a Variable Finds Its Input

Every variable in the Rapidlogger System Utility has an I/O Type and an Input Number. A pump rate or pump total variable has I/O Type 'Frequency', and its Input Number says which frequency input it counts pulses from. Input Number 1 is frequency input F1, Input Number 2 is F2, and so on up to 8. The variable reads that input only. A pulse signal arriving on any other frequency input is counted by whichever variable is set to that input, or by nothing at all.

The default cementing variable list (Tech Note #11) uses the following assignments:

Variable	Name	I/O Type	Input Number	Terminal
5	Pump1Rate	Frequency	1	F1
6	Pump2Rate	Frequency	2	F2
8	Pump1Total	Frequency	1	F1
9	Pump2Total	Frequency	2	F2

The rate and the total of the same pump always share one input. The rate variable uses a multiplier of the volume per pulse times 60 and the total variable uses the volume per pulse itself (Tech Note #17).

Frequency Input Terminals

All Rapidlogger units are built on one of two circuit boards: the regular board, used in the Standard, Max and Mini units, and the mini board, used in the SE and ExD units. The 'NextGen' designation is a revision of the board and does not change any terminal assignment. Check which board is in the unit before using the tables below.

Rapidlogger Systems

The wiring sheet supplied with the unit shows the terminals used at the factory.

Regular board

Field wiring lands on the JB1 terminal block inside the enclosure. Inputs F3 and F4 have no JB1 position; they are wired at the factory directly to the main board connector J5 when ordered, for example for engine RPM sensors (Tech Note #107).

Input Number	Input	JB1 Terminal	Board Connector
1	F1	JB1-20	J5-1
2	F2	JB1-21	J5-2
3	F3	none	J5-3
4	F4	none	J5-4
5	QA1 / F5	JB1-16	J9-1
6	QB1 / F6	JB1-17	J9-2
7	QA2 / F7	JB1-18	J9-3
8	QB2 / F8	JB1-19	J9-4

Sensor power is taken from the 24 VDC OUT terminals JB1-3 to JB1-6 and the sensor return goes to the GND terminals JB1-7 to JB1-10. Inputs F1 and F2 accept a square or sine wave of -24 to +24 V, so they suit magnetic pickups as well as proximity switches. The Q terminals accept a positive square wave only.

NOTE: Inputs 5 to 8 are the quadrature encoder terminals QA1, QB1, QA2 and QB2. They count as frequency inputs only when 'Quadrature as Frequency' mode is switched on in System Setup. That setting changes all four terminals at once, so a unit that uses an encoder for depth cannot also use these terminals as frequency inputs.

Mini board

The mini board has two frequency inputs, F1 and F2, on connector J5. They are brought out on the frequency cable (Cable 6: GND, F1, F2, Q1, Q2, 24 V out). There are no inputs 3 to 8 on this board.

Input	Input	J5 Pin	Cable 6	Shared With
-------	-------	--------	---------	-------------

Rapidlogger Systems

Number			Wire	
1	F1	J5-1	F1	Q1A
2	F2	J5-2	F2	Q2A
none	Q1B	J5-3	Q1	quadrature only
none	Q2B	J5-4	Q2	quadrature only

NOTE: On the mini board the F1 pin is also the A channel of quadrature encoder 1, and the F2 pin is the A channel of encoder 2. A pump sensor and an encoder cannot share the same pin. Pump rate variables on a mini board must use Input Number 1 or 2.

Why a Pump Reads on One Input and Not on Another

The usual case is a sensor that has been moved. A pump sensor that worked on F1 is re-wired to F2, or a second pump's sensor is landed on F3, and the variable for that pump still has its old Input Number. The sensor is working and the pulses are arriving, but no variable is counting that input, so the rate shows zero. The opposite also happens: a variable is re-assigned in the Utility while the sensor stays on its original terminal.

Checking the Raw Signal

On the Rapidlogger keypad press F6, F6, F5, F2 to open the frequency diagnostics screen. It shows the pulse rate in Hz on each frequency input. Run the pump, or turn the shaft that carries the target, and watch which input changes.

- Pulses appear on an input, but the pump variable is set to a different Input Number: the mapping is wrong. Either move the sensor wire to the terminal the variable expects, or change the variable's Input Number to the input that shows the pulses (next section).
- Pulses appear on the right input but the rate still reads zero: check that the variable is enabled and that its multiplier is not zero.
- No pulses on any input: the problem is in the sensor or the cable. Check the 24 V supply at the sensor, the

Rapidlogger Systems

ground return, the plug at the unit, and the gap between a proximity switch and its target (Tech Note #107 gives the gap for the Rapidlogger inductive sensor).

Correcting the Input Number in the Rapidlogger System Utility

1. Connect the PC to the Rapidlogger System over Ethernet or WiFi. Refer to Tech Note #9 for network setup.
2. Open the Rapidlogger System Utility and click 'Find Rapidlogger' to verify communication.
3. Click 'Read All from Unit' to load the current variable configuration from the Rapidlogger.
4. Click 'Write Vars File' to save a backup of the current setup on the PC before making changes (Tech Note #13).
5. Select the pump rate variable, for example variable 6 Pump2Rate. Change its Input Number to the frequency input the sensor is wired to, using the terminal tables above.
6. Click 'Write One to Unit' and confirm that the message window shows 'Variable Apply OK'.
7. Select the matching pump total variable, for example variable 9 Pump2Total, set the same Input Number and click 'Write One to Unit' again.
8. Power cycle the Rapidlogger so that the new assignments take effect.
9. Run the pump and confirm that the rate and total variables on the LCD and in RapidVu respond.

NOTE: Do not change the Multiplier when correcting the Input Number. The multiplier belongs to the sensor and the pump, not to the terminal. If the pump has changed as well, re-calibrate as described in Tech Note #17.

The pump rate and total variables are now reading from the inputs the sensors are wired to. Keep the updated variable file with the unit's records so that the mapping is known the next time a sensor is moved.