

800 Displaying Series Flowmeter



OVERVIEW

The principle of operation is very simple. A jet of liquid is directed at a free running Pelton wheel turbine in a specially shaped chamber. The rotation of the rotor is detected with a Hall effect sensor. The output frequency of these pulses is directly proportional to flow rate and the total number of pulses the total volume passed. The bearing material is sapphire as this gives a long trouble free life to the meter. The non-metallic construction means that these meters may be used with aggressive chemicals and ultra-pure water. Very strong acids will damage the ceramic magnet.



INSTALLATION

The meter produces a pulse output the frequency of which is proportional to the flow through the device.

- Suitable for many liquids including water and most fuels
- Connections for 8mm dia. hoses or 3/8" John Guest
- Reliable and accurate
- Supplied with 2M (approx) of cable.
- Flow ranges from 50 mL/min to 15 L/min.

Note: when used in automotive applications, the formation of vapour should be minimised by fitting the sensor between the fuel pump and the carburettor, but before any pressure regulator. The device should be mounted vertically if vapour is likely to form.

The pipe work must be designed in such a way as to eliminate reverse flow, and the liquid pass through the meter in the direction of the arrow. The meter should be installed in a position that prevents it from draining down as on start-up serious damage could result by "impacting" an empty flowmeter with a high velocity fluid stream. The fluid should be clean and homogenous. In all cases an upstream filter of at least 80 microns must be fitted. It is recommended that before the flowmeter is installed in the line a "dummy" section of pipe is inserted and the system flushed. This is to eliminate any debris in that section of the line. The pipe must not stress the body of the meter and should be fully supported either side with appropriate isolation valves and in some cases a by-pass valve. On initial start-up increase the flow slowly to ensure no over speeding of the meter occurs as the air is forced from the line. This is best achieved by monitoring the flow rate and ensuring that a 50% over-range is not exceeded. Never blow a flowmeter with an airline. Care should be taken to ensure that no air enters the system (e.g. leaky pump gland) or that no cavitation takes place. With a volatile liquid we recommend at least twice the vapour pressure plus 1 Bar as the operating pressure. The user must ensure that the materials of construction are compatible with their fluid. We accept no responsibility for material compatibility; it is the users' responsibility.



TECHNICAL SPECIFICATIONS

Model	Flow range L/Min	Linearity % FSD	Typical Freq. Hz.	Approx 'K' Factor
803	0.05 – 0.5	2.0	142	17000
815	0.12 – 1.5	2.0	175	7000
845	0.20 – 4.5	1.5	260	3500
865	0.25 – 6.5	1.5	230	2100
810	0.30 – 10.0	1.0	235	1420
824	0.50 – 15.0	1.0	245	980
F.S. Pressure drop		1 Bar @ 1cSt		
Working pressure		10 Bar		
Temperature range body		-25 to +125°C 0 to 60°C display		
Repeatability		±0.25%		
Sensor to sensor variation		±5%		
Supply voltage		8 to 12Vdc.		
Current consumption		40mA (typical)		
Outputs		5v pulse		
Output low		100mV max.		
Rise and fall times		2uS max		
Wetted materials		PVD F sapphire and Viton Ceramic magnet		
Weight		0.081 kg		



ELECTRICAL CHARACTERISTICS

Hall effect sensor with display electronics

Supply voltage 8 to 12Vdc

Temp range -10 to 55°C

Rise & fall times 1.5uS max

Supply current 80mA typ

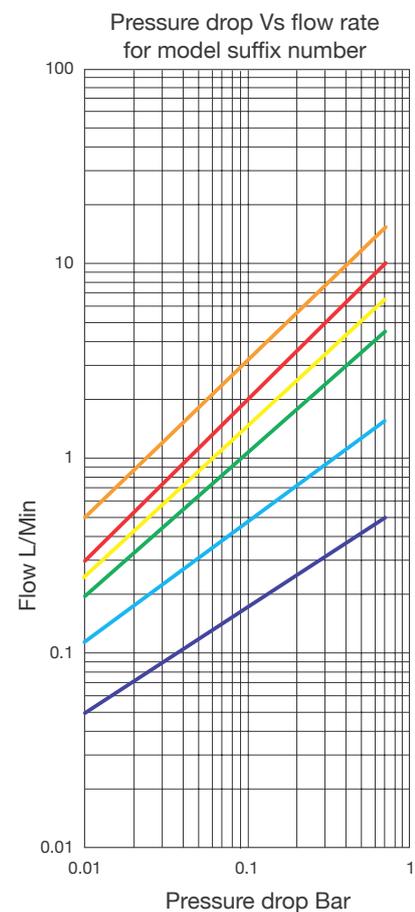


COMMISSIONING

If problems occur during commissioning always check the fundamentals first.

- Is the flowmeter/instrument the correct one for the installation?
- Is the power connected to the meter and the instrument, and is it turned on?
- Is the instrument set/wired correctly? I/P port, pulse type, frequency span, units etc.
- Where possible check the O/P from the flowmeter with an oscilloscope before proceeding.
- Was the line flushed prior to installing the meter?
- Was the flow increased slowly?
- Is the meter blocked?

If you cannot find a solution ask your supplier for technical support.

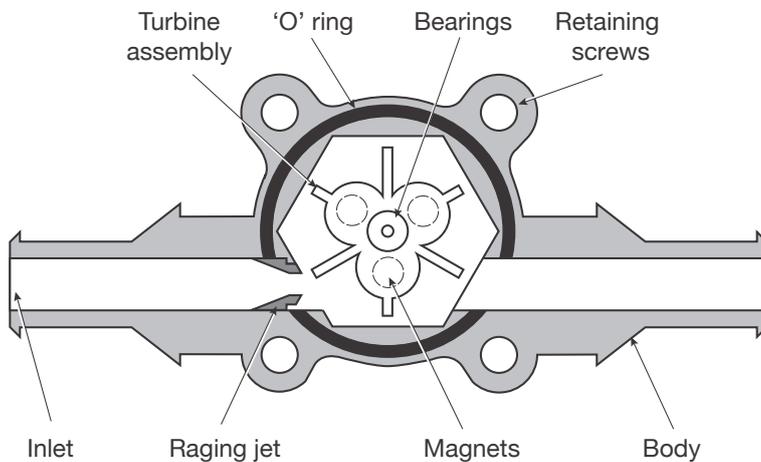


803 — 1mm Jet 865 — 4mm Jet
 815 — 2mm Jet 810 — 5mm Jet
 845 — 3mm Jet 824 — 6mm Jet



TECHNICAL SPECIFICATIONS

It is recommended that all “signal” cables are run separately to power lines and switched inductive loads and are located well away from inverters and other “noisy” apparatus. Always use sound wiring practice.

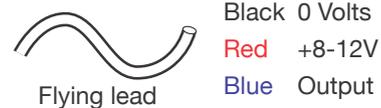


Inserting a ranging jet

There are four ranging jets that may be inserted into the inlet to alter the flow capacity of the meter. Once a jet is inserted it cannot be easily removed without damaging it or the flowmeter bearings. Care should be taken in selecting the correct jet as more than one may not be used. Consider the chart on page 2 and select what flow range is required at what pressure drop, more than one flowmeter may be suitable for the flow rate. For best accuracy choose the jet that has the highest permissible pressure drop as the meter performance will generally be better than a jet with the lowest pressure drop. Use a large diameter punch between 5.5mm and 6mm and drive the jet firmly home until it hits a stop.

Once any jet is fitted the original calibration is void.

Connections





PROGRAMMING

00:00

In normal operation when the meter is showing flow rate the “colon” in the centre flashes. The “unit” and time base are independently determined in the calibration routine, e.g. cc/sec, grams/minute, litres/Hour etc.



0000.0

If “both” is selected in the menu the left hand button will change the display to total and then back to rate. The right hand button can be selected to reset the totaliser. The “unit” is the same as the rate meter but the decimal point position may differ.



Pin

If both buttons are pressed together for four seconds the meter enters program mode and a request is made to enter a PIN. The display flashes between the two words “Pin” and “no”. If no PIN has been entered a press of the left key will advance the program to the next step. The default PIN is 0000.

no

0000

If a PIN is required the display changes with the left hand digit flashing zero. The right hand button increments the number, when the required number is reached the left hand button moves the flashing digit to the right. Each digit or location can be cycled until the number you require is reached. Holding the left hand button for 3 seconds then enters the PIN chosen and advances the program. To exit the programming at any time press both keys together for 4 seconds.

1000



Alt

This gives the option of changing the PIN. The left key by-passes this option. If the right key is pressed the existing PIN will be displayed. The method of changing the display is as above with the right hand key changing the number and the left hand key changing the digit being altered. A 3 second press and hold on the left hand key advances the program.

Pin

0000



Auto

This function allows the user to self calibrate the indicator by passing a pre-determined amount through the flowmeter. The electronics records the number of pulses received, calculates the pulses per “unit” as the ‘K’ factor and enters it in the “SCL Fact” section later in the programming. This number may be edited later if required. Any “unit” may be used, grams, cc, litres etc. This “unit” is used for both total and rate displays. The right hand key enters the volume selection routine and increments the required amount of liquid through pre-set values, 0.1 0.25 0.5 1.0 5.0 10 & 20. Before this program is continued the flowmeter must be primed and ready to discharge the pre-set amount. The larger the amount the more accurate the calibration. When the left hand key is pressed the internal counter counts the number of pulses received until the counter is stopped. The display shows “run” until no further pulses are received or the left button pressed (e.g. against a measuring cylinder) and then it shows “stop” to show the count is completed. To proceed press the left key.

CAL

0.1

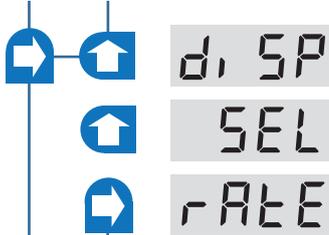
run

stop



PROGRAMMING

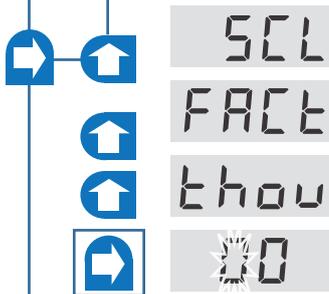
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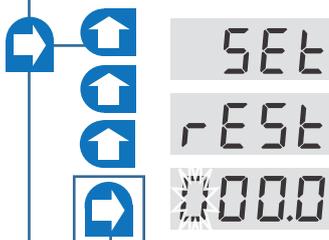
This function permits the user to select the display function, three options are available. When the right key is pressed the display changes to the previously selected option. Further presses of the key cycle through the options, flow rate only “rate”, totaliser only “tot” and switchable between rate and total “both” using the left hand key in the run mode. The right key cycles the options and the left hand one advances the program to the next section.



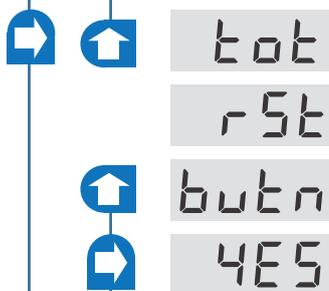
This sets the decimal place for the totaliser. When the right key is pressed the display changes to the previously set position, repeated presses cycles the display through the options 0000 000.0 00.00 & 0.000. These are decimals of the chosen “unit”. The left hand key advances the program.



The scale factor is the number of pulses for a given unit of liquid, the chart on the front page gives a starting point for pulses per litre but any convenient measurement can be used. These figures are only approximate and will vary from meter to meter and the system into which it is installed. In all cases it is best to calibrate the meter in the actual running conditions. If “Auto cal” has been used the ‘K’ factor that the electronics calculated will be displayed. As the number of pulses per unit may be greater than 9999 the actual number is entered in two sections permitting a factor of 99999.9. First tens of thousands and then thousands the remaining digits – hundreds, tens, units and tenths are entered in the calibration section “rest”. The right hand key begins the entry mode, it then cycles the number and the left hand key moves to the next digit. Holding the left key for 3 seconds advances the program to “set rest”.



This section sets the three least significant digits and a decimal place. The right hand key changes the display and the left hand digit flashes to show it is in entry mode. Further presses of the right key cycles through the digits 0 to 9, the left hand key advances the entry option to the next digit. When the required number has been entered press the left key for 3 seconds to advance to the next section.



If either “tot” or “both” mode is selected in the “disp sel” section of the program the user has the option to disable the totaliser reset button. “Yes” means the reset button works, “no” disables it. Pressing the right hand button the display shows the previously selected state, either yes or no. Pressing the right hand key changes the display the left hand key acknowledges the choice and advances the program. Changing the choice from no to yes will not reset the counter until the right hand key is pressed in run mode.



PROGRAMMING continued



rATE

The "rate dp" is the number of decimal places required for the flow rate indicator. The right key changes the display to the previously selected value.



dp

Further presses will cycle the display through the available options. 0000 000.0 00.00 and 0.000 Pressing the left key uses the selected option when ever flow rate is being displayed.



0000



rATE

"Rate" is the time base used for flow rate display, e.g. unit volume per second, per minute



SEC

or per hour. The right key enters the mode and cycles between the options "SEC", "60 S", "hour". The left key enters the option and advances the program step.



FILT

This option permits the user to alter the degree of filtration on the display, 0 is no filtering and 9 is the maximum. This does not affect the totaliser just the amount the display "jitters" during normal operation and its response to step changes in flow rate. The right key enters the mode and cycles the number; the left key enters the option and exits the program. The word "End" shows for approximately 2 seconds before the unit returns to the "run" mode.



1



End

Note: - not all display options are possible and an error may occur if the device is operating at the extremes of the internal arithmetic. If an error occurs recalibrate the electronics increasing or decreasing the resolution or alter the time base.

SENSOVANT

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