



Streamflo Velocity Meter V1.3

400

INSTALLATION AND OPERATION

Nixon Flowmeters Ltd. Leckhampton, Cheltenham, Glos UK Tel. 0044 (0) 1242 243006
Fax 0044 (0) 1242 222487 Email info@nixonflowmeters.co.uk Website www.nixonflowmeters.co.uk

INTRODUCTION

The STREAMFLO miniature current flowmeter system is designed for measuring low velocities of conducting fluids, usually water, in open channels. It is primarily intended for laboratories and specialised industrial use. The measuring head with a cage approximately 15mm diameter enables readings to be taken in confined spaces thus the accurate measurement of velocity in hydraulic models of river estuaries and irrigation schemes are two of its many uses. The system is highly sensitive, responding to velocities as low as 5.0 cm/s. Two probes are available covering velocities up to 300 cm/s.

Principle of Operation

The measuring head consists of a five bladed rotor mounted on a hard stainless steel spindle. The spindle terminates in fine burnished conical pivots which run in jewel bearings mounted in an open frame. Frictional torque is thus extremely low and results in a linear output over a wide range of velocities. The pivots and jewels are shrouded to reduce the possibility of fouling should the flow channel become unduly contaminated. The head is attached to the end of a stainless steel tube containing an insulated gold wire terminated 1.0mm away from the rotor, and is connected to an electronic measuring unit via a co-axial cable.

When the rotor is immersed in a fluid, the passage of the rotor blades past the gold wire tip slightly varies the measurable impedance between the tip and the tube.

This variation is used to modulate a 15KHz carrier signal generated within the indicating instrument which in turn is applied to the electronic detector circuits. Automatic compensation is made for change in liquid conductivity and following amplification and filtering of the carrier frequency a square wave signal is obtained. In the digital indicator the pulses are counted over a known time period to obtain a digital reading.

With each probe, a calibration chart is provided which refers frequency to linear velocity. Variation in probes is not large except at the very low velocities where machining tolerances can have an appreciable effect.

SPECIFICATIONS

All probes 403, 404, 413, 423

Size of head to be submerged.	Width	15mm
	Length	25mm
	Depth	15mm
Connector	UNC Co-axial socket	
Stem Material	316 stainless Steel	
Cage Material	Nickel plated bronze	
Bearings	1.0 mm Vee Jewel	
Bearing Housing	316 stainless steel	
Rotor	Delrin	
Spindle	316 stainless steel	
Conductor Tip	Gold alloy	
Grommet	Perspex	
Fairings	Brass	

403 Low Speed Probe

Range	5-150 cm/sec
Accuracy	+/- 2% of true velocity
Immersion Length Max	420 mm

404 High Speed Probe

range:	60-300 cm/sec
Accuracy:	+/- 2% of true velocity
Immersion length max	420 mm

423 Angled Probe

Range:	2.5 - 150 cm/sec
Accuracy:	+/- 2% of true velocity
Immersion Length Max	420 mm
Vertical Measuring Head	
Distance from CL of Stem	40 mm
Operation	Vertical flow upwards or downwards

MAINTENANCE

Streamflo probes are delicate laboratory instruments and therefore extreme care should be taken when removing from the instrument case. Ensure that the probe is mounted in suitable support clips above the flow channel such that the rotor head is immersed to a depth of at least 15 mm, with the engraved arrow on the connector pointing in the appropriate direction.

The probe is mainly intended for use in indoor clean streams and ducts. It is not recommended that the probe should be used in streams or rivers in full spate, where vegetable matter could impinge on the rotor. Even under the most carefully controlled conditions, however, some foreign matter particularly fine hairs, may sometimes foul the rotor spindle. This will normally be apparent by a serious and unexpected drop in indicated frequencies or by complete stoppage of the rotor. This condition may usually be corrected by the careful use of fine tweezers, unwinding the hair in the opposite direction to normal rotation.

No lubrication of the rotor is necessary, but occasional examination of the probe tip is desirable to ensure complete cleanliness. No coarse abrasive material should be used to clean the end of the gold wire but a mildly abrasive polish could be used if carefully applied with a very thin strip of hardwood. To remove deposits of grease and film, an occasional brief wash in a 30-1 Hydrochloric Acid solution is recommended. Under no circumstances should the probes be left to soak in this solution for long periods in view of electro-chemical corrosion, and the probes should always be rinsed well in clean distilled water before further use. A rinse in methylated spirits may also prove successful against difficult forms of fouling.

The jewel bearings and pivots are delicate assemblies and dismantling should only be attempted by a skilled watchmaker or by return to our factory for maintenance. If it is desired to perform on-site servicing spares are obtainable for all cage assembly components.

INDICATOR OPERATING AND MAINTENANCE INSTRUCTIONS

Type 440 Digital Indicator

FUNCTION

The 440 digital indicator has been developed for use with any Streamflo miniature current flowmeter probe where laboratory or field measurements are required. The unit may be battery powered or mains powered using the standard power supply. The power supply is intended for worldwide use and has four interchangeable plugs for all regions. The unit can operate on 110V or 240V at 50Hz or 60 Hz

SPECIFICATION

Power:	Four - AA size rechargeable Ni-MH 1300 mAh
Battery life:	300 hrs on full charge.
Display:	Backlit multifunction LCD display 70 x 38 mm
Controls:	On/Off switch, A & B Function buttons, Backlight button
Input:	BNC miniature socket for co-axial cable
Output:	0-5 V DC from 3.5 mm socket
Case Size:	210 x 100 x 32 mm overall
Weight:	410g with batteries fitted
Case Material:	Moulded ABS plastic

OPERATION

No special setting up procedures are necessary other than to ensure that batteries are fitted in correct polarity and when used with the supplied rechargeable cells, that the cells have been sufficiently charged.

Connect the probe via the co-axial cable assembly to the BNC connector at the top of the unit. Press the on/switch for 3 seconds and the unit will display frequency Hz. The unit will now display frequency of probe pulses when the probe is immersed in water and the rotor is spinning. The frequency displayed can be converted to cm/sec by using the Streamflo probe calibration chart supplied with the probe.

The unit can be programmed to read directly in cm/sec by entering a calibrated figure read from the chart supplied with the probe. Press and hold button A and briefly press button B. The display will then show Cm/sec @ 50 Hz. Button B increments the values whilst button A shifts to the next number or parameter. Using the supplied calibration chart enter the Cm/sec velocity corresponding to 50 Hz. The display will then show the Cm/sec @ 0 Hz. Again, using the supplied chart enter the Cm/sec velocity corresponding to 0 Hz. The next setting allows you to set the decimal point position. The next setting controls the frequency in Hz that will scale the 0-5 V DC output if this is to be used. Finally, the update time can be adjusted for the frequency display. When you are satisfied all the parameters have been set press and hold button A and briefly press button B. The meter will now display "RUN" and is now set for use with the with the calibrated probe. **VERY IMPORTANT NOTE!** If the unit is used with another probe the values will need to be adjusted to the calibration chart results. To return the instrument to direct frequency display press and hold button B and briefly press button A repeatedly until the display shows "Hz".

Battery life with rechargeable AA dry cells is approx. 300 hours depending upon ambient temperature (please ensure these batteries are recharged on a regular basis).

Where alkaline batteries are being used it is essential to remove batteries before long periods of storage to prevent leakage.

Fault Finding - General

To find out whether the fault is in the indicator itself, the connecting cable, or the probe unit.

With the indicator If no readings are achieved when the probe is connected to the indicator it is necessary firstly to find switched on and the appropriate range and function selection having been made, remove the cable connector and with wetted finger rapidly touch the center pole of the indicator socket. A reading should be achieved under these conditions which will generally show the indicator to be in a satisfactory working condition.

Next connect the cable assembly to the indicator but remove the cable at the probe end and repeat the wetted finger operation. Achievement of signal will indicate that the cable assembly is in order and that the troubles must be due to a faulty probe. The most common cause of probe failure is the build-up of grease or film on the tip of the central conductor adjacent to the rotor blade tip, and cleaning as described previously will often cure this condition. Servicing and repairs are best carried out at our factory, and the instruments should be returned by air parcel post and fully insured. A service report is usually prepared within two days of receipt of the instrument indicating likely costs of repair and length of delay.

Most instruments are held in stock at our works and new replacement instruments are often the best solution where damage is extensive.

Guarantee

All Streamflo equipment is guaranteed against defects in material and workmanship for a period of 12 months from the date of invoice. Such defects will be rectified free of charge provided the faulty item is returned to our works carriage paid.

The guarantee is however only valid when the items are operated within the limiting parameters given under the specification headings, and the company reserves the right to claim return postage and package costs particularly on overseas contracts.

NOTES

Nixon Flowmeters Ltd. Leckhampton, Cheltenham, Glos UK Tel. 0044 (0) 1242 243006
Fax 0044 (0) 1242 222487 Email info@nixonflowmeters.co.uk Website www.nixonflowmeters.co.uk