

Engineering Specifications: AF7000 Streaming Current Monitor, Controller

- 1) The Streaming Current Monitor/Controller (SCM) shall be a fully self-contained sensor/monitor/controller for the measurement of the charge on particles in the coagulation phase of water, wastewater or industrial treatment processes.
- 2) Construction
 - a) The SCM is mounted onto a rectangular plate for ease of wall or inside panel mounted installation. The size of this paint coated aluminum plate shall be approximately 12.6" (320mm) in width and by 19.7" (500mm) in height.
 - b) The electronics and sensor modules shall be mounted onto the aluminum mounting plate.
 - c) The sensor assembly external components shall be constructed of cast and machined stainless steel and anodized aluminum.
 - d) The electrode housing shall be connected to the main body by way of a quick disconnect Tri-Clover Stainless Steel fitting.
 - e) The wetted parts shall be stainless steel, UHMW, and epoxy.
 - f) Highest recommended sample flow rate shall not exceed 5 liters/min.
 - g) The housing of the electronics module shall be ABS plastic with superior corrosion resistance.
 - i) The housing has a clear-hinged front cover to access the keypad for programming, zeroing or manual adjustment.
 - ii) I/O terminal barrier strips shall be located at the base of the housing under a screwed down cover with electrical cable glands at the base for entry / exit of cables.
 - iii) Electrical connections shall be via IP67 waterproof glands on the base of the electronics module, side cover of the motor, optical pick up housing and sensor electrode assembly.
 - h) The dry weight of the complete SCM shall be approx 47.4lbs (21.5kg) for the standard option version.
- 3) Electronics Processor
 - a) The instrument shall be microprocessor controlled. The instrument shall calculate the reading using advanced digital processing. The streaming current shall be calculated based on an algorithm custom designed for the streaming current signal. The algorithm shall account for the shape of the small current signal generated by the sensor. It shall not rectify and filter in the traditional way.
 - b) Response shall be adjustable from 1 second to 1 minute.
 - c) The controller shall continually run internal diagnostics checks to ensure proper operation of components. The detection of any error will result in a fault alarm being initiated.
 - d) Signal processing - Shall use FFT signal processing. An onboard optical pickup shall determine the measurement point each sensor stroke.
 - e) Zero Setting - This shall be via keypad and a single key push. The onboard software shall reset the instrument automatically to the new "Zero" setting.
 - f) The controller shall contain a dual display, one for the unadjusted SCM value and the other for the offset SCM value. Setting the offset shall be provided via a 'push and hold' button for the zero point setting requiring no more than 3 seconds
 - g) An output of 4 to 20mA corresponding to a selectable SC range is produced
 - h) The power supply shall be 110Vac 60Hz or 230Vac 50Hz as ordered.

- 4) Sensor Module - The sensing assembly shall be mounted onto the backing / mounting plate.
 - a) The sensor module shall consist of a half (1/2) horsepower, 90W motor driving via a gearbox the reciprocating sensor at a speed of approx three hundred (300) strokes per minute.
 - b) The sensor body shall be of cast Stainless steel and the electrode housing shall be machined stainless with quick disconnect Tri-Clover process fittings.
 - c) The sensor body shall have integral process fittings for inlet and outlet sample flow, the sizing of which shall fit the standard sampling accessories and constant head flow device available. Sample flow rate shall be 1-4 liters/ minute.
- 5) Options – The supplier shall make available the following options if required:
 - a) PID controller, proportional and integral type; manually tuned with anti integral windup bump-less auto / manual transfer and parameter change. Forward or reverse acting.
 - b) Up to two (2) relays. Fully adjustable set point, span, zero and hysteresis
 - c) Fault alarm
 - d) Communications:
 - i) Analog (4-20 mA)
 - ii) Digital RS485 – electrically isolated; Data rate 1200 – 9600 baud; MODBUS interface
 - e) Automatic sensor flush for auto cleaning operation
 - f) Water connections, weir and grit trap
- 6) Programming of the operational set points, relays and calibration shall be accomplished via the front keypad.
 - a) For setting the zero point at anytime after the commissioning stage can be carried out by manually adjusting and holding the zero button down for 3 seconds. This will automatically zero the instrument.
 - b) For higher-level interrogation and operational performance data there shall be a RS232 communication port that allows access to the raw sensor data and more extensive programming tools. (Typically to be used only by the manufacturer or fully trained service personal.)
 - c) During calibration procedures and auto clean operation the output signals shall be held at the last value for a client-programmed period of time.
- 7) Quality Control - the AF7000 SCM shall be supplied complete with: Operation/Installation instruction manual; quality assurance certificate with signal performance data and final inspection certificate
- 8) Manufacturer's Service and Start-Up
 - a) Contractor will include the manufacturer's services to perform start-up on instrument to include basic operational training and certification of performance of the instrument.
 - b) Contractor will include a manufacturer's Service Agreement that covers all the manufacturer's recommended preventative maintenance, regularly scheduled calibration and any necessary repairs beginning from the time of equipment startup through to end user acceptance / plant turnover and the first 12 months of end-user operation post turnover.
 - c) Items A and B are to be performed by manufacturer's factory-trained service personnel. Field service and factory repair by personnel not employed by the manufacturer is not allowed.
 - d) Use of manufacturer's service parts and reagents is required. Third-party parts and reagents are not approved for use.