

## INTERFACE LEVEL ANALYZER

(Revised 1/12/2006)

### MODEL 2511A

#### General Specifications

The system shall consist of three components:

1. Analyzer
  - A. Minimum size of Graphical Display analyzer 4.5 x 2.5 inches
  - B. Clarity displayed and outputted
  - C. Correction for distance loss software
  - D. Peak or edge selection software
  - E. Offset adjustment
  - F. Ignore spurious echoes software using the first derivative
2. Transceiver
  - A. An external transceiver must interface between analyzer and sensor
3. Transducer

The manufacturer will conform to the ISO 9001 quality standards. The system shall operate on the principal of reflected ultrasonic sound distance determination. The system shall not require the transducer to come in contact with the interface. The transducer/transceiver shall be placed within 75 feet of each other. The analyzer can be located up to 500 feet from the transceiver.

The system shall be capable of monitoring interfaces continuously in the following programmable ranges:

- 0.1 - 25.0 Feet with a resolution of 0.1 Feet
- 0.2 - 50.0 Feet with a resolution of 0.2 Feet
- 0.3 - 75.0 Feet with a resolution of 0.3 Feet
- 0.4 - 99.9 Feet with a resolution of 0.4 Feet

The system shall have "Dead Zones" that are programmable by the operator.

The analyzer shall operate from either 115 or 230 VAC. The monitor shall operate at temperatures from -30 to 50 Deg. C. The monitor is available with a thermostatically controlled heater for temperatures below -20°C.

Analyzer Model 2511A

The analyzer shall be housed in a NEMA 4X enclosure with brackets for wall or standard round handrail mounting. The analyzer shall be fully microprocessor controlled. It shall have two displays.

1. A backlit LCD digital display displaying the numerical value programmed in tenths of a foot. It shall have a maximum range of 0-99.9 feet.
2. A backlit LCD graphics display (128x240 Pixel) capable of showing by selection:-
  - A. A profile of the relative density changes occurring in the tank. This screen update time is programmable by the operator.
  - B. A programmable 3, 6, 12 or 24 hour historic trend plot of the numeric display readings.
  - C. Help screens for each program parameter.

These displays shall both be visible from the front of the instrument without opening the enclosure. The analyzer shall not require any external switches, contacts or inputs of any kind to determine the interface location or to reposition the transducer for any reason. The circuitry will provide the following basic functions:

1. Run or Operate Mode
2. Test Mode
3. Program (Instrument) Mode
4. Set Point Program Mode
5. Internal Continuous Self-Diagnostics

It shall be capable of at least displaying continuously either the most settled interface or the top of the unsettled area. This function will be selectable from the "Program" mode of the analyzer. The analyzer shall have the following outputs:

1. 4 Individually Programmable SPDT relays rated 7 amps.
2. 4 – 20 ma isolated output representing the level, which can be scaled to any range.
3. 4 – 20 ma isolated output representing clarity with a range of 0 – 100%
4. Digital Serial Interface either RS 232 or RS 485.
5. One Internal Diagnostic Alarm Relay and Panel indicator.

The analyzer shall have at least the following "Test" capabilities:

1. Lamp Test of all digits and indicators.
2. Constant current output for 4 and 20 milliamps.
3. Relay test to activate the relays.
4. Tank profile output test. The analyzer shall be capable of sending a digital graphic profile of the tank directly over the digital output provided.

The analyzer shall have at least the following "Program" capabilities:

1. Format the display
  - A. Interface depth from bottom up in feet or meters.

- B. Interface distance from transducer down in feet or meters.
  - C. Interface as a percent of the total tank depth.
2. Program the time for averaging the signals in minutes. This is to give greater definition and avoid any process variations caused by rakes, skimmers or other such devices.
  3. Be capable of scaling the 4 and 20 milliamp output to any numbers within the range of the instrument, at a resolution of .1 foot.
  4. Be capable of setting the baud rate for the serial port at 300, 600, 1200, 2400, 4800 or 9600 baud.
  5. Speed of sound correction software.

The analyzer shall be capable of being set to understand the actual tank bottom.

The analyzer shall have built-in self-diagnostic functions which at least will include:

1. "No tank depth has been entered"
2. All components are functioning, but the analyzer cannot find an interface. This would occur if the tank were to be unsettled or the interface were in one of the two "Dead Zones".
3. The analyzer is not receiving any signals indicating a transducer or transceiver failure.
4. The analyzer has detected a failure in its' circuitry.

When the analyzer detects one of these functions, it will activate the alarm relay, display an "Error Code" on the display, display an explanation of the error condition on the profile display, light a visible alarm light on the instrument and send a corresponding digital indication on the serial output (when polled).

### **Transceiver Model TR - 25**

The transceiver shall be located within 500 feet of the analyzer and within 75 feet of the transducer. It shall be housed in a weatherproof enclosure. It shall provide the required signal generation for the analyzer.

### **The Transducer**

The transducer shall be waterproof and include up to 75 feet of cable (Standard is 25 Feet) for connection to the analyzer. It shall come ready to receive a mounting pipe supplied by others. It shall be supplied with either fixed mounting hardware or a pivoting bracket where the application requires. The transducer can be of single or dual crystal design. The single crystal design must be capable of measurement within 6" of the sensor, and/or must be able to operate at up to 105°C in a pH range of 1-13. The dual crystal design; one crystal for transmitting an ultrasonic signal, the other for receiving the signal, must be capable of measurement within 6" of the sensor.

The standard transducer shall have a temperature operating range of -30 to 80°C, and the optional harsh environment transducer shall have a temperature range of -30 to 105°C



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