

Model PDS-360/360DX OPEN-CHANNEL FLOWMETER SPECIFICATIONS
Spec: 360.01.05

1.0 SCOPE

These specifications describe a model PDS-360 and PDS-360DX Microprocessor Based, Ultrasonic Open-Channel Flowmeter as manufactured by Control Electronics, Inc. and supplied by Enchlor Inc.

2.0 DESCRIPTION

The PDS-360/360DX Flowmeter shall provide continuous, non-contact measurement of open-channel flow through any standard Primary Flow Device.

2.1 ELECTRONIC PROCESSING UNIT

a. The PDS-360/360DX Flowmeter shall be a microprocessor controlled unit with front panel, menu based programming and alpha numeric operator interface. It shall provide two (2) isolated, independently adjustable, 4-20mA. analog output signals proportional to flow into 1000 ohm load. The 4-20mA outputs shall be programmed for averaging and damped (user adjustable) for steady chart recordings and control.

b. The flowmeter shall contain mathematical conversion equations to relate measured depth of flow to flow rate for Parshall, Leopold-Lagco and Palmer-Bowlus flumes; V-Notch and Rectangular Weirs (with or without end contractions); Linear elements and user defined curves. Look-Up Tables are not acceptable.

c. Setup and programming shall be accomplished using four (4) clearly marked, pressure sensitive "button" areas on the front panel of the controller. All programmed variables and functions shall be PASS WORD protected.

d. The calibration (scaling) of the Flowmeter shall be accomplished from the front panel and shall accommodate spans of 0-1.00 inch full scale to 0-150.00 inches full scale. The DEAD BAND (Min. Range) shall be automatically set from 10.0 to 150.00 inches, with 12" typical. All settings and readings shall be displayed in 0.01" increments.

e. The Flowmeter shall have a "Test Output" mode for Analog Output Simulation, eliminating the requirement to physically simulate flow levels for analog output calibration and testing.

f. The Flowmeter shall have a "Test Relay Outputs" mode for testing all relays.

g. Lost-Signal Logic shall be programmable. In the event Echo return is lost, the Flowmeter will alert the operator, then output a programmed % of flow (0-99%) until the echo signal returns.

h. All programmed and Totalized Data shall be saved in non-volatile memory to prevent loss upon power failure. The flowmeter shall restart with no operator assistance upon return of power. A 12 volt DC battery may be connected to the flowmeter for continuous operation during a power outage.

i. The analog output signals (4-20mA.) shall be repeatable to $\pm 0.5\%$ of range and calculation accuracy to within $\pm 0.4\%$ of value .

j. The flowmeter shall monitor the temperature at the measuring site using a temperature probe built into the Sensor head or allow for manual entry of temperature for correct temperature compensated calculations. Flowmeter shall use a programmed default temperature in the event of temperature probe failure.

k. Surge protection shall be provided on the 120VAC power line and 4-20mA. output line to reduce potential damage caused by unexpected voltage transients.

l. Flow Totals shall be displayed in 8 digits, using programmable multiplier factors of 1, 10, 100, 1000. The counter shall not reset or lose data in the event of a power failure or system shut down. The Totalizer shall be resettable only after entering a security code. A Low-Flow Shut-Off level in GPM may be programmed to prevent totalizing and recording below a programmed flow rate.

2.2 DISPLAY PANEL

A two line, 20 character per line, Alphanumeric, back lighted LCD display shall provide instantaneous flow rate indications in INCHES, GALLONS PER MINUTE, MILLIONS OF GALLONS PER DAY, PERCENT of flow as well as Totalized Flow , Sensor Temperature and Time Stamped Data Logging history of flow totals and all programmed variables.

2.3 DATA LOGGING (Not available on the PDS-360DX unit).

The flowmeter shall have built-in, Time Stamped Data Logging capabilities. with a programmable logging rate from 0 to 99 minutes of average GPM flow. In addition, a 24 hour Flow Summary with 200 independent counters shall keep the total flow and Average GPM flow rate for each day of the past 6+ months and also time-stamp the daily Minimal and Maximum GPM flow rates. The 24 hour Flow Summary 'Start Time' shall be programmable. An RS-232 output terminal and RJ11 modular jack shall be available to down load Data Logging to a PC computer or printer. No special software is required to retrieve data. The user may use Microsofts HYPER-TERMINAL in WINDOWS to down load preformatted data. An optional MODEM may be used for remote downloading of all data.

2.4 ALARM OUTPUT (Not available on the PDS-360DX unit).

Four (4) 5 Amp SPDT relay closures shall be provided as Alarm/Pump control contact outputs. The relay action shall be programmable with the ability to establish independent ON-OFF settings of each relay for differential control.

2.5 SAMPLER PROGRAMMABLE PULSE OUTPUT (Not available on the PDS-360DX unit).

One (1) Programmable 5 Amp SPDT relay Pulse Output shall be provided for operating a remote sampler, counter or other device. The pulse rate shall be programmable from 0 to 999,999 Gallons. Contact closure shall be 250 milliseconds in duration.

2.6 ENCLOSURE

The flowmetering system shall be housed in a fiberglass enclosure rated NEMA 4X, IP65 (water-tight, dust-tight and corrosion resistant) with a clear hinged cover for viewing the display panel. The enclosure shall be suitable for wall mounting and withstand submergence to six feet.

2.7 ULTRASONIC SENSOR

A US60TC 40Khz PVC explosion proof, corrosion resistant, immersible sensor shall be provided. The Sensor shall be usable in Class 1, Div. 1, Groups C & D and Class II, Div. 1, Groups E, F & G environments. The sensor shall be mounted a minimum of 12.0 inches (standard) above the maximum flow level to be monitored and in the event of being submerged, shall resume normal operation when the flow level returns to its normal range. The projected ultrasonic beam shall be no greater than 5; conical and suitable for use in a stilling well. Signal applied to the Sensor Cable shall not exceed 40Volts peak to peak to prevent possible harm to personnel and arcing of cable in the event of a loose connection or cable damage. Sensor cable may be shorted with no damage resulting to equipment. Signals greater than 40 Volts applied to the Sensor Cable shall not be acceptable. The sensor shall be capable of being located up to 1500 feet from the Electronic Processing Unit, requiring no special pre-amps or other circuitry. The sensor shall have 3/4 inch NPT female pipe threads for mounting and a built-in temperature probe.

2.8 SENSOR MOUNTING BRACKET

An optional corrosion resistant, PVC sensor mounting bracket shall be provided to accurately position the sensor over the Primary Flow Device. It shall have adjustable horizontal, vertical and angular capabilities.

2.9 WARRANTY

The Flowmeter shall be pretested, calibrated and 100% quality control inspected and be warranted against defects in parts and labor for one (1) year from date of shipment.

Electronics	
Power Requirements:	120/220 VAC, ±15%,50/60 Hz, 12-24 VDC @ 15W max.
Temperature:	25°F to 125°F (-5°F with opt. heater)
Display:	2 line x 20 character, Alphanumeric, LCD with LED Backlighting
Totalizer (counter)	One, 8 digit accumulative with programmable multiplier of x1, x10, x100, x1000. 200 daily, time stamped 8 digit totalizers (data Logg)
Outputs:	Two (2) independent 4-20 mA isolated into 1000 ohm max. RS-232 (RS-485, MODEM opt.); Four (4) control relay outputs; One (1) Programmable Pulse (250ms. duration) relay output; Relays rated SPDT 5A/250 VAC
Span Range:	0-1.00" to 0-150.00" full scale
Dead Band (blanking):	Automatic 10" to 150"
Resolution:	0.01", 0.01 GAL/MIN
Accuracy*:	±0.5% of Range or better. Calculated error than ±0.04%
Memory:	Flash and non-volatile RAM
Flow Equations:	Parshall, Palmer/Bowlus, Leopold-Lagco, Rectangular Weirs with and without end contractions, V-Notch Weirs, User Defined
Data Log:	200 Day Flow Summary: min, max, avg GPM and Total Gallons; Time Stamped AVG GPM flow rate with programmable log rate of 00-99 minutes in 1 minute increments; Time Stamped EVENT list to record flowmeter actions
Download:	Directly to serial printer (24 hour summary only); All data directly to PC/Laptop through COM port or MODEM. All Data is preformatted.
	* field conditions, such as turbulence etc., may affect the apparent accuracy.

Sensor	
Exposed Material:	PVC Housing, Epoxy
Beam Pattern:	5° Conical (2.5° from centerline)
Temperature:	-40°F to 160°F
Cable:	20 foot corrosion resistant, 1500 ft. max., 2 twisted pair shielded, Belden#8723, Max 40 Volts Pulsed applied
Dimensions:	3.0" dia. x 2.5" len.
Mounting:	3/4" NPT female
Temp Probe:	Built into Sensor Head, ±2.0°F in 1 degree increments
Enclosure	
Material:	Fiberglass with clear hinged Polycarbonate cover
Rating:	NEMA 4X, IP65, Water-Tight, Dust-Tight and Corrosion-Resistant - CSA, UL listed
Dimensions:	7.2" x 11.8" x 6.8"
Mounting:	4.92" x 12.3" with stainless steel mounting feet

Options

Heater/Thermostat, PVC Sensor Mounting Bracket, Sensor Cable, Serial Printer, MODEM, External Temperature Probe ...

Warranty

Systems are pre-tested and quality control inspected before shipping. Warranty is against defects in parts and workmanship for a period of one (1) year.

Specifications and design subject to change without notice.