Model 0501

PetroCount IMS CONTROL UNIT

DESCRIPTION

The PetroCount Inventory Management System (IMS) Control Unit is a rugged yet compact electronic preset designed to provide precise delivery of petroleum, industrial and chemical products. The Control Unit easily adapts to any type of pulsed output flowmeter and all types of two-stage control valves. The Control Unit utilizes advanced high-speed microcomputer technology which provides unlimited flexibility. Programming the Control Unit is easily performed by simply selecting the desired options from built-in menus. PetroCount IMS is available in Division 1 Explosion Proof enclosure.

Delivered quantities are displayed on a large 8-character numeric display. Operator prompts and program menus are presented on a 32-character alphanumeric display. A sixteen pushbutton keypad provides pushbuttons 0-9, Start, Stop, Reset, Select, Repeat and Enter. These are used for entering values for the various user-selectable parameters in addition to the batch delivery quantities.

DESIGN FEATURES

- Division 1 Explosion-Proof Enclosures meet or exceed National Electric Code requirements for Class I, Division 1, Groups C&D and Class II, Division 1, Groups E, F and G.
- Two liquid crystal displays with back lighting, 8-character numeric and 2 x 16 character alphanumeric.
- Hazardous service, Type 4X weather and corrosion resistant – Division 1 and 2 enclosures.
- Watchdog timer checking function.
- Sequential batch blending plus multiple batch capability.
- Temperature and pressure compensation per API Tables.
- Digital valve control or conventional two-stage valve control.
- Multiple calibration settings for meter-factor linearization
- Archival data storage
- Pre-batch testing plus operator initiated diagnostics.
- Two serial data communication channels.
- Instantaneous flowrate indication (when mode is activated).
- Digital time and temperature displays.
- Internal heaters with thermostat for operation to -40°C (-40°F).

⚠ WARNING

Do not operate this instrument in excess of the specifications listed. Failure to heed this warning could result in serious injury and/or damage to the equipment.

ELECTRICAL SPECIFICATIONS

Instrument Power

115 Vac Configuration: 95 Vac to 135 Vac, 47 Hz to 63 Hz, 0.25 amp maximum without heaters operating, 1.00 amp maximum with heaters operating.

230 Vac Configuration: 190 Vac to 270 Vac, 47 Hz to 63

INPUTS

PULSE INPUT

12 Vdc Configuration: Threshold - 5 Vdc ±1 Vdc; Hysteresis - 0.1 Vdc; Input Resistance - 2.0 kOhm; Maximum Input Voltage - 30 Vdc; Maximum Input Frequency - 10 kHz

EMERSON
Process Management

5 Vdc Configuration: Threshold – 2.0 Vdc ±0.5 Vdc; Hysteresis – 0.1 Vdc; Input Resistance – 2.5 kOhm; Maximum Input Voltage – 30 Vdc; Maximum Input Frequency – 10 kHz

20 mA Configuration: Threshold – .8 ±1 mA; Hysteresis – 0.1 mA; Input Resistance – 596 Ohm; Maximum Input Voltage – 20 Vdc; Maximum Input Frequency – 10 kHz

5 mA Configuration: Threshold – 3 ±1 mA; Hysteresis – 0.1 mA; Input Resistance – 614 Ohm; Maximum Input Voltage – 20 Vdc; Maximum Input Frequency – 10 kHz

DIGITAL INPUTS

Nominal Input Voltage: 12 Vdc; Maximum Input Voltage – 30 Vdc; Threshold – 6 Vdc ±1 Vdc; Hysteresis – 1 Vdc; Input Resistance – 1.95 kOhm; Minimum Pulse Width – 10 ms.

PERMISSIVE POWER DETECT INPUT

Input Voltage: 90 Vac to 270 Vac; 47 Hz to 63 Hz; Input Impedance – 56 kOhm minimum.

PRTD INPUT

Connection Type: Three wire with provision for terminating a fourth wire; PRTD Type: DIN 43760 Standard with a temperature coefficient of 0.00385 Ohm/Ohm/deg. C;
Drive Current: 1 mA nominal.

CURRENT LOOP INPUTS

Input Resistance – 250 Ohm; Nominal Input Current – 4-20 mA; Maximum Input Current – 45 mA.

OUTPUTS

DIGITAL OUTPUTS

Maximum Off State Voltage – 60 Vdc; Maximum On State Voltage – 0.35 Vdc (I = 0.25 amp); Maximum Current – 1.0 amp; Maximum Frequency – 100 Hz; Minimum Pulse Width – 5 ms.

AC Solid State Relays
Load Voltage – 24 Vac to 280 Vac, 25 Hz to 70 Hz; Maximum Current – 1.5 amp; Maximum Off State Leakage – 6 mA; Maximum On State Voltage Drop – 1.6 Vac

DC Solid State Relays
Load Voltage – 3.0 Vdc to 60 Vdc; Load Current – 0.01amp dc to 1.5 amp dc; Maximum
Off State Leakage – 1.0 mA dc; Maximum On State Voltage Drop – 1.85 Vdc

Additive Outputs
Maximum Frequency - 0.5 Injections/second

DC Power Sources for Use with Pulsers, Digital Inputs and Current Loop Transmitters
+12 Vdc Regulated at 110 mA, Fused at 250 mA
+24 Vdc Unregulated at 100 mA, 1% ripple maximum, fused at 250 mA

AC Power Sources for Use with Relays
Line Power Fused at 3 amps; Permissive Power Fused at 3 amps

ENVIRONMENTAL SPECIFICATIONS

Temperature
Division 1 and 2
Operating: -40 to 122°F (-40 to 50°C)
Storage: -40 to 158°F (-40 to 70°C)
Rack Mount
Operating: 32 to 104°F (0 to 40°C)
Storage: 140°F (60°C)

Thermal Shock
No harmful effect for operating (< 1°C/Min.) or storage (< 3°C/Min.)

Humidity
Division 1 and 2: 0-100%

Vibration
S.A.M.A. Standard PMC 31.1 - 1980 Section 5.3 (Condition #2 - Field Mounted, Divisions I and II)

Shock
Drop and Topple Test from a height of three feet when packaged in its normal shipping container

EMI/RFI (Division I and II Enclosures)
S.A.M.A. Standard PMC 33.1 - 1978, “Electromagnetic Susceptibility of Process Control Instrumentation,” Classification 2-abc; No Error

Salt Fog
NEMA 4X

Dimensions
See back page.

Table 1 Control Unit Model Number Breakdown

Model

0501	Explosion Proof (Division 1)						
	Division II (NEMA 4X)						
	PCII/PC-44 Retro-Fit Kit (Division 1)						
	Auxiliary Terminal (Division I Only)						
	CODE	**SOFTWARE REVISION LEVEL**					
	D	Propane Applications					
	C	Gasoline Applications - Sequential Blend - Auxiliary Terminals					
		CODE	**POWER**				
		1	115/230 Vac 47-63 Hz (User Selectable)				
			CODE	**CERTIFICATIONS**			
			A	None (Retro-fit Only)			
			B	UL			
			C	CSA (Canada)			
			F	CENELEC (Europe) Explosion Proof Only			
				CODE	**HOUSING**		
				1	Explosion Proof (Auxiliary Terminal available in Explosion-proof only)		
				2	Rackmount		
				3	Retrofit Kit		
				4	Division II (NEMA 4X)		
				5	Retrofit Kit, bottom view display		
					CODE	**OPTIONS**	
					A	None	
					B	Analog Inputs (4-20mA and RTD)	
					C	Auxiliary Terminal	
						CODE	**RELAYS**
						1	5ac
						2	10ac
						3	5ac/5dc
						4	None (Auxilliary Terminal)
							CODE	**LANGUAGE**
							A	English (Aux. Term. avail. in Eng. only)
							B	Spanish (Operator Prompts Only)
							D	German (Operator Prompts Only)

0501 C 1 B 1 B 2 A

Figure 1 PetroCount Division 2

PROGRAMMING

The Control Unit contains four basic programming modes which permit the user to configure each unit for the specific application. The programming variables are selected from a built-in menu and are advanced by using the select and repeat keys.

Programming Modes			
Setup	Status	Archive	Test

In the Control Unit's Setup Mode, menus are presented for selection in the following:

Delivery
Factors
Alarms
I/O Configuration
T&P Compensation
Blending
Data Communications

Valve Control
Select from digital or conventional two stage valve control with independent selections for low flow start, low flow stop and final stop.

Valve Control Error Limit
When digital valve control is selected, the control tolerance for the programmed flow rate is entered as a percentage value. If the flow rate exceeds the tolerance, the valve is signaled to adjust (open or close) as required to maintain the programmed flow rate.

Meter-Factor Linearization
Flowmeter accuracy is maintained with programmable multi-point linearization. Apply these meter factors to the digital valve flowrate set points for maximum flowmeter accuracy.

Additive Injection
Input the individual numeric values for each of the six different additive injection factors. The delivered quantity for one full cycle of the injector is input using the numeric keypad.

Voltage Selection
Configure the PetroCount for 115 Vac or 230 Vac, 50 or 60 Hz operation by installing program jumpers on the customer connector board.

Permissive Sense
Use the permissive power input circuit as a safety device or to verify operational integrity such as: Ground connectors, high level or “dead man” interrupts.

Data Acquisition
Two separate digital signals are provided for net and/or gross outputs. The outputs may be factored from 0.1 to 10.0 for each unit quantity delivered. Pulse widths (5.0-25.0 milliseconds) are adjustable and selections are made from the menu.

Preset Options
Three options are available including conventional numeric, repeat previous or select from four pre-programmed values. In addition, minimum and maximum allowable preset values may be programmed.

Display Reset
A programmable internal time counter may be selected to automatically reset the previous delivered quantity. When the time counter signals a reset, the previous authorized delivery is terminated, the display is returned to zero and the normal operator prompt is displayed.

Operator View Group
Up to ten separate user-selectable variables may be configured for instantaneous operator viewing. These parameters may be viewed but not changed by the operator and often include:

- Flow Rate
- Temperature
- Pressure
- Current Time
- Density
- K-Factor
- Blend Ratio
- Relay Status
- Meter Factors
- Delivered Gross
- Delivered Net
- Status Registers
- Preset Quantity
- Preset Remaining

Viewing Angle Adjust
Fifteen (15) separate vertical viewing angle set points within the sixty-degree viewing boundary provides optimum readability of the back-lighted alphanumeric display.

Display Test Enable
Engage the local display test function as necessary for display segment checks if required by the local weights and measures authority.

Operator I.D. Codes
Operational security controls may be implemented by requiring the operator to input a numeric access code of eight digits or less.

Alarms
Built in programmable alarm conditions are user-selectable and may be programmed to monitor one or more of the following conditions:

- Low Flow Rate
- High Flow Rate
- Valve Failure
- Preset Over Delivery Quantity
- Preset Under Delivery Quantity
- Pulse Security Error
- Data Communications Error
- Blend Feedback
- Equilibrium Vapor Pressure

Alarm Actions
An internal menu permits selection of desired responses when an alarm condition occurs. The responses are:

- Off (no response)
- Display Only
- Display and Close an Alarm Contact
- Display, Alarm and Stop the Control Unit
- Display, Alarm, Stop and Lock the Control Unit

Digital Output Signals
User programmable output relays provide flexibility for a broad range of control unit applications. Output relays K-1 through K-10 with Digital Outputs DO-1 and DO-2 provide a total of twelve configurable outputs which may be assigned for:

- Pump Contact
- N.O. Valve Pilot
- N.C. Valve Pilot
- N.O. Valve Stem Switch
- N.C. Valve Stem Switch
- Additives 1-6
- Blend Component A, B, C or D
- Auxiliary Contacts 1-6
- Data Acquisition Net/Gross
- Alarm Annunciator

Relay Options
The Control Unit can be ordered with 5 ac, 10 ac or 5 ac/5 dc solid state relays.

Digital Input Signals
When blending, four digital inputs (DI1, DI2, DI3 and DI4) are available. These valve position input circuits permit feedback for automatic confirmation that only the appropriate product supply valve is open.

Pulse Security
Connect a dual channel pulse signal, 90 degrees out-of-phase for Level "B" pulse integrity.

Meter Pulse Inputs
Program the Control Unit to accept the meter pulse signal which suits the application. The 10 kHz input may be configured for a 5 Vdc, 12 Vdc, 5 mA or 20 mA threshold level.

Analog Inputs
Two 4-20 mA analog inputs are provided for pressure, density or temperature. If pressure and density inputs are used, a separate RTD input is available for high precision temperature sensing.

Temperature Compensation
From the menu, select the temperature compensation method by linear equation or API Tables 6A, B or C, 24, 24A or B, 54, 54A, B or C.

Pressure Compensation
If correction for pressure effects on the fluid are desired, the pressure transmitter scaling, i.e., upper limit, lower limit and offset are programmed via the keypad. Compressibility (K-Factor) sources are selectable from API 11.2.1, 11.2.2, 11.2.1.M or 11.2.2.M.

Density Compensation
Density inputs either manual or via the analog current loop may be used when the API Table option is selected for temperature corrections as the fluid's density is a function of the CTL calculation.

Batch Blending
Program the Control Unit for custom blended product delivery by selecting the sequential batch blend feature. Up to six different blends created from as many as four separate components provide for a broad range of blended products. A final line flush ensures accuracy in subsequent blends. This feature comes complete with individual settings for:

- Blend Recipe Selection
- Blend Names and Totals (Net/Gross)
- Component Names and Totals (Net/Gross)
- Component Density
- Component Compressibility
- Component Vapor Pressure
- Component Valve Delays
- Component Valve Feedback (Open/Closed)

Data Communications
Full two-way data communications are provided for remote access using either computer mode or terminal mode. In communications Port #1, select RS-232 for serial communications or RS-485. Communications Port #2 is dedicated RS-485 for multi-drop configurations. Program these ports with unique data rates, word size, stop/parity bits, and communications port time-out settings for customer configuration to suit the host equipment.

Status Registers
All control unit parameters may be viewed on the local display or by using a remote access computer for monitoring:

- Operating Status
- Alarm Status
- Meter Factor Status
- Delivery Status
- Blend Recipe Status
- Blend Feedback Status
- Auxiliary Contact Status
- Totalizer Status
- Flowrate Status
- Temperature Density/Pressure Status

Archive Register
An archive memory storage of past transactions is maintained constantly even after a power outage. These registers may be set to free run or halt when full. These registers are user programmable for selection of:

- Transaction Number
- Start Time
- Completion Time
- Preset Quantity
- Gross Quantity Delivered
- Net Quantity Delivered
- Effective Temperature
- Alarm Status
- Blend Totals (Net Gross)
- Date

Data Logging
Connect a serial interface printer to communications Port #1 to record transaction details such as:

- Driver I.D.
- Unit Address
- Gross Delivered
- Net Delivered
- Gross Total
- Net Total
- Time In
- Time Out
- Effective Temperature

Data Security
Program data is secured with a wire sealable mechanical switch plus a user-defined 8-digit access code.

Figure 2 PetroCount II/PetroCount 44 Retrofit Kit

Retrofit Kit
A retrofit kit is available to upgrade previous generation PetroCount II/PetroCount 44.

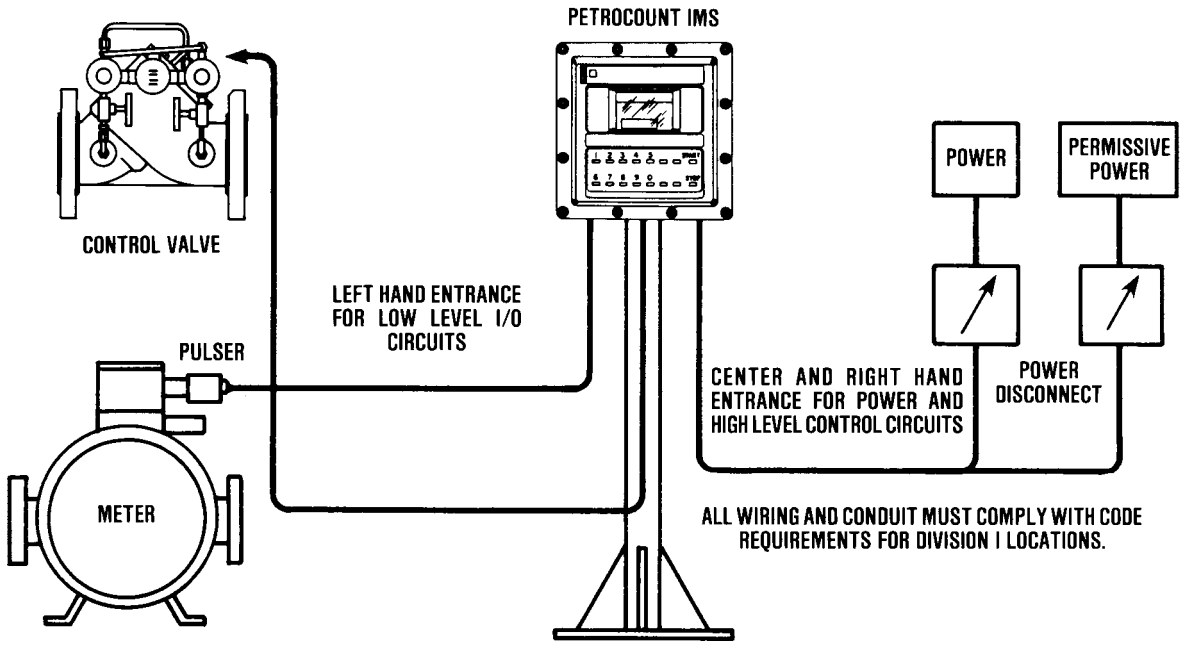

Figure 3 Installation Considerations

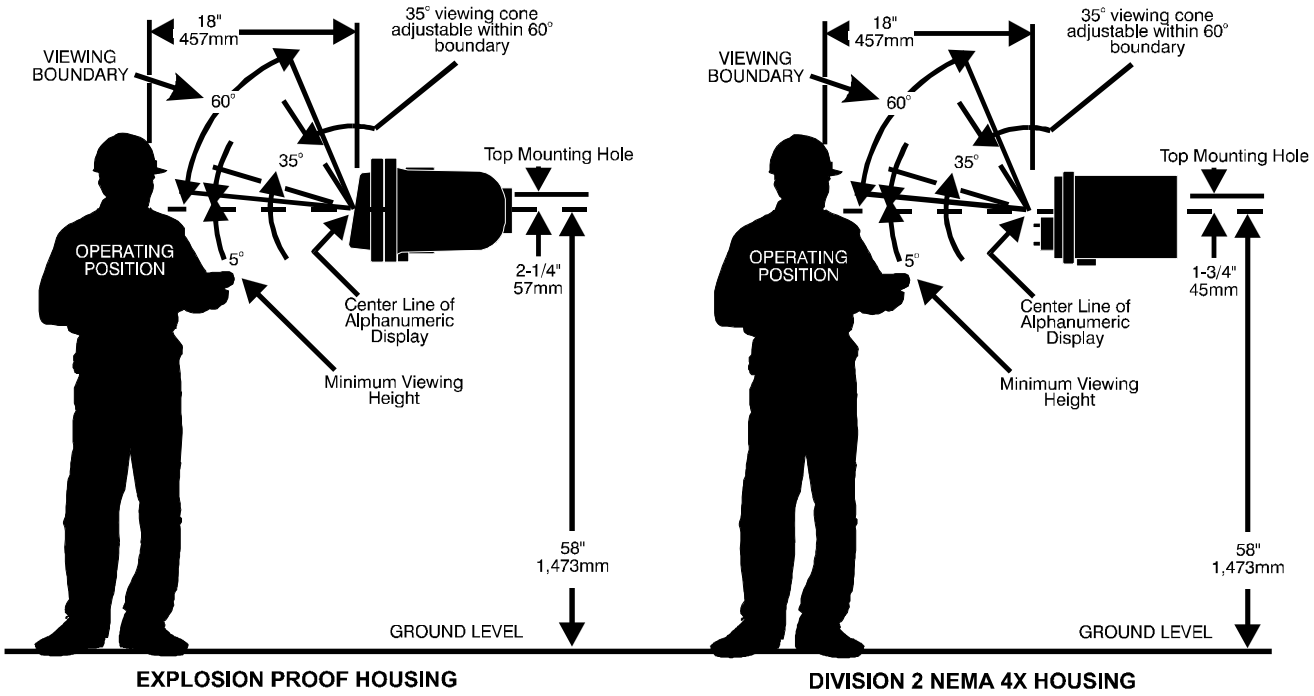

Figure 4 Mounting Considerations

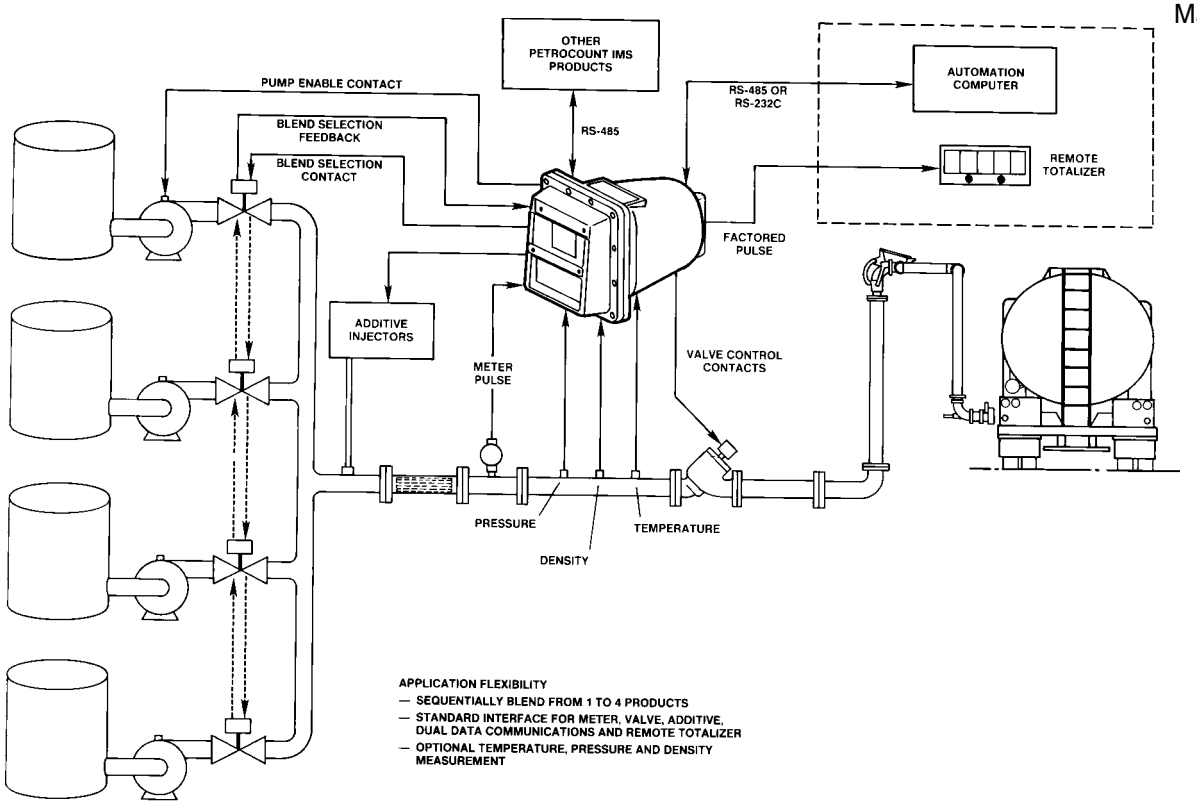

Figure 5 Loading Rack Application

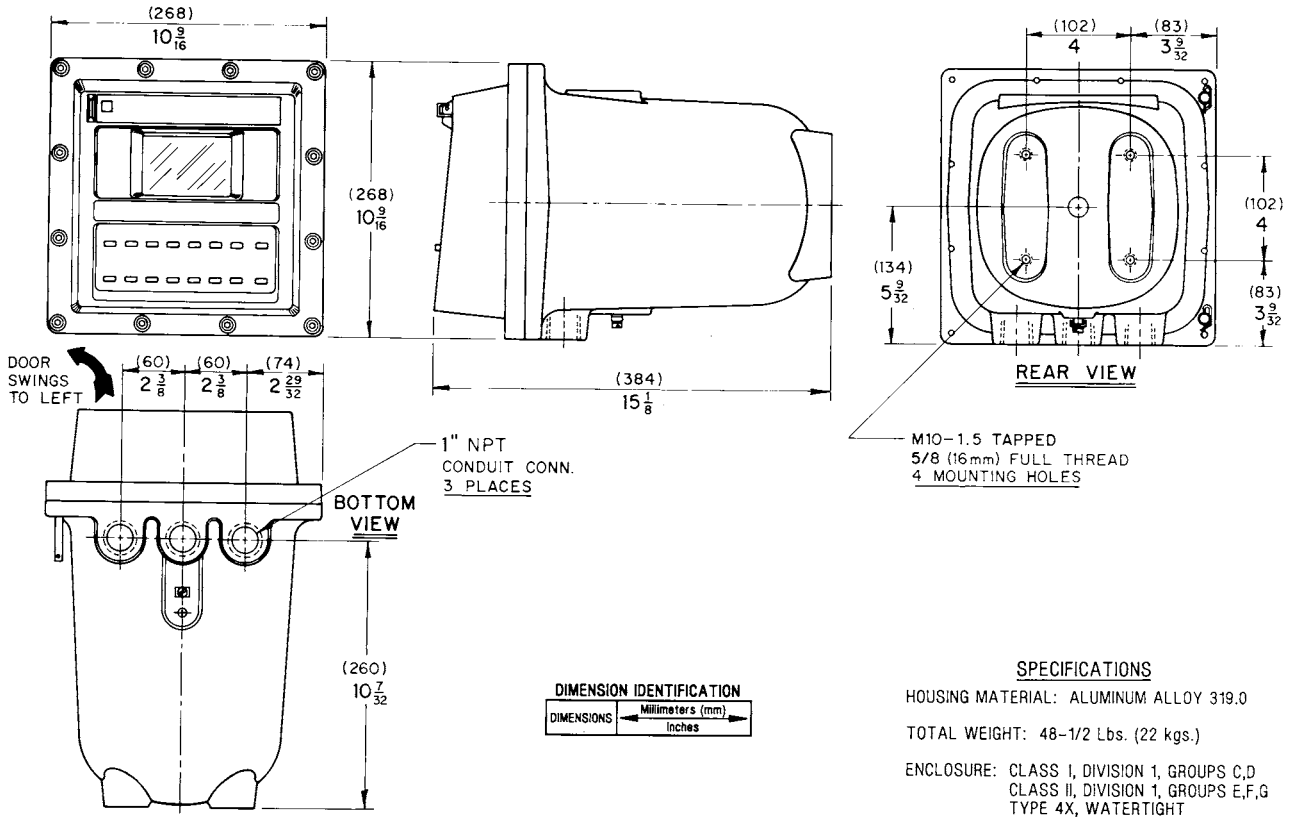

Figure 6 PetroCount Control Unit Division 1 Dimensions

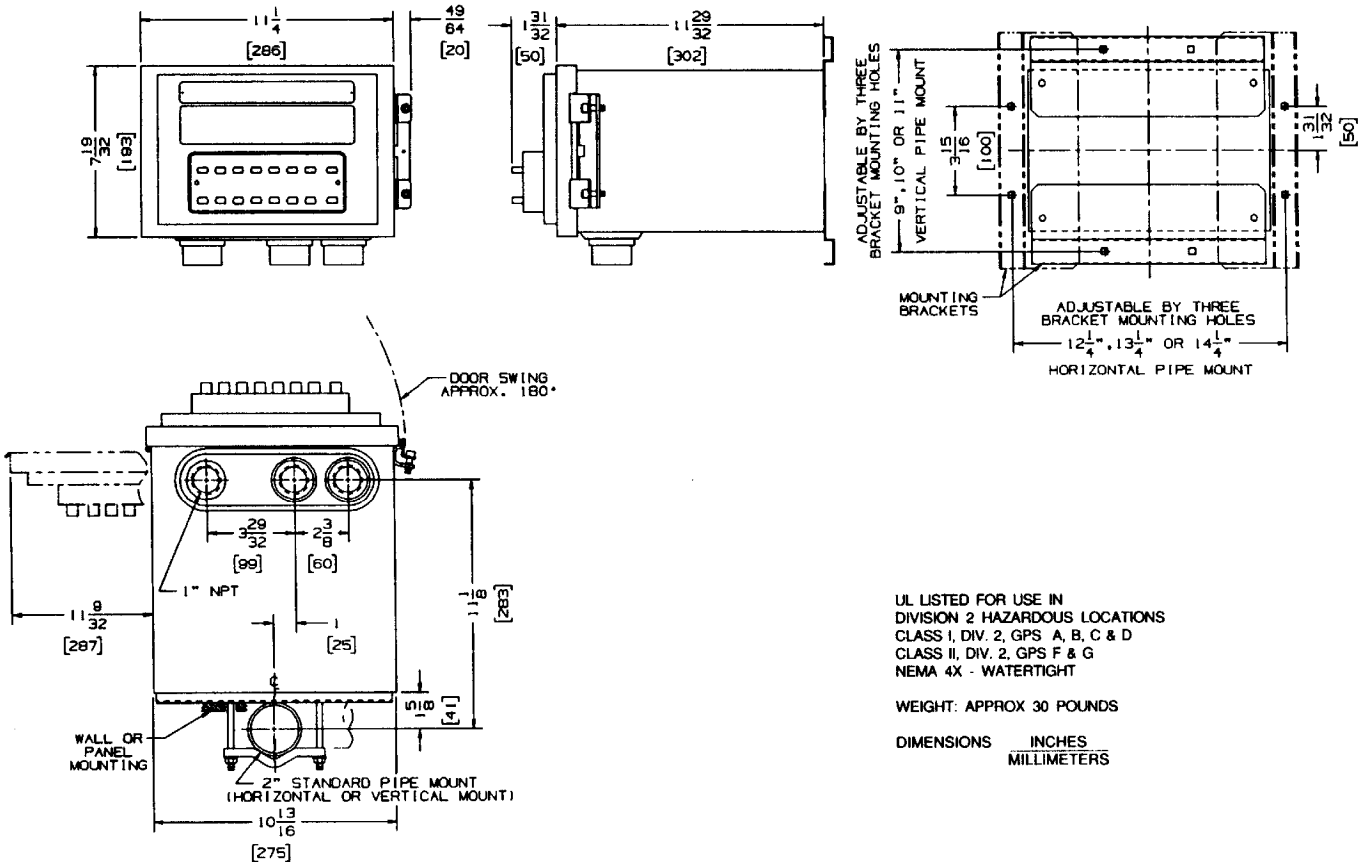

Figure 7 PetroCount Control Unit Division 2 Dimensions

Daniel Division Headquarters - Houston, Texas, USA, Tel: (713) 467-6000, Fax: (713) 827-3880
USA Toll Free 1-888-FLOW-001
Calgary, Alberta, Canada, Tel: (403) 279-1879, Fax: (403) 236-1337
Stirling, Scotland - *UK, Mid-East & Africa,* Tel: +44 1653-638300, Fax: +44 1653-600425
Singapore - *Asia Pacific* Tel: +65- 777-8211, Fax: +65 -770-8001
www.daniel.com
Daniel is a wholly owned subsidiary of Emerson , and a division of Emerson Process Management.