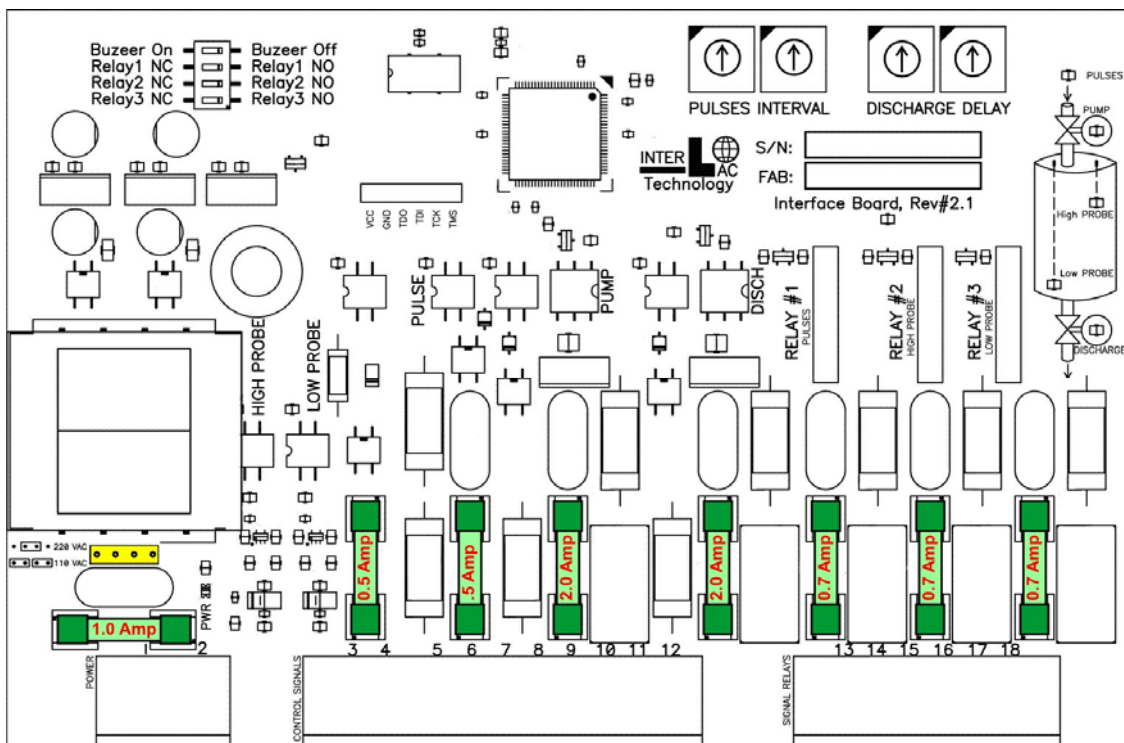


**FEATURES**

- Digital time setting with rotary switches:
  - 1 to 99 seconds for pulse interval
  - 0 to 99 seconds for discharge delay
- Wide range of switching voltage: 24V AC up to 240V AC
- Protected solid output switches
- Additional signal solid switches:
  - selectable NO or NC contacts
  - for operation with AC or DC voltage
- 3.3V probe power sensors
- High stability and reliability
- Mnemonic LED indicators of operation
- Sound accompaniments of operation

**APPLICATIONS**

- Electronic parts of automatic system
- Protection fill/discharge system
- Level pulses converter
- Remote monitoring
- Enhanced replacement for analog unit



## PRODUCT DESCRIPTION

The PC is digital probe controller unit for using with batch controller or in fill/discharge system. The PC has following function:

- Switch off filling valve if there are not pulses from flow meter specified time interval (for example disconnection flow meter circuits);
- Switch off filling valve if liquid in bottle touch safety (high) probes;
- Switch off discharge valve if low probe is dry and specified time delay is elapsed.

The PC works with AC or DC pulses from flow meter and it controls electrical valves (fill and discharge) powered with AC voltage 24 to 240V. Additional isolated switches let to use additional control/monitoring equipment with different input level and signals (AC or DC). For example the PC can convert DC (AC) flow meter pulses to AC (DC) pulses.

The PC unit has simple and clear for understanding mnemonic LED indicators also it has handy and clear interface. It is suitable for work in blow dry system. Very high stability and reliability are specified using digital structure of PC and using solid state switches (relays).

It is ideally suitable for enhanced replacement for analog probe control unit like Green Probe, V-204, V-186 and other.

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## GENERAL VIEW

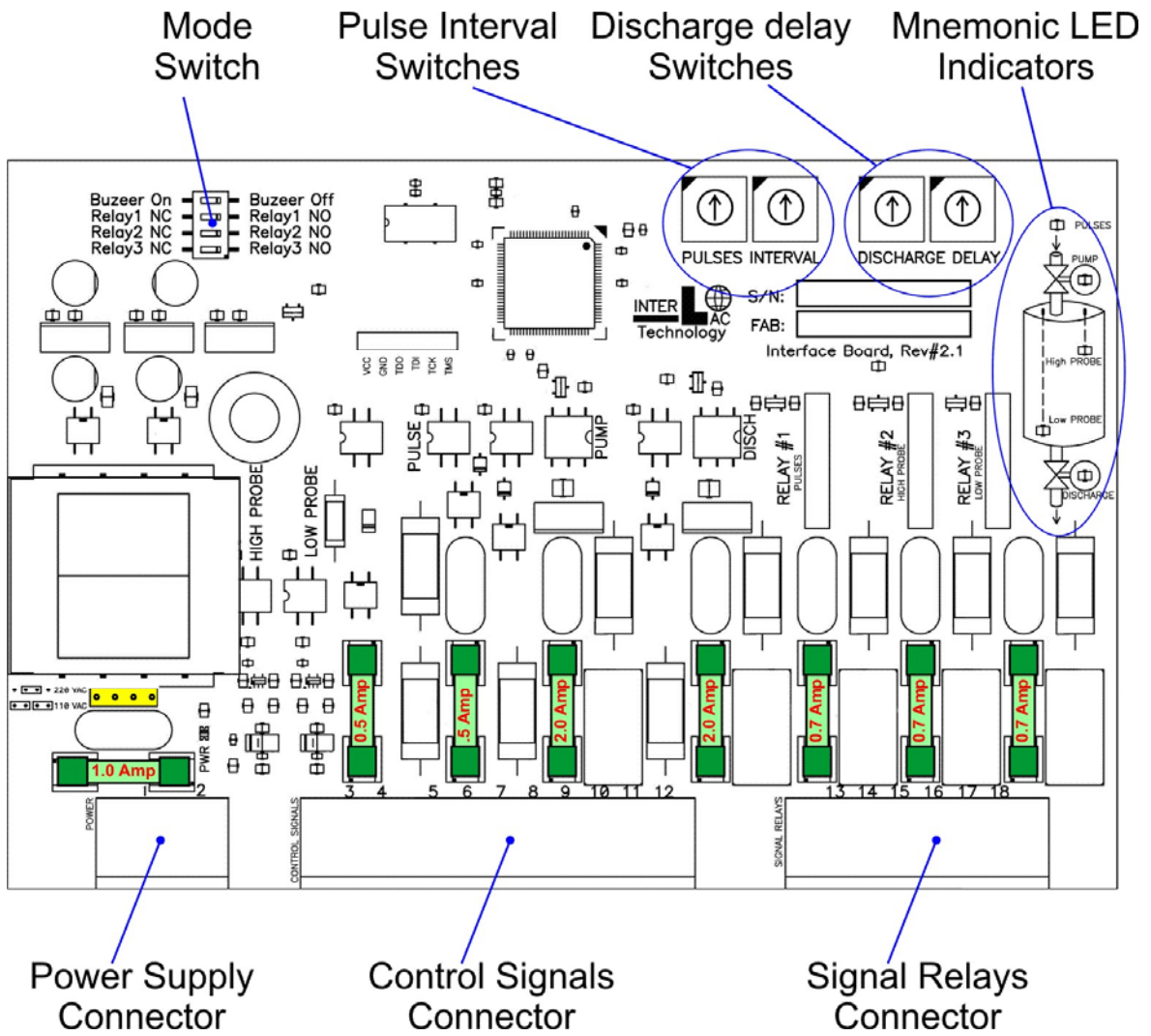


Figure 1. Probe Controller Unit

## SPECIFICATIONS

Time interval:	1 to 99 seconds for pulse interval 0 to 99 seconds for discharge delay 2 rotary switches (10 positions: 0-9) for each time interval	
Control valve output:	AC switching:	up to 240V AC Zero Crossing
	Maximal switching power:	up to 150Wt
	Maximum current:	Limited by fuse 2 Amp
Signal relay output:	DC switching:	up to 240V DC
	AC switching:	up to 240V AC
	Maximal switching power:	up to 75Wt
	Maximum current:	Limited by fuse 0.7 Amp
Input flow meter signal	AC output signal	75V AC to 240V AC Maximum 10 pulses per second
	DC output signal	5V DC to 36V DC Maximum 200 pulses per second
Input fill/discharge signals	AC signal	75V to 240V AC
Flow meter input impedance:	DC input	2 KOhms
	AC input	9.9 KOhms or 24 KOhms
Power supply:	110V AC / 220V AC @ 10mA	
Operational temperature	From -4° to +160°F (-20° to 71°C)	

## THEORY OF OPERATION

Block schematic of PC is shown on the figure 2. The PC board has 3 driver switches: pulse interval switches, discharge delay switches and mode switches.

Pulse interval switches – set maximum interval time (in seconds) lack of pulses from flow meter. When PC gets fill signal, it opens fill valve and starts to measure interval between coming pulses from flow meter. If the PC will not be to get pulses longer then set interval time it will stop filling process. Thereby the PC is controlling flow meter work. Pulses and filling process will be indicated with mnemonic LED indicators. Signal relay #1 will repeat every pulse from flow meter.

Discharge delay switches – set delay (in seconds) of power off discharge valve after low probe will be dry (liquid will not touch low probe). Thereby the PC is controlling low level of liquid in bottle. Working of low probe will be indicated with mnemonic LED indicator.

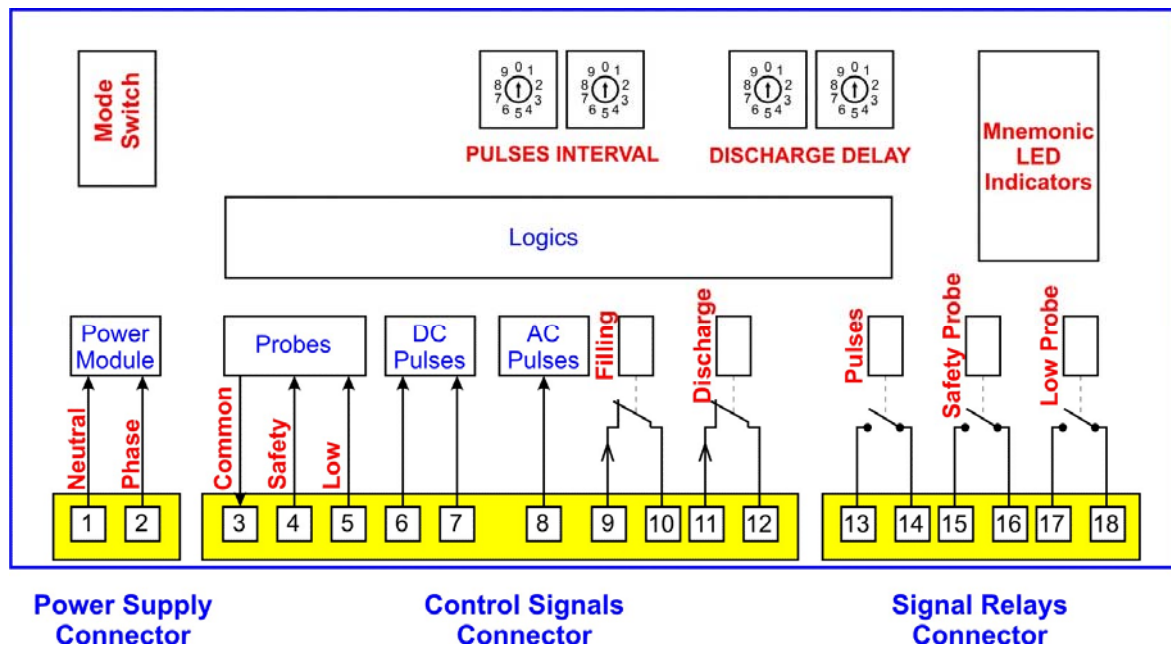


Figure 2. Block Schematic of Interface Board

Table 1. Connectors pin out

Connector	Contact Number	Description
Power Connector	1	AC power Supply, 110V/220V, <b>Neutral (L2)</b>
	2	AC power Supply, 110V/220V, <b>Phase / Hot (L1)</b>
Control Signals Connector	3	Common Probe
	4	Safety / High probe
	5	Low probe
	6	Flow meter DC pulses input, <b>polarity does not matter</b>
	7	Flow meter AC pulses input, <b>Phase / Hot Pulses</b>
	8	Flow meter AC pulses input, <b>Phase / Hot Pulses</b>
Signal Relay	9	Filling signal (power) input <b>Phase / Hot</b> , from controller
	10	Filling signal (power) output <b>Phase / Hot</b> , to filling valve
	11	Discharge signal (power) input <b>Phase / Hot</b> , from controller
	12	Discharge signal (power) output <b>Phase / Hot</b> , to filling valve
Signal Relay	13	Flow Meter Pulses Repeater Relay, <b>polarity does not matter</b>
	14	Flow Meter Pulses Repeater Relay, <b>polarity does not matter</b>

INTERFACE BOARD PC

Connector	15	Safety / High Probe Relay, <i>polarity does not matter</i>
	16	
	17	Delayed Low Probe Relay, <i>polarity does not matter</i>
	18	

Mode switches let to choose following options:

Switch name	Description
Buzzer ON/OFF	Sound of events: start up, filling, discharging, safety and low probes
Relay 1 NO/NC	Signal relay repeats pulses from flow mitrer, can be Normal Opened or Normal Closed
Relay 2 NO/NC	Signal relay repeats safety (high) probe event, can be Normal Opened or Normal Closed
Relay 3 NO/NC	Signal relay repeats delayed low probe event, can be Normal Opened or Normal Closed

When liquid inside of bottle will touch safety (high) probe filling process will be immediately stopped. In this case discharge function will be obtainable only. Safety probe will be indicated with mnemonic LED indicator.

### CONNECTION

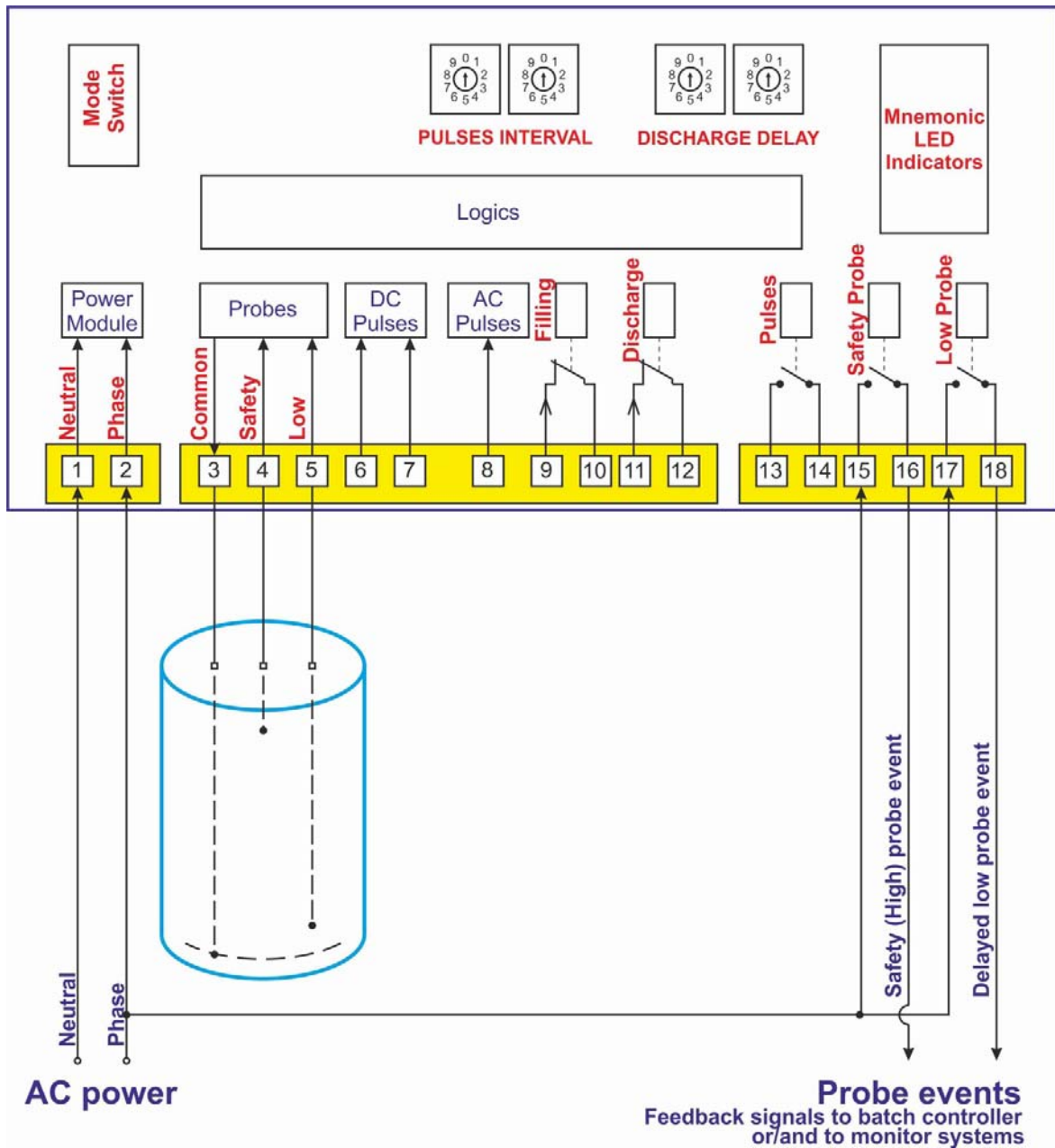


Figure 3. Probe connection

INTERFACE BOARD PC

Two schematic of typical connections of flow meter are shown in figure 4 and 5, for more information please reference flow meter manual.

The PC support DC or AC flow meter pulses, also the PC can provide (switch) AC or DC pulses to other devices independently from input pulses.

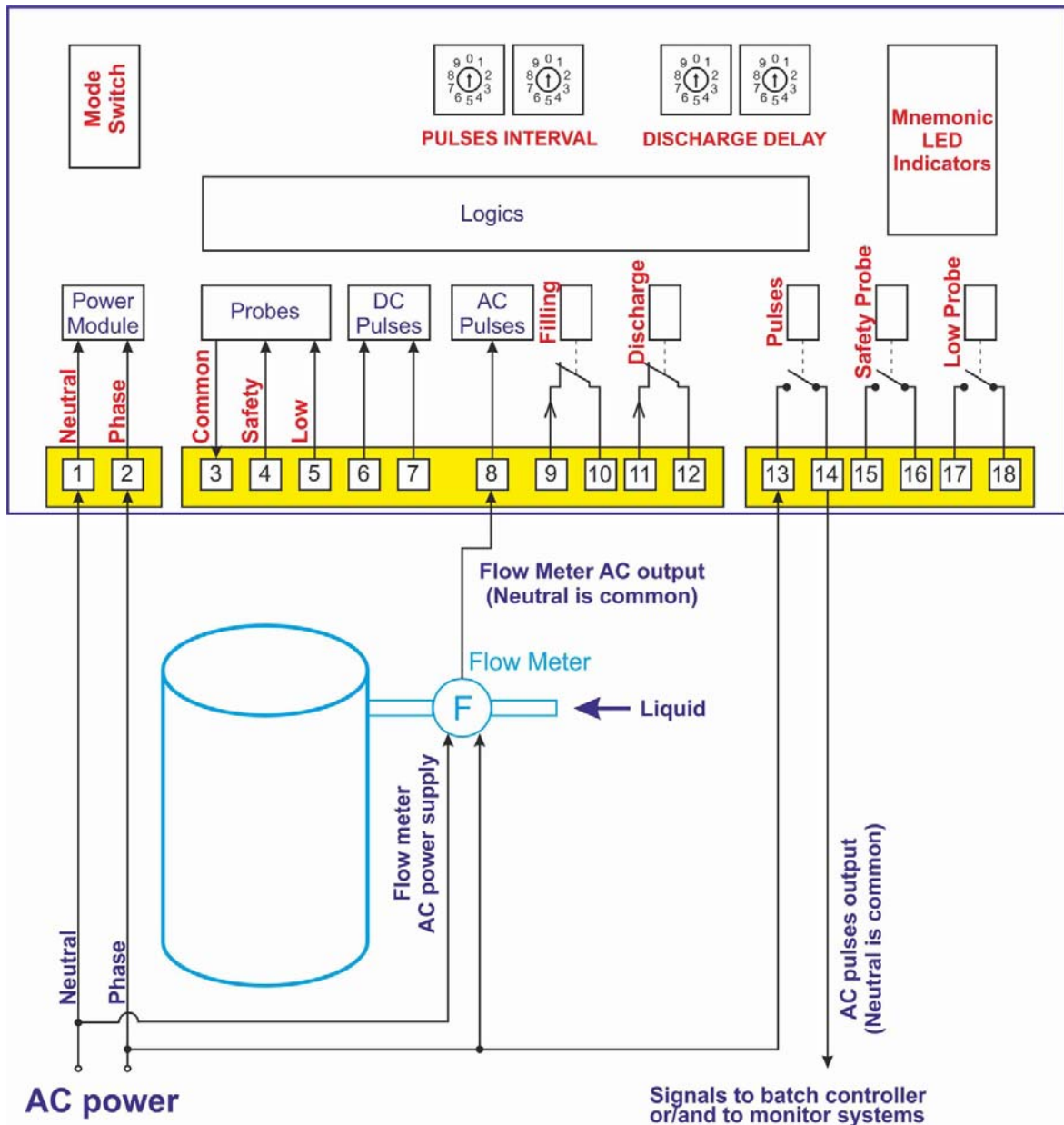


Figure 4. Flow Meter connection (AC power, AC output pulses)

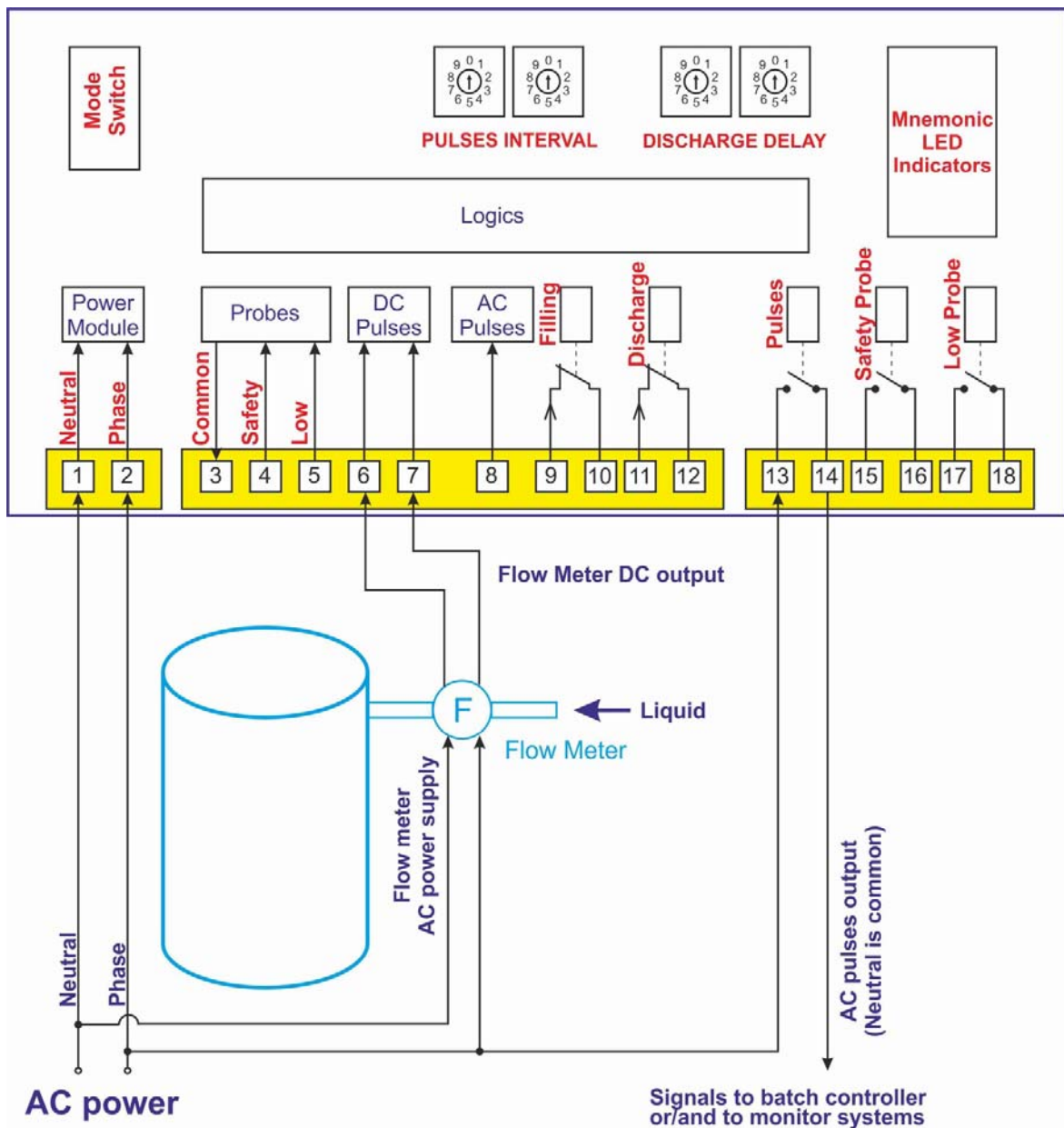


Figure 5. Flow Meter connection (AC power, DC output pulses)

INTERFACE BOARD PC

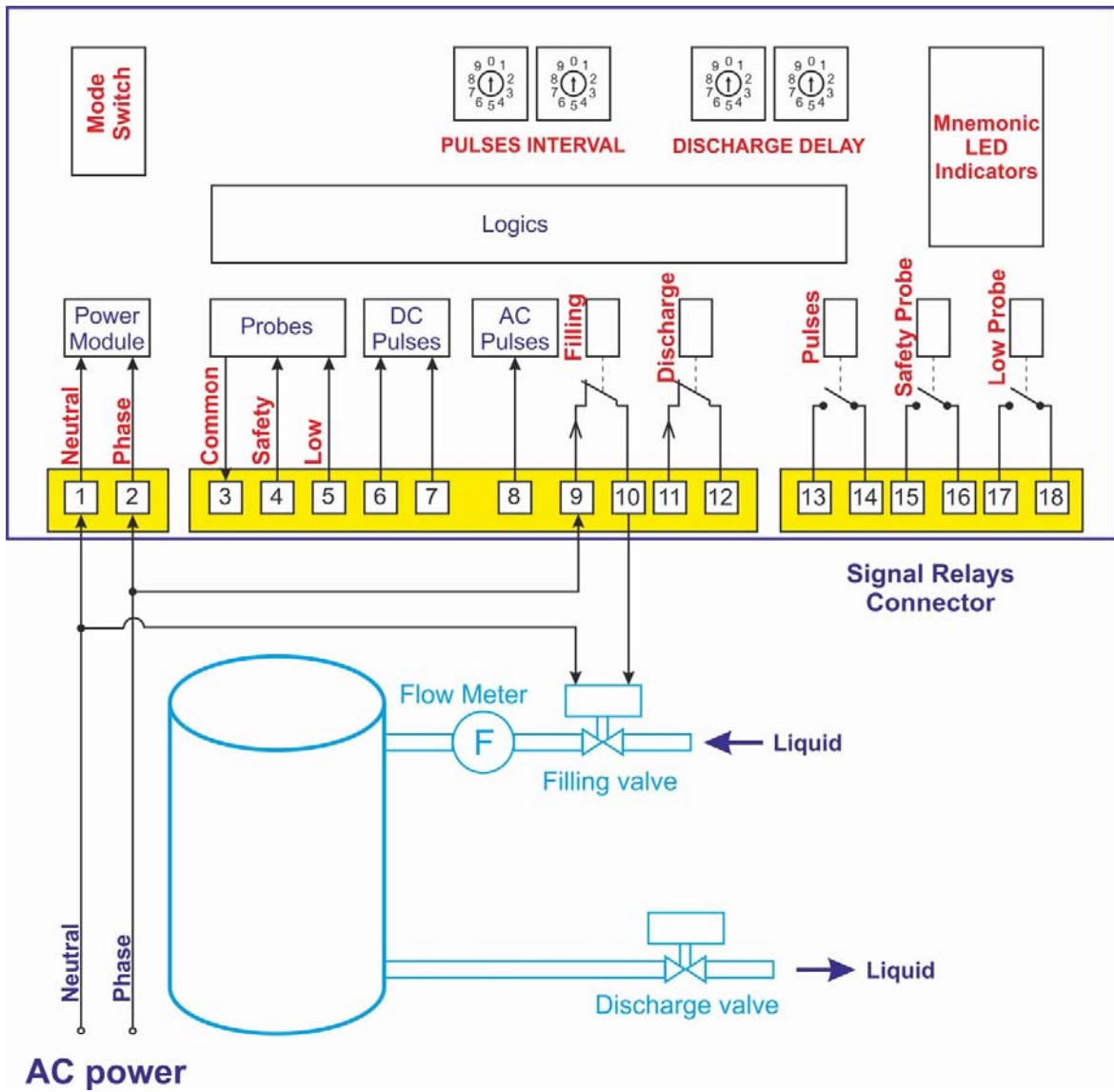


Figure 6. Filling valve connection

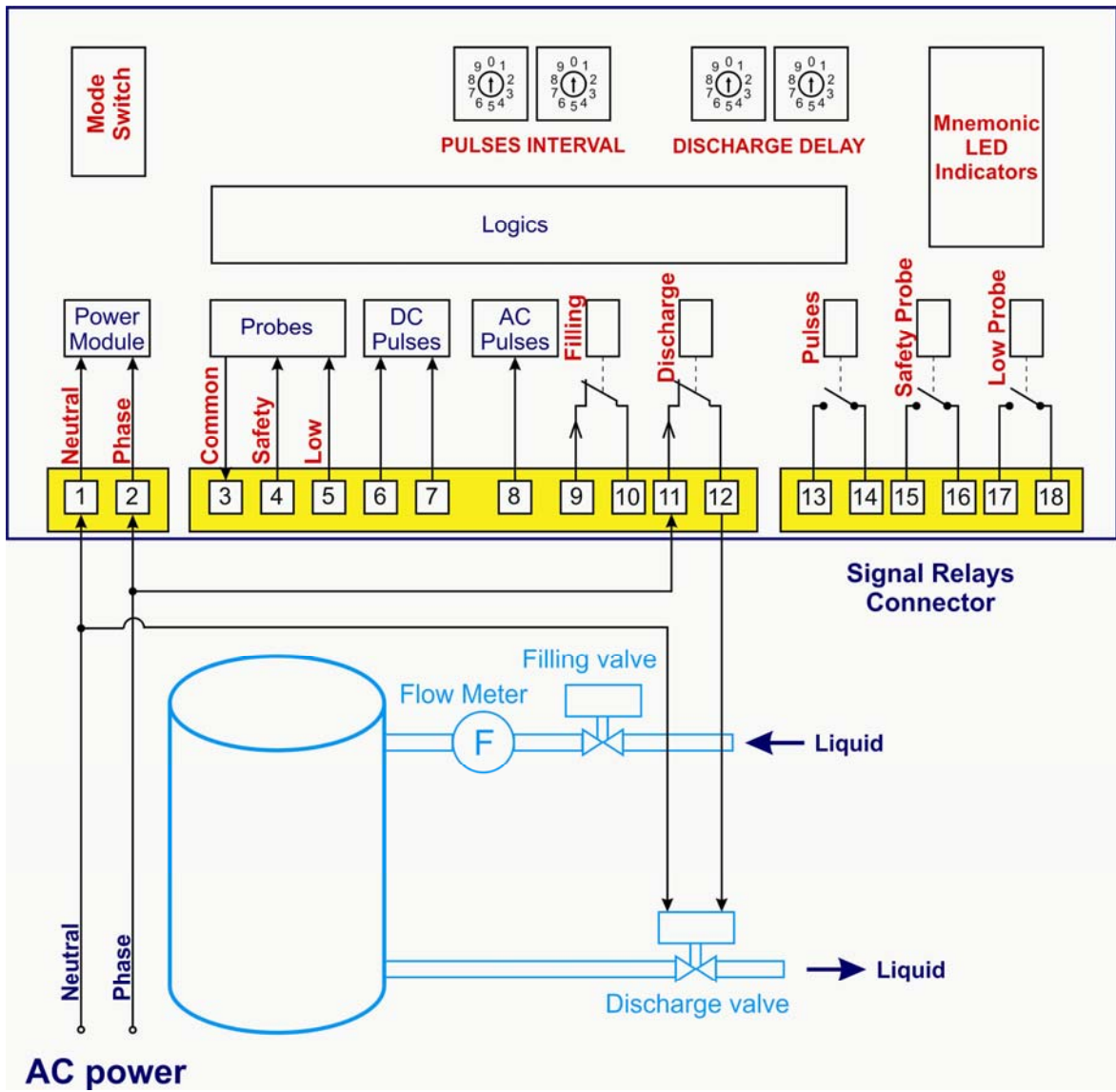
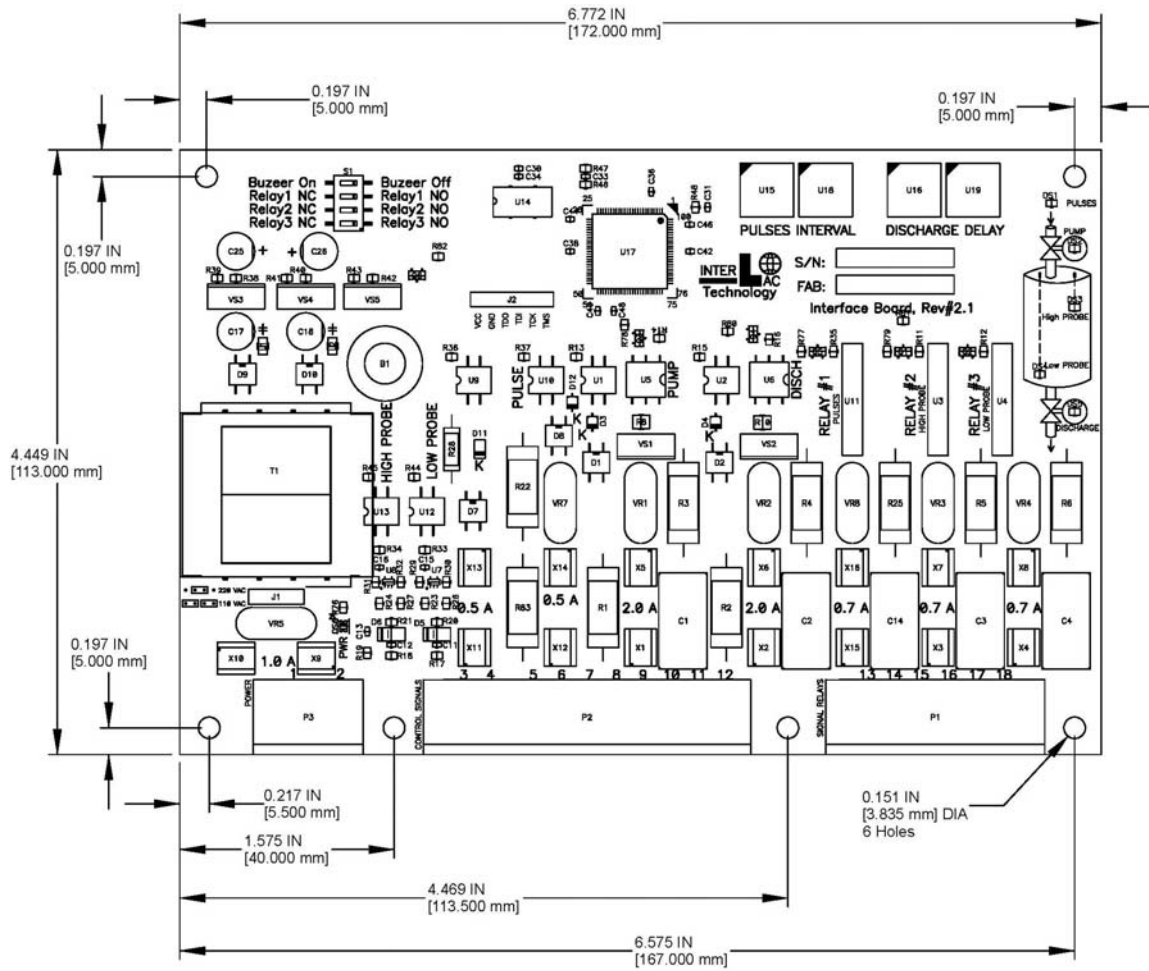


Figure 7. Discharge valve connection

INTERFACE BOARD PC

OUTLINE DIMENSIONS



## FREQUENTLY ASKED QUESTIONS

**Q:** *Why do you use cutout fuses? I think that auto-resetting fuse is better.*

**A:** If only briefly, auto-resetting fuse - it is a nonlinear thermistor that limits current. It has following main imperfections:

- these devices go into a high resistance state but not open circuit and hazardous voltage may be present in line;
- auto-resetting fuse has long time going into a high resistance state (10 -30 second);
- auto-resetting fuse is not suitable for repeated fault conditions; ...

Another words auto-resetting fuse is not suitable for this application.

**Q:** *Why do quantity pulses limit with only 10 pulses per second in AC output signal mode?*

**A:** This is limit with only feature of AC signal and triac work (that using like AC switch).

**Q:** *What do I need to do if I need to get about 100 pulses per second?*

**A:** If you need to work with pulses more than 10 pulses per second you need to use only DC output signal. If not missing pulses will be.

**Q:** *May do I change value of output signal fuse?*

**A:** Yes, you may only for filling and discharge valves. In really signal switch can work with current up to 3.5 Amp. If you need you may decrease or increase value fuse up to 3.5 Amp. But we are recommending to use output signal fuse in range from 0.5 Amp to 2.0 Amps. This will protect connected cable/wires and equipment.

**Q:** *What kind switches using in probe board?*

**A:** For AC signal using triac with zero crossing function; for DC signal using power N-channel MOSFET transistor.

**Q:** *What is Zero Crossing feature in AC output signal mode?*

**A:** Zero crossing function lets to switch on triac when AC voltage crossing zero (voltage is by zero). This function minimizes overshoots and reduces the generation of line noise transients. Triac will be switched off when AC voltage will cross zero too. Hereby triac provides right AC pulses.

**Q:** *Is power input and output signal are galvanic isolated?*

**A:** Yes, all signals and power supply lines are galvanic isolated.

**Q:** *Can I use AC pulses from flow meter but for batch controller use DC pulses?*

**A:** Yes, you can. Signal Relay #1 “pulses” will react for each pulses from flow meter (AC or DC). You can connect this relay to AC or DC power from 3V to 240V. Thereby probe board may be used like converter AC or DC pulses from flow meter to DC or AC pulses. Also you may use with different input/output voltage levels.

**Q:** *How is input impedance for flow meter pulses? Can I change this input impedance?*

**A:** For DC pulses input impedance is 2 kOhm, for AC pulses – 9.9 kOhm. You can increase impedance for AC pulses to 24 kOhm for this cut off resistor R83 (it is by control signal connector). If flow meter has triac AC output we do not recommend to increase input impedance of probe board. Also you can decrease input impedance using external resistor (parallel to input DC or AC).

**Q:** *Why digital timers using in PC better than analog timer using in other probe board?*

**A:** Digital timer has clearly set up time unit. Operator can easy and fast to set time from 0 to 99 second with step 1 second. Also digital timer has more stable and precession operation.