

# ARJAY



## LEVEL-EASE™

## Series 2000

Level Monitors and Controls

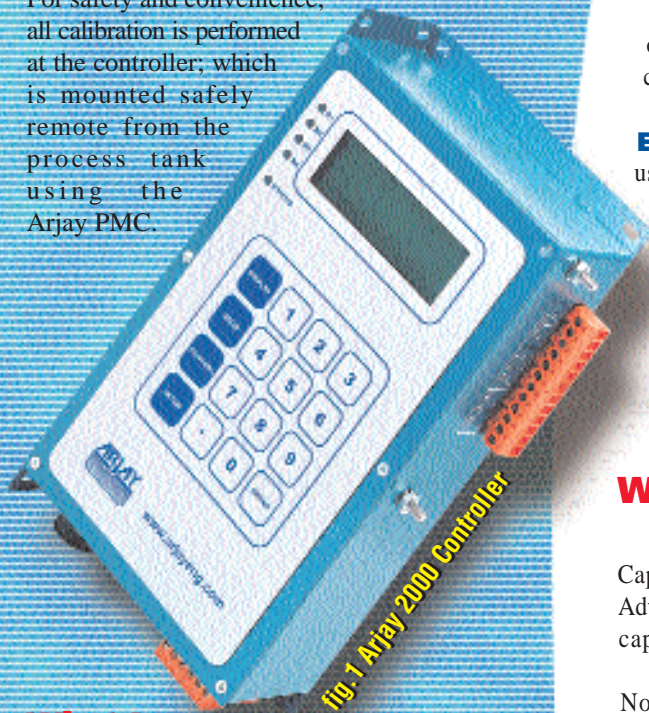
## The Basics

The Level-Ease 2000 from Arjay offers a unique and totally flexible approach to capacitance level instrumentation.

Your system starts with a powerful micro-controller platform. Feature Modules are then added on to meet your specific requirements. All of this is provided in a compact and easy to wire packaging.

User interface is accomplished with a straight forward menu driven display with keypad entry. No dials, potentiometer or buttons to work with.

For safety and convenience, all calibration is performed at the controller; which is mounted safely remote from the process tank using the Arjay PMC.



## What Is the Arjay Pulse Module Circuit (PMC)?

Arjay instruments are used in a wide variety of industries and environments and the design reflects this.

The Pulse Module Circuit (PMC) (see fig. 2) is a small circuit card mounted into the head of the probe. It allows the sensor to tune a radio frequency (RF) oscillator to the tank and process parameters. This approach minimizes the influences of impedance and resistance changes which are caused from product build-up on the probe. The result is enhanced accuracy and stability.

Safety and accessibility for the installer and operator are key concerns in all Arjay designs. The PMC translates the probe capacitance into a high resolution frequency signal which is sent via 2-conductor shielded wire to the remote control unit mounted up to 1 kilometer away. No calibration or user maintenance is required at the probe prior to, or during the normal operation of the instrument. This is especially advantageous in hazardous classified areas or harsh and unsafe environments.

## What is the advantage of this powerful controller?

**Ease of Use.** First of all, it's easy to set up. The 4-line display guides you through the control features for the modules you selected. For calibration, any two points of level are entered by the user and the unit will automatically extrapolate the zero and span. The tanks do not need to be emptied or filled and calibration can even be done while the process is operating. This means no down time during the instrument set up. All of this is accomplished away from the tank using the Arjay Pulse Module Circuit (PMC).

**Self diagnostics** occurs every six seconds to insure stability and accuracy of system operations. Any fault is indicated through a display warning. The relays, if chosen, can be set to a fail-safe alert mode.

**Economics.** An important feature in any selection process. The Level-Ease can be used as a simple read only unit or built up to include relays, analog outputs, communication protocols, and a variety of power inputs. You can even choose to input two tanks onto one unit; saving additional unit costs, wiring, and space.

For multiple tank applications, units can be close coupled and share a common keypad/display to further reduce space requirements and redundant component purchases.

## Why Capacitance?

Capacitance instruments have been used in industrial applications for many years. Advancements in controller design, combined with application common sense, make capacitance instruments a popular choice for level measurement.

No single level technology is ideal or desirable in all applications. Capacitance offers the flexibility to monitor both liquids and solids from 5 millimeters to 50 meters. It has no moving parts and is easy to maintain. Accuracy is a reflection of the process conditions and can be as precise as 1 millimeter.

Capacitance is an electronic principle by which a probe forms a capacitor with the grounded tank wall or other ground reference such as a probe shield. In an empty tank, the dielectric of the air provides a low capacitance value. As the tank is filled, the air is displaced by a product of a higher dielectric. This increases the capacitance value proportionally and is translated into a useable level signal.

For interface applications, the initial medium may be a product such as oil. The displacing medium may be water, or other product. The interface level is tracked in the same manner.

Since capacitance is a direct measurement of the product dielectric and the tank environment, the stability of these parameters is an important consideration. Where process variations hamper adequate accuracy, compensation inputs can be accommodated.

## Integrity

Level instruments can be subjected to a wide variety of environments and demands.

Fluids and the ambient air can be corrosive, bulk solids can be erosive, pressures vary, and temperatures can swing. These are just a few of the environments that Arjay instruments can be found.

Add to this Electromagnetic Interference (EMI/RFI) and unstable power surges and it becomes evident why the Level-Ease 2000 has been designed with complete protection against these elements.

Probes are made with Teflon, 316SS, and explosion proof parts. Circuits are designed with isolation, EMI/RFI protection, and signal stabilizing software.

All of this is backed by over 20 years of field experience and a network of professional representatives ready to assist you.

## Other Capacitance Instruments and Applications

Where a direct mounted control unit is preferred over the remote Level-Ease system, Arjay offers a basic probe mounted switch and transmitter.

The 9820 offers a single relay with the added feature of full differential for cycling control between two distinct points on the probe.

The 9080 provides a continuous 4-20 mA output proportional to the calibrated level on a single probe.

Arjay's application experience and unique sensor design extend the use of capacitance circuits to include:

- Dry Pump/Dry Run Monitors
- Open Channel Flow Monitors
- Interface (phase detection)
- Plugged Chute Detection
- Concentration Monitors
- Floating Oil Spill Alarms
- Interstitial Leak Alarms
- Containment Spill Alarms



fig.2 Arjay PMC

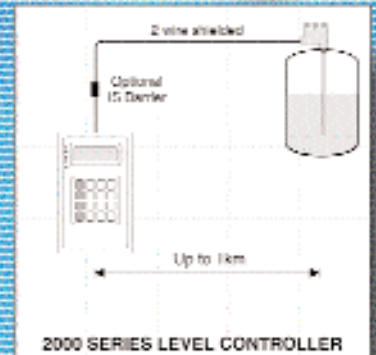


fig.3 Remote electronic

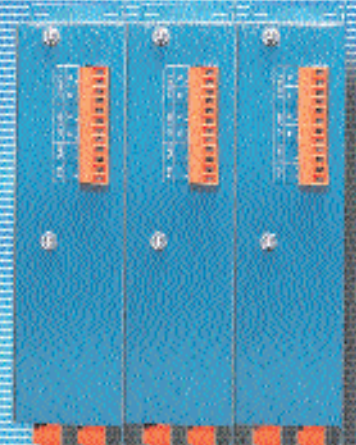


fig.4 Multi-tank



fig.5 Many probe designs

LEVEL INSTRUMENTS (CAPACITANCE TYPE)				SHEET _____ OF _____			
NO	BY	DATE	REVISION	SPEC. NO.		REV.	
				CONTRACT		DATE	
				REQ - P.O.			
				BY	CHK'D	APPR.	
<b>GENERAL</b>	1	TAG NUMBER					
	2	SERVICE		SAMPLE			
	3	LINE NO./VESSEL NO.					
	4	APPLICATION					
	5	FUNCTION		ALARM/TRANSMIT			
	6	FAIL-SAFE		HIGH			
<b>PROBE</b>	7	MODEL NUMBER					
	8	ORIENTATION		VERTICAL			
	9	STYLE		GENERAL			
	10	MATERIAL		316 SS			
	11	SHEATH		TELFON			
	12	INSERTION LENGTH		48"			
	13	INACTIVE LENGTH		N/A			
	14	GLAND SIZE & MATERIAL		3/4 NPT			
	15			316 SS			
	16	CONDUIT CONNECTION		1/2 "			
<b>AMPLIFIER</b>	17	LOCATION		AT PROBE			
	18	ENCLOSURE		EXPLOSION PROOF			
	19	CONDUIT CONNECTION		1/2 "			
	20	POWER SUPPLY		N/A			
<b>SWITCH</b>	21	TYPE					
	22	QUANTITY AND FORM		4xSPDT			
	23	RATING: VOLTS/Hz OR dc		250 VAC MAX. 50/60Hz			
	24	AMPS WATTS HP		10A MAX.			
	25	LOAD TYPE		RESISTIVE	INDUCT.		
	26	CONTACTS OPEN	ON	INCR	OPEN	ON	INCR.
	27	CLOSE	LEV.	DECR	CLOSE	ON	DECR.
	28	OUTPUT		4-20 MA ISOLATED			
<b>TRANS.</b>	29	RANGE		0-100%			
	30	ENCLOSURE CLASS		TYPE 4X			
	31	COMPENSATION CABLE		N/A			
<b>OPTIONS</b>	32	LOCAL INDICATOR		LCD			
	33	I/P TRANSDUCER		N/A			
	34	SIGNAL LIGHTS		LED			
	35						
<b>SERVICE</b>	36	UPPER FLUID					
	37	DIELECTRIC CONSTANT					
	38	LOWER FLUID					
	39	DIELECTRIC CONSTANT					
	40	PRES. MAX	NORMAL				
	41	TEMP. MAX	NORMAL				
	42	MOISTURE					
	43	MATERIAL BUILDUP					
	44	VIBRATION					
45	MANUFACTURER		ARJAY				
46	MODEL NUMBER		2000 SERIES				

**NOTES:**  
EXAMPLE OF TYPICAL SYSTEM ABOVE

1. MODEL 2114-1-1 CONTROLLER WITH
2. IS-TS-48" PROBE

## LEVEL-EASE 2000 Performance Specifications

### Monitor

Enclosure Material and Rating:	Type 4X polycarbonate (optional)
Power Input:	110 VAC, 50/60 Hz or 220 VAC or 24 VDC (specify at time of order)
Signal Output:	4-20 mA, isolated
Accuracy:	+/- .2% of span
Temperature Rating:	minus 20°C to +60
Relays (when ordered):	10 amp @ 240 VAC full differential
Display:	four line LCD in selectable units
Communication:	RS-485

### Standard Probe

Housing:	Explosion Proof, epoxy coated cast aluminum
Wetted Parts:	316SS and Teflon
Temperature Rating:	probe: -60°C to +260°C pmc.: -60°C to +60°C
Pressure Rating:	1500 psi max.



Operation Manuals, Technical Notes  
and drawings can be found at:

[www.arjayeng.com](http://www.arjayeng.com)  
or contact us directly.

# Level-Ease 2000 Work Sheet

## Part 1: Control Unit (includes pulse card for probe)

code	base unit	Price
2	Arjay Level-Ease 2000 Capacitance Level Monitor	
<b>code</b>	<b>probe input and controller mounting style</b>	
1	Single probe input (stand alone unit, includes keypad/display)	
2	Dual probe input (stand alone unit, includes keypad/display)	
3	Single probe input (multi-tank-mounting, requires calibrator)	
4	Dual probe input (multi-tank mounting, requires calibrator)	
<b>code</b>	<b>description</b>	
0	No 4-20 mA output(s)	
1	4-20 mA output (includes one output per probe input)	
<b>code</b>	<b>relay output, (10amp @ 120 vac, SPDT, dry, full differential)</b>	
0	No relays	
2	Two independent relays	
4	Four independent relays (relay to probe input is user selected)	
<b>code</b>	<b>power input</b>	
0	24 vdc, .5 amp	
1	115 vac, 50/60 Hz	
2	230 vac, 50/60 Hz	
<b>code</b>	<b>unit enclosure</b>	
0	No enclosure (subplate mount)	
1	Type 4X polycarb with window	
2	Type 4X polycarb with no window	
3	Other	

Selection arrows point from the following options in the table to the code:
 

- Base unit code: 2
- Probe input style: 1
- 4-20 mA output: 1
- Relay output: 0
- Power input: 1
- Unit enclosure: 1

**# 2 - 1 - 1 - 0 - 1 - 1**

## Part 2: Calibrator (if multi-tank units ordered above, one calibrator only required)

- A) Portable Calibrator (9vdc battery) #A00069
- B) Wall mount Calibrator with LCD call-up display #A00070

## Part 3: Probe (most typical configuration, other styles available)

- A) For metal straight walled tanks #A00314-"length"
  - 3/4" npt, 316SS process connection
  - teflon coated, explosion proof
- B) For non-metallic and horizontal tanks #A00106-"length"
  - 2"npt, 316SS process connection
  - 316SS concentric shield for probe
  - teflon coated, explosion proof

**Flexible probes and various tank connections available: see Probe Options**

## The Company

*Arjay Engineering Ltd. provides complete engineering, design, and manufacturing services for its product offering. Our network of technical representatives work closely with our customers to assure that the product received is the right product for the right installation.*

### The Arjay Level-Ease system offers these features:

- Minimal electronics in the field
- NO control wiring in the field (two wire signal wire only!)
- Remote diagnostics
- Interchangeable parts
- Automatic calibration features
- Micro-controller accuracy
- Flexibility of design
- Standard and custom software
- Menu selection of display units
- Compact integral transmitters available

*For unique application requirements, Arjay is ready to assist and review your individual process. We will provide any support necessary to get your project moving in the most efficient and economical way possible.*

*The Series 2000 Level Control System is one of the many products offered in the Arjay family of process and control instrumentation.*

*Combining advanced technology with application common sense assures our customers of continued satisfaction.*

*For additional information or inquiries, please contact your nearest Arjay representative or call us directly at our Oakville (Toronto), Canada office:*



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