ECHOLINE®

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LOW PRESSURE MONITOR

Prevents Unwanted Shutdown
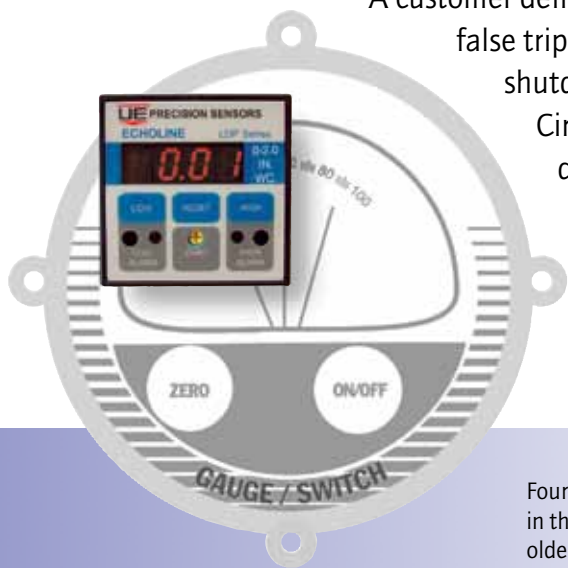**High & Low Alarm Settings**
UL 991

PRECISION SENSORS

OVERVIEW

ECHOLINE® was designed in cooperation with a leading semiconductor manufacturer to prevent costly system shutdowns and reduce maintenance costs associated with low pressure monitoring of gas cabinet exhaust systems. ECHOLINE's Maintenance Mode feature prevents false alarms during system maintenance and balancing. A customer defined time delay prevents false trips which can cause system shutdowns. "ECHO" (Electronic Circuit Health Output) diagnostics alert the user to loss of external power or internal electronics failure. Four ECHOLINE® units fit into the space of one old-fashioned gauge/switch.

Four LDP switches will fit in the same space as one older gauge/switch

FEATURES

LED display of process and alarm state

Alarm status indicator

Front panel zero adjustment

Independently-set low and high set points

- **Conformance to S2-0200 and CE, complies with the requirements of UL 991**
- **Latching relay output with adjustable time delay**
- **"Maintenance Mode" to prevent false trips during ventilation system balancing**
- **LED status indication**
- **Self-diagnostics**
- **Adjustable time delay to eliminate false trips and unwanted system shut down**
- **Optional selectable display of WC" or Pascal**

Front cover cleanroom image courtesy of Pentagon Technologies.

APPLICATIONS

STATIC PRESSURE APPLICATION	ECHOLINE® FULL SCALE RANGES
Gas Cylinder Cabinets	1" to 5" WC
Gas Isolation Box (GIB)	1" to 5" WC
Mini Environments	0.2" WC
Wet Bench & Wet Station	0.5" to 1" WC
Chemical Dispensing	0.5" to 1" WC
Diffusion Furnace Scavenger	0.5" to 1" WC
Cleaning Hoods	0.5" to 1" WC
Glove Boxes	1" to 5" WC
Pump & Equipment Exhaust	1" to 5" WC
Supplemental Exhaust	0.5" to 1" WC

SEMI S2-0200 SAFETY CONSIDERATIONS AND UL 991

ECHOLINE® was created using widely accepted best practices in an AS 9100 / ISO 9001:2000 quality environment. Components used in the design and production of ECHOLINE® have been selected for their time proven performance, availability and reliability. ECHOLINE® contains no moving parts that can wear out, or microprocessors that are susceptible to hidden software problems.

Centralized monitoring of multiple locations

When Used To Provide Safety Interlock, Monitor Ventilation Or Optimize Exhaust, ECHOLINE® Features:
- Discrete all analog electronic components - no microprocessor
- Self-monitoring "ECHO" diagnostics
- Complies with the requirements of UL 991
- Fault tolerant design
- Maintenance mode
- User selected time delay
- Convenient interfacing with facility alarm system

When Used To Monitor Non- Critical Ventilation, ECHOLINE® Features:
- Maintenance mode to prevent false trips during ventilation system balancing
- Optional non-latching relay
- Bright LED display of process pressure

Operation
High and low limit alarms are independently set from the front panel. In normal operation, the LED display will indicate the sensed pressure and the High Limit/Low Limit LED status indicators will be green. When a preset limit is exceeded, the LED signals an alarm condition by turning red. After a customer selected time delay, the electromechanical relay contacts will be latched open and the LED display will flash the process pressure once every second. Manually depressing the reset button will cause the relay contacts to close if and when the process pressure is within set limits.

Maintenance Mode
The "Maintenance Mode" option is a unique and convenient safety feature which allows the user to widen the alarm set points during system maintenance. By closing terminal circuits 3 and 4, using a key switch or password protected computer, the user can expand the limits to 5% and 95% of the range to continue monitoring and prevent false trips. Opening terminal circuits 3 and 4 immediately returns the set points to the previous settings.

Time Delay
ECHOLINE® includes an adjustable "stand alone" time delay to prevent intermittent tripping due to brief transient upsets. When the unit senses a pressure outside the limits, the status LED will immediately turn red, but the relay will not open for a pre-selected time delay. The time delay will reset to zero if the process pressure returns to within the limits during the transient conditions. This feature provides a degree of "fault tolerance" for exhaust flow interlock applications. The time delay is field settable through a jumper located on the rear of the enclosure for 1, 10, 20 or 30 seconds.

ECHO Diagnostics
The ECHO function is an internal electronic check of certain circuit parameters. In the event of an internal failure, the ECHO output relay immediately opens to communicate the fault condition and the unit display goes blank. The electromechanical output relay has isolated contacts that monitor the circuit in real time.

SPECIFICATIONS

Indicating Pressure Ranges	0.2 to 20" WC (see model chart)
Display	3½ digit, 0.30" high red LED
Alarm Set Point Range	Independently set high and low limits, 5 to 95% of indicating range
Reset	Alarm condition will remain until front panel reset button is pressed, and pressure is within limits
Calibration	Field adjustable zero via front panel screw adjustment
Accuracy	1% of range @ 20° C
Switch and ECHO Outputs	Electro-mechanical relay, SPDT, Form A Dry Contacts
Relay Rating	1.0A @ 30 VDC, resistive
Status LEDs	Green in normal state, red in alarm state
Time Delay	1, 10, 20, 30 seconds. Factory set at 10 seconds. Changeable via rear panel jumper.
Analog Output (optional)	0-10 VDC or 4-20 mA, non-isolated, current sinking. Maintenance Mode feature disabled.
Overpressure	± 14.5 psi (8" WC and above), ± 80" WC (under 8" WC)
Pressure Connection	Push-to-connect fitting(s) for 0.25" O.D. tubing or dual barbed fitting for 0.170" I.D. hose
Media	Dry air, or inert non-conductive gas
Operating Ambient Temperature	0 to 40°C
Enclosure	⅟₁₆th DIN 43700, panel mounted polycarbonate, plastic
Wiring	Plugable terminal block, 18-26 AWG, DSub (9 pin) connector
Weight	7 oz (200 g) maximum
Power	12-24 VDC, 1.4 Watts

APPROVALS

CE Conformance to S2-0200 SEMI standards
EN61326-1:1997 Electromagnetic compatibility

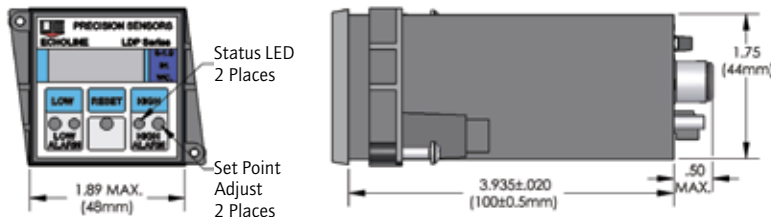UL Recognized Component – **Complies with the requirement of UL 991.**

MODEL CHART

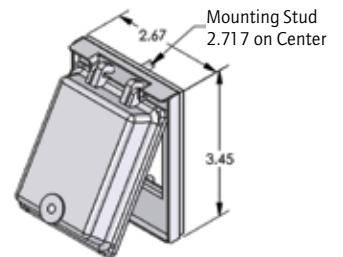| Model		Range / Units*	Minimum Set Pressure	Proof Pressure	Burst Pressure
LDP0.2	WC	0.2" x 0.001" WC	.002" WC	± 80" WC	120" WC
LDP0.5	WC	0-0.5" x 0.001" WC	0.03" WC	± 80" WC	120" WC
LDP1	WC	0-1" x 0.01" WC	0.05" WC	± 80" WC	120" WC
LDP2	WC	0-2" x 0.01" WC	0.10" WC	± 80" WC	120" WC
LDP5	WC	0-5" x 0.01" WC	0.3" WC	± 80" WC	120" WC
LDP10	WC	0-10" x 0.1" WC	0.5" WC	± 14.5 psig	20 psig
LDP20	WC	0-20" x 0.1" WC	1.0" WC	± 14.5 psig	20 psig
LDP100	MW	0-100 x 0.1 mm WC	5 mm WC	± 80" WC	7 psig
LDP50	P	0-50 Pascal x 0.1 Pascal	3 Pa	± 80" WC	120" WC
LDP100	P	0-100 Pascal x 1 Pascal	5 Pa	± 80" WC	120" WC
LDP500	P	0-500 Pascal x 1 Pascal	25 Pa	± 80" WC	120" WC
LDP1000	P	0-1000 Pascal x 1 Pascal	50 Pa	± 80" WC	120" WC
LDP2000	P	0-1999 Pascal x 1 Pascal	100 Pa	± 80" WC	120" WC
LDP10	KP	0-10 KPa x 0.01 KPa	0.50 KPa	± 30 psig	45 psig

* For user selectable scale (WC to Pa), consult factory
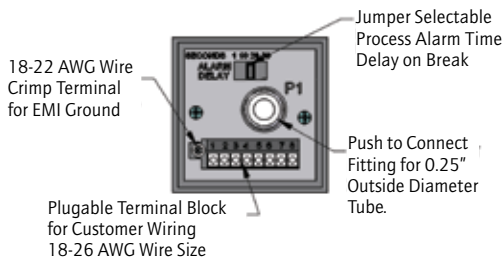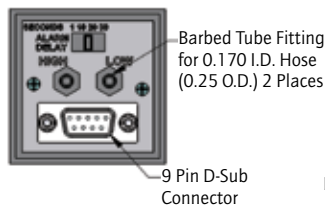* For alternate units of measurement, consult factory

DIMENSIONAL DRAWINGS
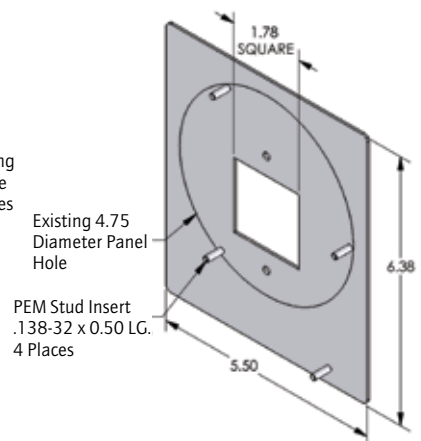
Optional Clear Watertight Cover

Mounting Stud 2.717 on Center

2.67

3.45

Status LED 2 Places

Set Point Adjust 2 Places

1.89 MAX. (48mm)

1.75 (44mm)

3.935±.020 (100±0.5mm)

.50 MAX.

Optional Retrofit Mounting Plate

1.78 SQUARE

Existing 4.75 Diameter Panel Hole

PEM Stud Insert .138-32 x 0.50 LG. 4 Places

6.38

5.50

Back View Single Port Gage Pressure

18-22 AWG Wire Crimp Terminal for EMI Ground

Plugable Terminal Block for Customer Wiring 18-26 AWG Wire Size

Jumper Selectable Process Alarm Time Delay on Break

Push to Connect Fitting for 0.25" Outside Diameter Tube.

Back View Dual Port Differential Pressure

Barbed Tube Fitting for 0.170 I.D. Hose (0.25 O.D.) 2 Places

9 Pin D-Sub Connector

HOW TO ORDER

Create a part description by using the system below. The part description will follow this form. A drawing based on the part description will be submitted for user approval.

Type	Setting Range	—	Pressure Connection	Standard Pressure	Accessory	Options
LDP	**1 WC**		**N**	**M**	**C**	**M05**

LDP 1WC   N   M   C M05

	CODE	DESCRIPTION
Type		
	LDP	Low Differential Pressure

Setting Range

Inches of Water Column

		Pascal	
0.2WC	0 - 0.2" WC	50 P	0 - 50 Pascal
0.5WC	0 - 0.5" WC	100 P	0 - 100 Pascal
1WC	0 - 1" WC	500 P	0 - 500 Pascal
2WC	0 - 2" WC	1000 P	0 - 1000 Pascal
5WC	0 - 5" WC	2000 P	0 - 1999 Pascal
10WC	0 - 10" WC	10 KPa	0 - 10 KPa
20WC	0 - 20" WC		

Millimeters of Water Column

100MW	0 - 100 MW

Pressure Connection

N	Single push-to-connect for "Negative" Pressure—Negative pressure display will indicate increasing negative value as pressure goes below atmospheric.
P	Single push-to-connect for "Positive" Pressure—Positive pressure display will indicate increasing positive value as pressure goes below atmospheric.
D	Dual barbed tube for "Differential" Pressure—Differential pressure display will indicate negative value as 'low' port goes below 'high' port.

Standard Features (only one can be selected)

M	Maintenance Mode
A	4 - 20 mA Analog Output
V	0-10 VDC Analog Output

Accessory

C	Clear watertight cover (when ordering separately, specify p/n 9728)
P	Retrofit mounting plate (when ordering separately, specify p/n 9729)

Options

M01	Non-latching alarm (automatic reset)
M02	6 mm Metric push-to-connect fitting, use with "N" or "P" pressure connections
M03	Positive pressure alarm. This option reverses the operation and allows the unit to work with positive pressure input or with positive differential pressure (high above low).
M05	D Sub connector (9 pin), use with "D" pressure connection only
M07	No low alarm
M08	No high alarm

The specified example denotes a 0 to 1" WC ECHOLINE® with a single "negative" pressure port, maintenance mode option, watertight cover and D Sub connector.

UE

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