

# AUTOMATION PRODUCTS GROUP, INC.

**Operator's Manual**

## **LPU-2127**

Rev. A5, 1/14



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Supplier of industrial controls, heaters, and sensors since 1963

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## Table of Contents

<i>Warranty</i> .....	3
<i>Introducing</i> .....	4
<i>Understanding Ultrasonics</i> .....	5
<i>Installation</i> .....	7
<i>Hazardous Mounting</i> .....	8
<i>Wiring</i> .....	9
<i>Programming</i> .....	10
<i>Operation</i> .....	11
<i>Calibration</i> .....	13
<i>Utilities</i> .....	14
<i>Mode Sheet</i> .....	16
<i>Specifications</i> .....	19
<i>Certificate of Compliance</i> .....	20



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2

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## • Warranty and Warranty Restrictions

APG warrants its products to be free from defects of material and workmanship and will, without charge, replace or repair any equipment found defective upon inspection at its factory, provided the equipment has been returned, transportation prepaid, within 24 months from date of shipment from factory.

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Warranty is specifically at the factory. Any on site service will be provided at the sole expense of the Purchaser at standard field service rates.

All associated equipment must be protected by properly rated electronic/ electrical protection devices. APG shall not be liable for any damage due to improper engineering or installation by the purchaser or third parties. Proper installation, operation and maintenance of the product becomes the responsibility of the user upon receipt of the product.

Returns and allowances must be authorized by APG in advance. APG will assign a Return Material Authorization (RMA) number which must appear on all related papers and the outside of the shipping carton. All returns are subject to the final review by APG. Returns are subject to restocking charges as determined by APG's "Credit Return Policy".

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3

## Introducing

The LPU series are loop-powered ultrasonic sensors. The LPU provides a low-power non-contact level measurement solution. These units are provided with 4-tactile switches and a 4-digit LCD display to provide the user feedback in programming and sensor performance data.

Sensor features include:

- Loop powered for low power consumption.
- Built-in keypad and display for easy setup and distance readings.
- Rugged Kynar transducer housing for harsh environments and high degree of chemical compatibility.
- Microprocessor-controlled.
- Listed by CSA for operation in Class 1 Division 2 Groups C & D and Class 1 Zone 2 A Ex nA IIB hazardous areas.
- NEMA 4X rating for outdoor applications.



4

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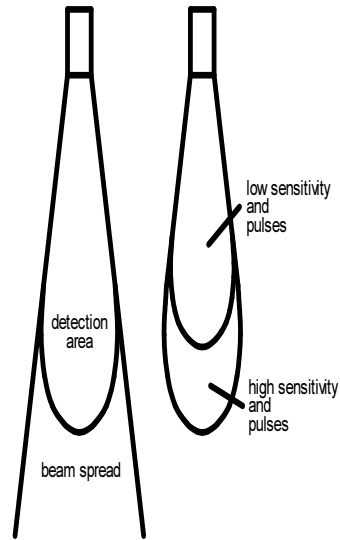
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## Understanding Ultrasonics

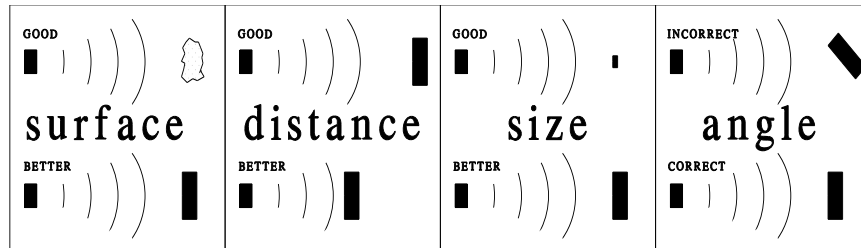
Ultrasonic sensors measure distance using a transducer to send out ultrasonic bursts. Each burst contains a series of 1-20 pulsed sound waves that emit in the shape of a cone, reflect off the target, and are received by the sensor. The time required for the sound burst to travel to and from the target is converted into a distance measurement by the sensor.

Ultrasonic sensing is affected by several factors including the target surface, distance, size, and angle. The following considerations will help ensure the best possible target conditions.



### Surface

The ideal target surface is hard and smooth and perpendicular to the sensor. This surface will reflect a greater amount of signal than a soft, sound wave absorbent surface. A target with poor sound wave reflection characteristics will reduce the operating distance of the sensor and decrease its accuracy.



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**Distance**

The shorter the distance from the sensor to an object, the stronger the returning echo will be. Therefore, as the distance increases, the object requires better reflective characteristics to return a sufficient echo.

**Size**

A large object will have a greater surface area to reflect the signal than a small one, therefore, a large target will be detected at a greater distance than a small target. The surface area recognized as the target is generally the portion closest to the sensor.

**Angle**

The inclination of the object's surface facing the ultrasonic sensor affects the reflectivity of the object. The portion perpendicular to the sensor returns the echo. If the entire surface is at a great enough angle, the signal will be reflected away from the sensor and no echo will be detected. Generally a target at an angle greater than 5 degrees off perpendicular will not be detected.



6

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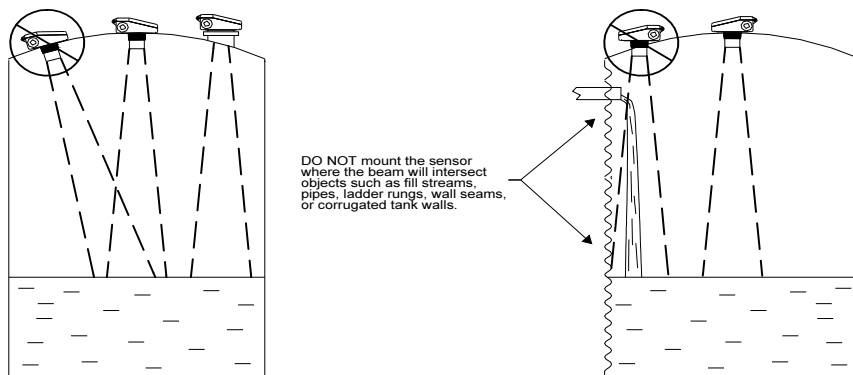
## Installation

The LPU sensor should be mounted so that it has a clear sound path to the level monitored. Mount the sensor away from tank walls and inlets. The path should be free from obstructions and as open as possible for the 9° off axis beam pattern. Follow the guidelines mentioned in "Understanding Ultrasonics", earlier in this manual. When using a stand pipe to mount the sensor above the tank, the stand pipe should be seamless and no longer than 4 inches to provide a smooth path for the sound waves to propagate into the tank. Seams from couplers, nipples or gaskets can cause erroneous echoes and degrade the sensors performance. The LPU can be mounted in a coupler, or flange using the 2" NPT threaded case.

**Caution: Do not over tighten! The sensor should be threaded in only hand tight.**

The minimum detection range of the LPU is approximately 1 ft. **The sensor should be mounted to ensure the target does not come closer than the minimum range or erroneous readings may result.**

See the Hazardous Mounting section of this manual before mounting the LPU sensor in a hazardous area.



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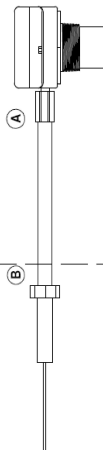
sales@whcooke.com

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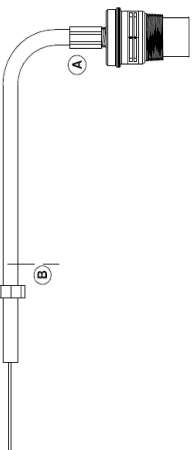
ZONE		REV		DESCRIPTION		REVISIONS		DATE		APPROVED	
All				All	Ampl Electronic Discharge Warning				3-5-08		KNR

**Installation in Class I Division 2 Groups C and D  
Class I Zone 2 A EXnA IIB**

NON-HAZARDOUS AREA HAZARDOUS AREA  
LPU-2127 / LPU-4127 Ultrasonic Sensor ( 4-20ma Loop Powered )

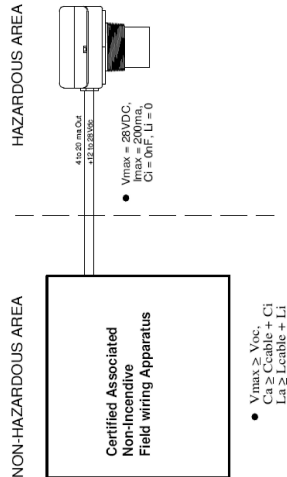


LPU-2428 / LPU-4428 Ultrasonic Sensor ( 4-20ma Loop Powered )



- Install in accordance with Section 18 of the CEC or Article 500 of the NEC.
- CSA listed or NRTL/UL listed conduit seal at location A & B as required by Local Authority.
- The cable is terminated in the sensor and runs continuously from the sensor through the Hazardous area and into the Non-Hazardous area.
- Electrical equipment connected to associated apparatus should not generate more than 250 V rms.
- Tampering or replacement with non-factory components may adversely affect the safe use of the system.
- **DO NOT DISCONNECT WHILE CIRCUIT IS ALIVE UNLESS AREA IS KNOWN TO BE NON-HAZARDOUS**

**Non-Incendive Wiring for Installation in  
Class I Division 2 Groups C and D, Max. Temp. 60 °C**



- $V_{max} \geq V_{oc}$   
 $C_a \geq C_{cable} + C_i$   
 $L_a \geq L_{cable} + L_i$

4-20mA max O/A  
12-32-2020

●  $V_{max} = 28VDC$   
 $I_{max} = 200mA$   
 $C_i = 0nF, L_i = 0$

- **WARNING - POTENTIAL ELECTROSTATIC CHARGING HAZARD -**
- Clean with only with a damp cloth

APPROVALS		DATE	
DRWN	KNR	12-8-03	
CHKD	Travis B	12-10-03	
APD	KNR	12-10-03	
MATERIAL	N/A		
FINISH	N/A		

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND TOLERANCES ARE AS FOLLOWS:	
DIMENSION	FINISH
DIM. TO A, XX	ANGLES
DIM. TO B, XXX	INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M (31M INSI)99
	THIRD ANGLE PROJECTION

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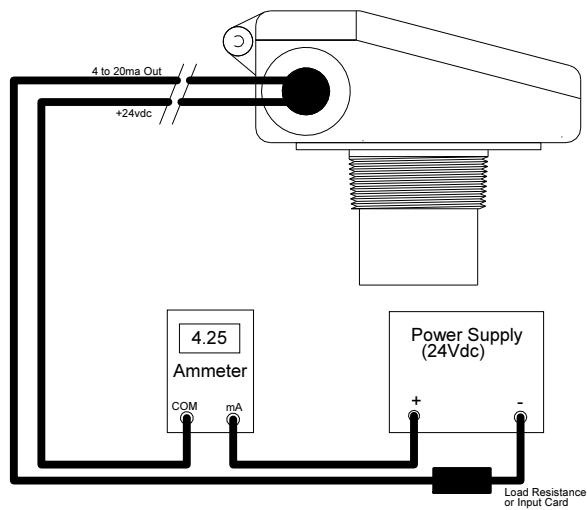
APG	
Automation Products Group, Inc. Ligon, Ohio USA - 1.888.525.7300	
Hazardous Installation Drawing For LPU-2127, LPU-4127, LPU-2428 & LPU-4428	
SIZE	PART NO
A	9002745
SCALE	DOCUMENT NO
DO NOT SCALE DRAWING	9002745
SHEET	OF
1	1



## Wiring

### Cable Entry

1. Remove the cable knock out with lid closed.
2. Clear flashing.
3. Open lid.
4. Install cable gland or conduit connection.
5. Connect cable as shown:  
12 to 28 VDC to (+) Terminal  
4 to 20 ma output to (-) Terminal



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9

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## Programming

The LPU is programmed using modes, similar to a digital wrist watch. The LPU display and programming buttons can be accessed by loosening the screw that secures and seals the sensor's lid. The LCD display shows the distance measurement. The display is also used to view the individual modes and their values when programming.

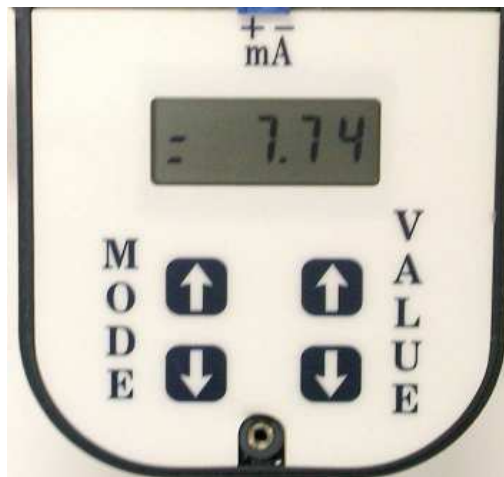
The LPU has four programming buttons, MODE UP, MODE DOWN, VALUE UP, and VALUE DOWN. The MODE UP/DN buttons allow the user to select the desired mode while VALUE UP/DN buttons allow the user to view and alter the settings.

To select a mode, press the MODE UP or MODE DOWN button until the desired mode is displayed. Press the VALUE UP or VALUE DOWN button once to view the current setting of that mode.

To change the selected mode setting, press the VALUE UP or VALUE DOWN button until the desired value is displayed.

To STORE or SAVE the changed mode value, press the MODE UP or MODE DOWN button once. At this point, the display will show the distance measurement. The values are stored in a nonvolatile memory, and will not be lost when power is turned off.

A list of the 17 modes is located on the LPU MODE SHEET near the end of this manual.



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## Operation

<u>MODE</u>	<u>DESCRIPTION</u>	<u>PARAMETERS</u>
1	<i>Units</i>	Range = 0-2 Default = 0 0 = feet 1 = inches 2 = mm

Mode 1 is used to select the units of measurement that will be used throughout the setup process and also for display. The units will also determine the resolution of the display and the outputs. The resolution is: feet 0.01, inches 0.1 and millimeters 1.

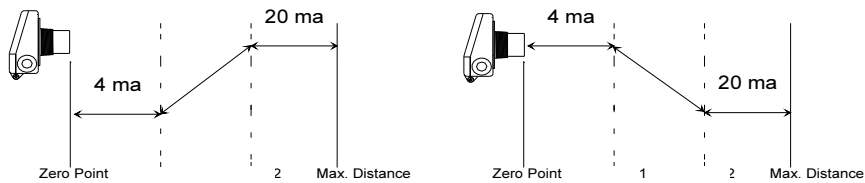
NOTE: All modes must be set using the units selected in Mode 1.

<u>MODE</u>	<u>DESCRIPTION</u>	<u>PARAMETERS</u>
2	<i>4 mA distance</i>	Units = Mode 1 Range = 0-9999 Default = 1.00 ft.

Mode 2 sets the 4 mA distance.

<u>MODE</u>	<u>DESCRIPTION</u>	<u>PARAMETERS</u>
3	<i>20 mA distance</i>	Units = Mode 1 Range = 0-9999 Default = 25.00 ft.

Mode 3 sets the 20 mA distance.



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## Operation (continued)

<u>MODE</u>	<u>DESCRIPTION</u>	<u>PARAMETERS</u>
4	<i>Response Time</i>	Range = 1-3 Default = 1 1 = 3.3 ft/min (1m/min) 2 = 15ft/min (4.5m/min) 3 = >15 ft/min (4.5/min)

Mode 4 is used to select the desired response time. The response time adjustment is the limit to which the LPU-2127 can keep up with different rates of change. The response time parameter automatically sets internal filter parameters for the programmed rate of change. More filter equates to a steadier output. The most filter is used in setting 1, the least in setting 3.

<u>MODE</u>	<u>DESCRIPTION</u>	<u>PARAMETERS</u>
5	<i>Fail-safe</i>	Range = 0 - 2 Default = 1 0 = hold last 1 = 22 mA 2 = 3.75 mA

Mode 5 sets the output condition that the sensor will revert to in the event of a loss of echo condition. If this mode is set to 0, the sensor will hold the last reading until the signal is regained. If set to 1, the output of the sensor will go to 22 mA. If set to 2, the output will go to 3.75 mA.

<u>MODE</u>	<u>DESCRIPTION</u>	<u>PARAMETERS</u>
6	<i>Fail-safe Delay</i>	Units = Seconds Range = 5-9999 Default = 15

Mode 6 sets the delay, in seconds, before the output will show a loss of echo condition. When the LPU does not receive an echo, it will hold the last valid condition for the number of seconds entered in Mode 5. When this time has expired, the display and output will change to their fail-safe settings.

*Most applications do not require the user to manipulate modes beyond 6.*



12

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## Calibration

<u>MODE</u>	<u>DESCRIPTION</u>	<u>PARAMETERS</u>
7	<i>4 mA Trim</i>	Range = 0-9999 Default = 5000

Mode 7 fine tunes the minimum current sourced on the analog output.

<u>MODE</u>	<u>DESCRIPTION</u>	<u>PARAMETERS</u>
8	<i>20 mA Trim</i>	Range = 0-9999 Default = 5000

Mode 8 fine tunes the maximum current sourced on the analog output.

<u>MODE</u>	<u>DESCRIPTION</u>	<u>PARAMETERS</u>
9	<i>Calibration</i>	Range = 0-1999 Default = 1000

Mode 9 is used to calibrate the sensor for variations in the speed of sound due to variations in atmospheres. The default of 1000 is used for most applications. Assume a decimal after the first digit.

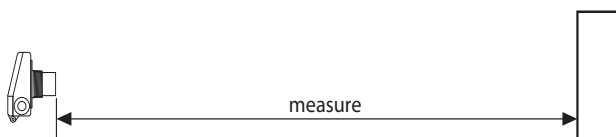
<u>MODE</u>	<u>DESCRIPTION</u>	<u>PARAMETERS</u>
10	<i>Distance Offset</i>	Units = Mode 1 Range = -3.00 to 3.00 Default = 0

Mode 10 is used to change the zero point of the sensor.

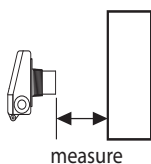
## Distance Calibration

Use a wall or other large flat target for calibration at longer ranges.

Step 1: Point the sensor at a target that is approximately at the maximum measurement range. Adjust the Multiplier value so that the sensor distance reading matches the actual measured distance to the target.



Step 2: Point the sensor at a target that is approximately at the minimum measurement range. Adjust the Offset value so that the sensor distance reading matches the actual measured distance to the target.



Step 3: Repeat steps 1 and 2 until the reading at each endpoint matches the actual measured distance. The accuracy at both endpoint should improve with each repetition of steps 1 and 2.



14

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## Utilities

<u>MODE</u>	<u>DESCRIPTION</u>	<u>PARAMETERS</u>
11	<i>Temperature Compensation</i>	Range = 0 - 2 Default = 1 0 = OFF 1 = ON 2 = View Temperature (degrees C)/ON

Mode 11 activates or deactivates the internal temperature compensation circuit. The speed of sound changes with changes in temperature, therefore changes in temperature can affect distance measurements. These affects can be minimized by activating temperature compensation. If the mode is exited while viewing temperature, temperature compensation is turned ON.

<u>MODE</u>	<u>DESCRIPTION</u>	<u>PARAMETERS</u>
12	<i>AutoSense</i>	Range = 0 - 1 Default = 1 0 = Manual (user controls Sensitivity and Pulses) 1 = AutoSense (sensor controls Sensitivity and Pulses)

Mode 12 activates or deactivates AutoSense. When operating with this mode active, the LPU-2127 will automatically change the sensitivity and pulses to match the application. Modes 13 and 15 limit the maximum level that sensitivity and pulses can be manipulated when operating in AutoSense. Modes 13 and 15 set the sensitivity and pulses when operating in manual mode.

<u>MODE</u>	<u>DESCRIPTION</u>	<u>PARAMETERS</u>
13	<i>Sensitivity</i>	Range = 0 - 100% Default = 100%

Mode 13 sets the level of gain that is applied to the echo. When operating in AutoSense, this parameter limits the gain that can be applied to the echo. If operating in manual, this parameter sets the receive gain. When in manual mode, set the sensitivity to the minimum value that will allow the target to be reliably tracked through the full range of environmental conditions.

## Utilities (Continued)

### MODE DESCRIPTION PARAMETERS

14	<i>Blanking</i>	Units = Determined by Mode 1 Range = 0.5 -16 ft. Default = 1.00 ft.
----	-----------------	---

Mode 14 sets the blanking distance. The *blanking* distance is the zone from the sensor to a point where the first echo will be accepted. Because of the physical properties of an ultrasonic sensor, objects cannot be detected closer than approximately 1 foot from the face of the transducer. This distance varies according to how much energy is being transmitted (Mode 5) and the installation. Low pulses and soft mounting may allow target detection as close as 6 inches. The blanking distance can also be used to ignore unwanted targets close to the sensor such as welds, seams, pipe fittings, or gaskets.

### MODE DESCRIPTION PARAMETERS

15	<i>Pulses</i>	Range = 1-20 Default = 16
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Mode 15 sets the maximum number of pulses the sensor can transmit when operating in AutoSense or simply the number of pulses when operating in manual (Mode 12). The LPU emits a burst of pulses and measures the time it takes for the burst to travel to and from the target. The more pulses that are sent in a burst, the stronger the returning echo. When operating in manual mode, increase the strength of the transmission by increasing the number of pulses for detecting soft targets in damping environments. In acoustically active environments or small enclosed areas, decrease the number of pulses to decrease the energy transmitted and reduce multiple echoes.

### MODE DESCRIPTION

16	<i>Software Version</i>	Mode 16 displays the software version of the LPU.
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### MODE DESCRIPTION

17	<i>Reset</i>	Mode 17 resets the LPU to factory default settings
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## Mode Sheet

<b>MODE</b>	<b>DESCRIPTION</b>	<b>PARAMETERS</b>	<b>EXPLANATION</b>
1	Units	Range = 0 - 2 0 - feet 1 - inches 2 - mm Default = 0	Sets the units to be displayed and used in setup. NOTE: Set Mode 1 before any other modes.
2	4mA Set Point	Units = Mode 1 Range = 0 - 9999 Default = 1.00	Sets the end point for the 4 mA analog limit.
3	20mA Set Point	Units = Mode 1 Range = 0 - 9999 Default = 25.00	Sets the end point for the 20 mA analog limit.
4	Response Time	Range = 1-3 Default = 1 1 = 3.3 ft/min (1m/min) 2 = 15ft/min (4.5m/min) 3 = >15 ft/min (4.5/min)	Sets the reaction rate of the sensor.
5	Fail-Safe	Range = 0 - 2 Default = 0 0 = Hold last reading 1 = 22ma 2 = 3.75ma	Sets the output status in the event of a loss of echo condition.
6	Fail-Safe Delay	Units = seconds Range=5-9999 Default = 15	Sets the delay in seconds before the output will show a loss of echo condition.
7	4mA Trim	Range = 0 - 9999 Default = 5000	Fine tunes the 4 mA analog output.
8	20mA Trim	Range = 0 - 9999 Default = 5000	Fine tunes the 20 mA analog output.
9	Calibration	Range = 0000 - 1999 Default = 1000	Sets the calibration factor. Assume a decimal after first digit.

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## Mode Sheet (continued)

<b>MODE</b>	<b>DESCRIPTION</b>	<b>PARAMETERS</b>	<b>EXPLANATION</b>
10	Offset Distance	Range = -999 - +999 Default = 0	Sets an offset for the display.
11	Temperature Compensation	Range = 0 - 2 Default = 1 0 = OFF 1 = ON 2 = View/ON	Activates or deactivates internal Temperature Compensation.
12	Autosense	Range = 0 - 1 Default = 1 0 = OFF 1 = ON	Activates or deactivates AutoSense.
13	Sensitivity	Range = 0 - 100% Default = 100	Sets to top sensitivity level. Zero is the lowest sensitivity settomg and 100 is the highest.
14	Blanking	Units = Mode 1 Range = 0.5 to 16 ft. Default = 1.00	Sets a dead zone in front of the transducer where echoes are ignored.
15	Pulses	Units = Pulses Range = 1 - 20 Default = 16	Sets the number of ultrasonic pulses transmitted in each burst. 20 being the strongest transmit setting.
16	Software Version		Displays the Software Version
17	Reset	Range = 0 - 1 Default = 0	Resets the mode parameters to their default values. Entering a 1 will reset the parameters.



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### Signal Strength Indicator

Bars located on the left side of the LCD display indicate the strength of the return signal from the sensor.

Excellent



Good



Fair



Loss of Echo



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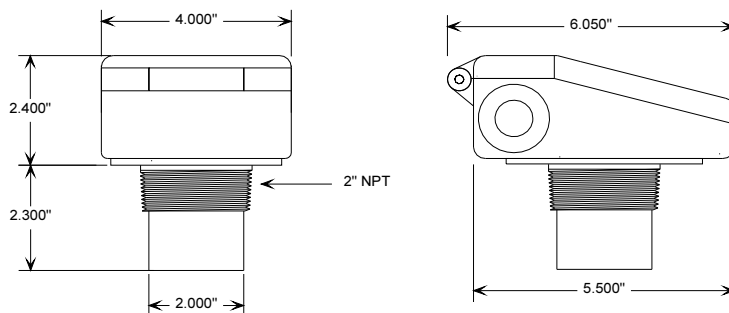
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## Specifications — LPU-2127

Operating Range .....	1 ft. to 25 ft. (0.3 m - 7.62 m)
Supply Voltage .....	12 to 28 VDC
Output .....	4-20 mA (Max 600 ohms @ 24 VDC) 4-20 mA (Max 150 ohms @ 12 VDC) (Includes barrier resistance)
Resolution .....	0.1 in. (2.54 mm)
Accuracy .....	+/- 0.25% of range with no temp gradient
Sensor Adjustments .....	Programmable modes
Maximum Current Draw .....	22 mA max
Transducer Type .....	Flat ceramic sealed PVDF face
Operating Temperature .....	-40 to 60°C
Internal Temp. Compensation .....	Yes
Sample Rate .....	3 seconds at 4ma - 0.6seconds at 20 ma
Beam Pattern .....	9° off axis
Enclosure .....	NEMA 4X , IP65
Cable Connection .....	2 terminals

## Dimensions



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20

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## Certificate of Compliance

Certificate: 1911747 Master Contract: 237484  
Project: 2386064 Date Issued: April 29, 2011  
Issued to: Automation Products Group Inc  
1025 West 1700 North  
Logan, UT 84321  
USA  
Attention: Karl Reid

*The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US or with adjacent indicator 'US' for US only or without either indicator for Canada only.*



*Rawn Murphy*  
Issued by: Rawn Murphy

### PRODUCTS

CLASS 2258 82 - PROCESS CONTROL EQUIPMENT - For Hazardous Locations -  
Certified to US Standards  
CLASS 2258 02 - PROCESS CONTROL EQUIPMENT - For Hazardous Locations

Class I, Division 2, Groups C and D, T6

Ex nA IIB T6; IP65

Class I, Zone 2; AEx nA IIB T6; IP65

LPU Series Ultrasonic Sensors, Models LPU-2127, LPU-4127, LPU-2428 and LPU 4428; Rated input 12 to 28Vdc, Outputs 4-20mA; Ambient temperature range -40°C to +60°C.

LOE Series Ultrasonic Sensors, Models LOE-2126, LOE-6126, and LOE-3136; Rated input 48VDC or 12 to 28Vdc, 200 mA containing two optically-coupled MOSFET solid-state relay outputs rated 1500 Vrms isolation voltage; Ambient temperature range -40°C to +60°C.

Note:

1) The LOE Series shall be powered by a suitable certified Class 2 power supply.



Certificate: 1911747

Master Contract: 237484

Project: 2386064

Date Issued: April 29, 2011

**CLASS 2258 04 - PROCESS CONTROL EQUIPMENT - Intrinsically Safe, Entity - For Hazardous Locations**

**CLASS 2258 84 - PROCESS CONTROL EQUIPMENT - Intrinsically Safe, Entity - For Hazardous Locations - Certified to US Standards**

**Class I, Division 1, Groups C and D, T3**

**Ex ia IIB, T3 (Canada); IP65**

**Class I, Zone 0; AEx ia IIB, T3 (USA); IP65**

LPU-2428 and LPU-4428 ultrasonic sensors; Rated input 12 to 28VDC, Outputs 4-20mA, Ambient temperature range -40°C to +60°C. Entity Parameters Vmax = 28VDC, Imax = 130mA, Pi = 0.91W, Ci = 0nF, Li = 110µH, intrinsically safe when connected in accordance with Installation drawing 9002747.

#### APPLICABLE REQUIREMENTS

CAN/CSA Standard C22.2 No. 0-M91	General Requirements - Canadian Electrical Code, Part II
CSA Standard C22.2 No.142-M1987	Process Control Equipment Industrial Products
CAN/CSA Standard C22.2 No.157-92	Intrinsically Safe and Non-Incendive Equipment for Use in Hazardous Locations
CAN/CSA Standard C22.2 No.213-M1987	Non-incendive Electrical Equipment for Use in Class I, Division 2 Hazardous Locations Industrial Products
CAN/CSA Standard E60079-0-02	Electrical Apparatus for Explosive Gas Atmospheres - Part 0; General Requirements
CAN/CSA Standard E60079-11-02	Electrical Apparatus for Explosive Gas Atmospheres - Part 11: Intrinsic Safety "I"
CAN/CSA Standard E60079-15-02	Electrical Apparatus for Explosive Gas Atmospheres - Part 15: Type of Protection "n"
CAN/CSA Standard C22.2 No. 60529-05	Degrees of Protection Provided by Enclosures (IP Code)
UL Standard 508	Industrial Control Equipment
UL Standard 913	Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations

DQD 507 Rev. 2009-09-01

Page: 2



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22

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Project: 2386064

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ANSI/ISA Standard 12.12.01-2007	Nonincendive Electrical Equipment for Use in Class I and II, Division 2, and Class III Divisions 1 and 2 Hazardous (Classified) Locations
UL Standard 60079-0	Electrical Apparatus for Explosive Gas Atmospheres – Part 0: General Requirements
UL Standard 60079-11	Electrical Apparatus for Explosive Gas Atmospheres Part 11: Intrinsic Safety "I"
UL Standard 60079-15	Electrical Apparatus for Explosive Gas Atmospheres Part 15: Electrical Apparatus with Type of Protection "n"
IEC 60529	Degrees of Protection Provided by Enclosures (IP Code)

#### MARKINGS

The following markings are provided on CSA-Accepted (Class 7922-01, File number 99316) adhesive label stock Product Number 7871 manufactured by 3M Company, which is suitable for indoor or outdoor use on Plastic Group VII, at a maximum service temperature of 80°C or higher. The label stock shall be printed with one of the approved printer and ink combinations as specified in the manufacturers listing and the finished label is affixed to the housing.

- Manufacturer's name, "Automation Products Group", or CSA Master Contract Number "237484", adjacent to the CSA Mark in lieu of Manufacturer's name.
- Model number: as specified in the PRODUCTS section, above.
- Electrical ratings: as specified in the PRODUCTS section, above.
- Ambient temperature rating: as specified in the PRODUCTS section, above (may be abbreviated).
- Manufacturing date in MMY format, or serial number, traceable to month of manufacture.
- The CSA Mark with "C" and "US" indicators, as shown on the Certificate of Conformity.
- Hazardous Location designation: as specified in the PRODUCTS section, above.
- Temperature Code: as specified in the PRODUCTS section, above (May appear on control drawing).
- Class I Division 1 additional Markings -
  - "Exia" followed by "IIB"
  - "INTRINSICALLY SAFE"
  - "WARNING- EXPLOSION HAZARD – SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY" (Equivalent wording is acceptable).
  - "WARNING- TO PREVENT IGNITION OF FLAMMABLE OR COMBUSTIBLE ATMOSPHERES, DISCONNECT POWER BEFORE SERVICING".
  - "Install per Drawing 9002748" (or equivalent): as specified in the PRODUCTS section, above
- Class I Division 2 additional Markings -
  - "Ex nA" followed by "IIB"
  - "WARNING- DO NOT DISCONNECT EQUIPMENT UNLESS AREA IS KNOWN TO BE NON-HAZARDOUS".
  - "WARNING – POTENTIAL ELECTROSTATIC CHARGING HAZARD – SEE INSTRUCTIONS" (or equivalent).

DQD 507 Rev. 2009-09-01

Page: 3

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23

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Project: 2386064

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- For the LPU Series Ultrasonic Sensors, the words "Reference installation drawing number 9002745" (or equivalent): as specified in the PRODUCTS section, above
- For the LOE Series Ultrasonic Sensors, the words "Reference installation drawing number 9003469" (or equivalent): as specified in the PRODUCTS section, above
- For the LOE Series Ultrasonic Sensors, the manual shall contain the following words: "WARNING – NONCONDUCTIVE SURFACE OF THE HOUSING MAY BE CHARGED BY NONCONDUCTIVE MEDIA, CLEAN WITH A DAMP CLOTH"

*Note - Jurisdictions in Canada may require these markings to also be provided in French language. It is the responsibility of the manufacturer to provide bilingual marking, where applicable, in accordance with the requirements of the Provincial Regulatory Authorities. It is the responsibility of the manufacturer to determine this requirement and have bilingual wording added to the 'Markings'.*



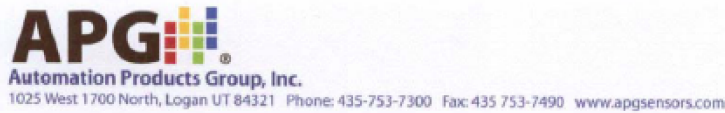
24

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**CE DECLARATION OF CONFORMANCE  
LPU SERIES ULTRASONIC SENSOR**

**November 11, 2009**

<b>Prepared By:</b>	Elden Tolman Product Development Engineer Automation Product Group, Inc. 1025 West 1700 North Logan, UT 84321
<b>Test Specification:</b>	EN 61326:2002
<b>Test Method:</b>	ICE 61000
<b>Manufacturer:</b>	Automation Products Group, Inc. 1025 West 1700 North Logan, UT 84321
<b>Test Location:</b>	815 West 1800 North Logan, UT 84321

**1. CERTIFICATION**

**I HEREBY CERTIFY THAT:**

The measurements shown in this test report were made in accordance with the procedures given in European Council Directive 89/336/EEC. The equipment was passed and the test performed according to European Standard EN 61326:2002 using method ICE 61000.

	11/11/2009
Product Line Manager	Date

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## 2. SUMMARY OF RESULTS

The LPU Series Ultrasonic sensor has been found to be fully compliant with the following standards and specifications:

Test	Specification	Method	Resulting Performance Criterion
Radiated Emissions	EN 61326 Class A:2002	EN 61326:2002	Pass
ESD Immunity	EN 61326 Annex A	ICE 61000-6-2	Performance Criteria B
Radiated Immunity	EN 61326 Annex A	ICE 61000-4-3	Performance Criteria B
EFT Burst	EN 61326	ICE 61000-4-4	Performance Criteria B
Surge	EN 61326	ICE 61000-4-5	Pass
Conducted Immunity	EN 61326 Annex A	ICE 61000-4-6	Performance Criteria B

## 3. PERFORMANCE CRITERIA

### 3.1 Pass:

In the case of Radiated Emissions, no significant readings were observed.

### 3.2 Performance Criteria A:

The device will continue to operate as intended. No degradation of performance or loss of function is allowed below the performance level specified by the manufacturer, when the device is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation and what the user may reasonably expect from the device if used as intended.

### 3.3 Performance Criteria B:

The device will continue to operate as intended after the test. No degradation of performance or loss of function is allowed below the performance level specified by the manufacturer, when the device is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation and what the user may reasonably expect from the device if used as intended.

### 3.4 Performance Criteria C:

Temporary loss of function is allowed, provided the function is self recoverable or can be restored by the operation of controls.



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# AUTOMATION

PRODUCTS  
GROUP, INC.

## Operator's Manual



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