Tel +1 (717) 767-6511
Fax +1 (717) 764-0839
www.redlion.net

Bulletin No. APLLP-F
Drawing No. LP0226
Released 1/06

MODEL APLLP - APOLLO LOOP POWERED PROCESS INDICATOR

- *DUAL RANGE, 4 to 20 mA or 10 to 50 mA*
- *3½-DIGIT, 0.47" (11.9 mm) LCD READOUT*
- *SELECTABLE RIGHT-HAND DUMMY ZERO*
- *SELECTABLE DECIMAL POINTS*
- *NEGATIVE & OVERRANGE INDICATION*
- *NEMA 4/IP65 SEALED METAL FRONT BEZEL*
- *PLUG-IN TERMINAL STRIP*

CE

DESCRIPTION

The Model APLLP, Apollo Loop Powered Process Indicator, utilizes the 4 to 20 or 10 to 50 mA process signal to derive its operating power.

The Model APLLP is designed to operate in 4 to 20 mA or 10 to 50 mA current loop signal circuits. When equipped with the proper transducer, the APLLP can be used to indicate temperature, pressure, humidity, flow, level and other process variables. The unit has a wide range of scaling and offsetting capabilities. The unit is calibrated at the factory for 4 to 20 mA operation, with 0.0 displayed when 4 mA is input and 100.0 displayed when 20 mA is input.

The die-cast front bezel meets NEMA 4/IP65 requirements for washdown applications. This allows the APLLP to be used in dirty, hostile environments and in wash-down areas.

SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in the literature or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

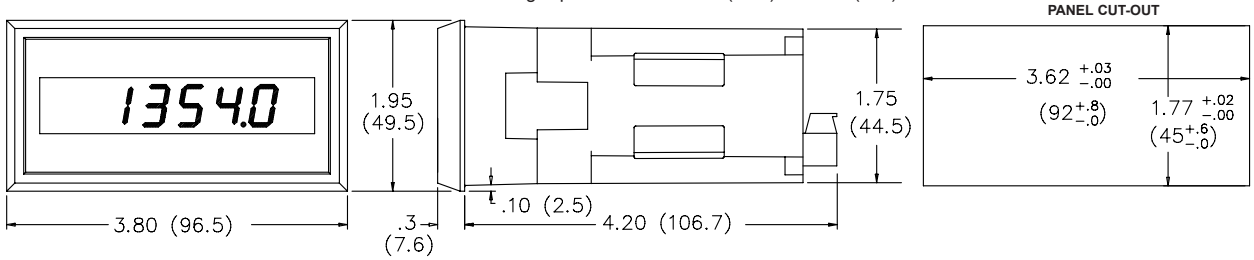
CAUTION: Risk of Danger.
Read complete instructions prior to installation and operation of the unit.

SPECIFICATIONS

1. **DISPLAY**: 3 1/2 active digits (-1999 to 1999), DIP switch selectable dummy right-hand zero (extends readout to -19990 to 19990), 0.47" (11.9 mm) high LCD display. Minus sign is displayed when indicator is adjusted for a negative offset.
   Overrange: Overrange is indicated by a 1 in the Most Significant Digit and the blanking of the three Least Significant Active Digits.
2. **DECIMAL POINTS**: Four, DIP switch selectable, decimal points allow the display to be read in tenths, hundredths, thousandths or ten-thousandths.
3. **VOLTAGE DROP**: 3 volts max.
4. **EQUIVALENT RESISTANCE**:
   At 20 mA (4 to 20 mA): 150 Ω max
   At 4 mA (4 to 20 mA): 750 Ω max
   EQUIVALENT RESISTANCE:
   At 50 mA (10 to 50 mA): 60 Ω max
   At 10 mA (10 to 50 mA): 300 Ω max
5. **MAXIMUM ALLOWABLE INPUT CURRENT**: 100 mA
6. **SCALING RANGE**:
   Span: Two potentiometers provide a coarse and fine span adjustment. Span range = 0 to 2000
   Offset: Two potentiometers provide a coarse and fine zero offset adjustment. Offset range = -1999 to 1999.
7. **LINEARITY**: ±(0.1% + 1 digit)
8. **READING RATE**: 2.5 per second, nominal
9. **RESPONSE TIME**: 1.5 seconds to settle for a step change
10. **NORMAL MODE REJECTION**: 60 dB 50/60 Hz
11. **ENVIRONMENTAL CONDITIONS**:
    Operating Temperature: 0 to 50°C
    Storage Temperature: -40 to 80°C
    Operating and Storage Humidity: 85% max. relative humidity (non-condensing) from 0°C to 50°C.
    Span Temperature Coefficient: 100 PPM/°C
    Offset Temperature Coefficient: 0.2 digits/°C
    Altitude: Up to 2000 meters

DIMENSIONS *In inches (mm)*

Note: Recommended minimum clearance (behind the panel) for mounting clip installation is 2.1" (53.4) H x 5.5" (140) W.



SPECIFICATIONS (Cont'd)

12. **CERTIFICATIONS AND COMPLIANCES**:

SAFETY

IEC 61010-1, EN 61010-1: Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 1.

IP65 Enclosure rating (Face only), IEC 529

Type 4 Enclosure rating (Face only), UL50

ELECTROMAGNETIC COMPATIBILITY:

Immunity to EN 50082-2		
Electrostatic discharge	EN 61000-4-2	Level 2; 4 Kv contact Level 3; 8 Kv air
Electromagnetic RF fields	EN 61000-4-3	Level 3; 10 V/m [1] 80 MHz - 1 GHz
Fast transients (burst)	EN 61000-4-4	Level 4; 2 Kv I/O Level 3; 2 Kv power
RF conducted interference	EN 61000-4-6	Level 3; 10 V/rms [2] 150 KHz - 80 MHz
Power frequency magnetic fields	EN 61000-4-8	Level 4; 30 A/m
Emissions to EN 50081-2		
RF interference	EN 55011	Enclosure class B Power mains class B

Notes:

1. Self-recoverable loss of performance during EMI disturbance at 10 V/m: Measurement error exceeds unit specifications.

For operation without loss of performance:

Unit is mounted in a grounded metal enclosure (Buckeye SM7013-0 or equivalent)

I/O cables are routed in metal conduit connected to earth ground.

2. Earth I/O cable shield at auxiliary equipment to comply.

Refer to the EMC Installation Guidelines section of this bulletin for additional information.

13. **CONSTRUCTION**: Die-cast metal front bezel with black, high impact plastic insert. Front panel meets NEMA 4/IP65 requirements for indoor use when properly installed. (Panel gasket and mounting clips included.) Installation Category I, Pollution Degree 2.

14. **WEIGHT**: 9 oz. (255 g)

SPAN (Adjustments)

Span is defined as the numerical range that the display traverses, disregarding decimal points and dummy zero, when the input signal is varied from minimum to maximum *(4 to 20 mA or 10 to 50 mA)*.

For example, if a unit is to display 25.0 @ 4 mA and 100.0 @ 20 mA, the span is 750 *(the difference between 250 and 1000)*. Had the minimum display been -25.0 the span would be 1250 [1000 -(-250) = 1250].

The APLLP can be set up to operate over a wide span range by adjusting the Coarse and Fine Span adjustment pots. The Coarse Span Pot is used to adjust the display to within a couple of counts of the desired reading. The Fine Span Pot is used to complete the adjustment for the desired reading.

OFFSET (Adjustments)

With 4 to 20 mA and 10 to 50 mA signals, the minimum currents are not zero based. In order to obtain a zero minimum display reading, the display must be offset. The display on the APLLP can be offset by adjusting the Coarse and Fine Offset pots.

EMC Installation Guidelines

Although this unit is designed with a high degree of immunity to ElectroMagnetic Interference (EMI), proper installation and wiring methods must be followed to ensure compatibility in each application. The type of the electrical noise, source or coupling method into the unit may be different for various installations. Cable length, routing and shield termination are very important and can mean the difference between a successful or a troublesome installation. Listed below are some EMC guidelines for successful installation in an industrial environment.

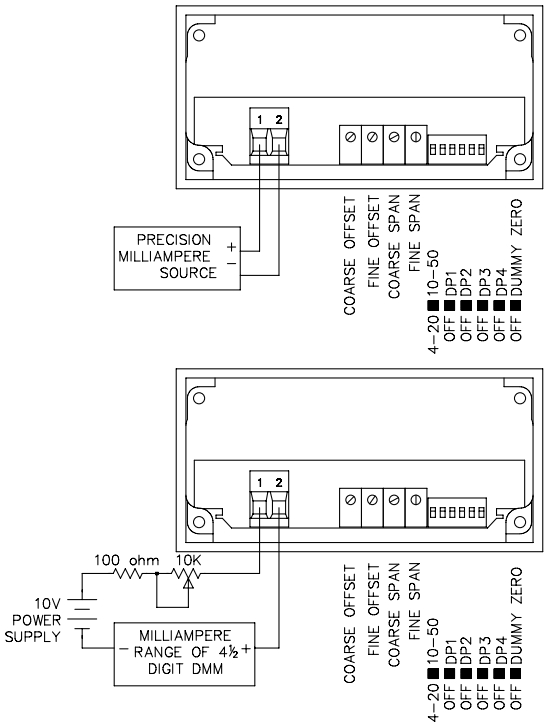
1. The unit should be mounted in a metal enclosure, that is properly connected to protective earth.
   a. If the bezel is exposed to high Electro-Static Discharge (ESD) levels, above 4 Kv, it should be connected to protective earth. This can be done by making sure the metal bezel makes proper contact to the panel cut-out or connecting the bezel screw with a spade terminal and wire to protective earth.
2. Use shielded (screened) cables for all Signal and Control inputs. The shield (screen) pigtail connection should be made as short as possible. The connection point for the shield depends somewhat upon the application. Listed below are the recommended methods of connecting the shield, in order of their effectiveness.
   a. Connect the shield only at the panel where the unit is mounted to earth ground (protective earth).
   b. Connect the shield to earth ground at both ends of the cable, usually when the noise source frequency is above 1 MHz.
   c. Connect the shield to common of the unit and leave the other end of the shield unconnected and insulated from earth ground.
3. Never run Signal or Control cables in the same conduit or raceway with AC power lines, conductors feeding motors, solenoids, SCR controls, and heaters, etc. The cables should be run in metal conduit that is properly grounded. This is especially useful in applications where cable runs are long and portable two-way radios are used in close proximity or if the installation is near a commercial radio transmitter.
4. Signal or Control cables within an enclosure should be routed as far away as possible from contactors, control relays, transformers, and other noisy components.
5. In extremely high EMI environments, the use of external EMI suppression devices, such as ferrite suppression cores, is effective. Install them on Signal and Control cables as close to the unit as possible. Loop the cable through the core several times or use multiple cores on each cable for additional protection. Install line filters on the power input cable to the unit to suppress power line interference. Install them near the power entry point of the enclosure. The following EMI suppression devices (or equivalent) are recommended:
   Ferrite Suppression Cores for signal and control cables:
   Fair-Rite # 0443167251 (RLC #FCOR0000)
   TDK # ZCAT3035-1330A
   Steward #28B2029-0A0
   Line Filters for input power cables:
   Schaffner # FN610-1/07 (RLC #LFIL0000)
   Schaffner # FN670-1.8/07
   Corcom #1VB3
   Corcom #1VR3

   Note: *Reference manufacturer's instructions when installing a line filter.*
6. Long cable runs are more susceptible to EMI pickup than short cable runs. Therefore, keep cable runs as short as possible.

CALIBRATION

To calibrate the APLLP, some additional equipment is required. Either a precision milliampere source or power supply, a 4½-digit DMM, a 10 KΩ pot and a 100 Ω resistor can be used. Refer to the figures below for set-up.

When calibrating the APLLP, there will be interaction between the Span and Offset pots. This interaction will require alternately checking the minimum and maximum readings while making the adjustments.



The following procedure should be followed.

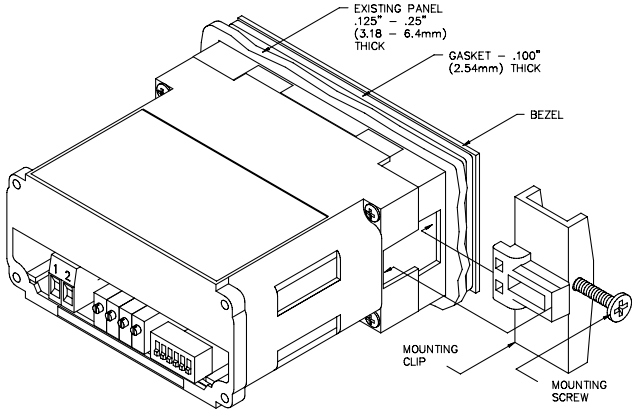
Set DIP switch position 1 for the desired current range 4 to 20 mA or 10 to 50 mA.

1. At the minimum input current *(4 or 10 mA)*, adjust the coarse offset pot so that the display is within a couple of counts of the desired minimum reading.
2. At the maximum input current *(20 or 50 mA)*, adjust the coarse span pot so that the display reading is within a couple of counts of the desired *"full scale"* reading.
3. Repeat steps 1 and 2 using the coarse adjustment pots until both the *"zero"* and *"full scale"* reading are within a couple of counts of the desired readings. Then repeat steps 1 and 2 using the fine span and offset adjustment pots to complete the adjustment for the correct display readings.

INSTALLATION ENVIRONMENT

The unit should be installed in a location that does not exceed the maximum operating temperature and provides good air circulation. Placing the unit near devices that generate excessive heat should be avoided.

The bezel should be cleaned only with a soft cloth and neutral soap product. Do NOT use solvents. Continuous exposure to direct sunlight may accelerate the aging process of the bezel.

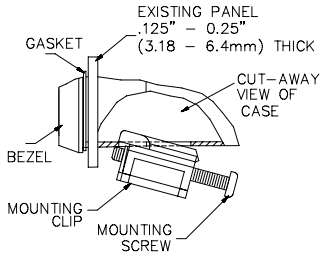


INSTALLATION

The unit meets NEMA 4/IP65 requirements for indoor use when properly installed. The units are intended to be mounted into an enclosed panel with a gasket to provide a water-tight seal. Two mounting clips and screws are provided for easy installation. Consideration should be given to the thickness of the panel. A panel which is too thin may distort and not provide a water-tight seal. (Recommended minimum panel thickness is 1/8".)

After the panel cut-out has been completed and deburred, carefully slide the panel gasket over the rear of the unit to the back of the bezel. Insert the unit into the panel. As depicted in the drawing, install the screws into the narrow end of the mounting clips. Thread the screws into the clips until the pointed end just protrudes through the other side.

Install each of the mounting clips by inserting the wide lip of the clips into the wide end of the hole, located on either side of the case. Then snap the clip onto the case. Tighten the screws evenly to apply uniform compression, thus providing a water-tight seal.



CAUTION: *Only minimum pressure is required to seal panel. Do* ***NOT*** *overtighten screws.*

DIP SWITCH SET-UP

Six DIP switches are located at the rear of the unit. These DIP switches are used to select the desired current range, decimal point position, and the dummy zero.

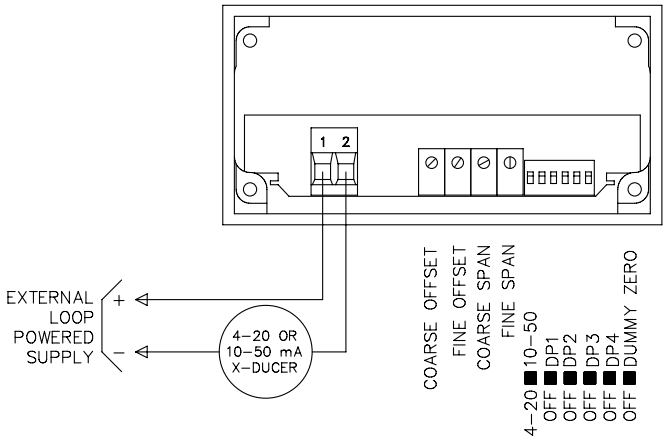
CONNECTIONS

All conductors should meet voltage and current ratings for each terminal. Also cabling should conform to appropriate standards of good installation, local codes and regulations. It is recommended that power supplied to the unit be protected by a fuse or circuit breaker.

The connections are made to a removable terminal block for ease of installation. To remove the block, pull from the back of the block until it slides clear of the terminal block shroud.

INPUT CONNECTIONS

The diagram below shows how the APLLP is connected in the current loop with a two wire transmitter and power supply.



TROUBLESHOOTING

For further technical assistance, contact technical support at the appropriate company numbers listed.

ORDERING INFORMATION

MODEL NO.	DESCRIPTION	PART NUMBER
*APLLP	Apollo Loop Powered Process Indicator	APLLP500
For more information on Pricing, Enclosures & Panel Mount Kits refer to the RLC Catalog or contact your local RLC distributor.		

** Units are shipped calibrated to read 00.0 @ 4 mA, and 100.0 @ 20 mA.*

Red Lion Controls
20 Willow Springs Circle
York PA 17402
Tel +1 (717) 767-6511
Fax +1 (717) 764-0839

Red Lion Controls BV
Basicweg 11b
NL - 3821 BR Amersfoort
Tel +31 (0) 334 723 225
Fax +31 (0) 334 893 793

Red Lion Controls AP
31, Kaki Bukit Road 3,
#06-04/05 TechLink
Singapore 417818
Tel +65 6744-6613
Fax +65 6743-3360