

MODEL APLHV - APOLLO AC POWER-LINE MONITOR



- 3-DIGIT, 0.56" (14.2 mm) HIGH LED DISPLAY
- AUTO ZEROING CIRCUIT
- FRONT PANEL CALIBRATION ADJUSTMENT
- NEMA 4/IP65 SEALED METAL FRONT BEZEL




DESCRIPTION

The Model APLHV is designed for AC power-line monitoring. The half-wave rectified input signal is calibrated to indicate the RMS value of a pure sinusoidal wave-form. The die-cast front metal bezel meets NEMA 4/IP65 requirements for indoor use, when properly installed.

SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in the manual 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.

 The protective conductor terminal is bonded to conductive parts of the equipment for safety purposes and must be connected to an external protective earthing system.

SPECIFICATIONS

- DISPLAY:** 3-digit, 0.56" (14.2 mm) high character, 7-segment Red LED.
- POWER:** Available in either 115 VAC or 230 VAC versions. Allowable power line variation; $\pm 10\%$, 50/60 Hz, 6 VA. Installation Category II, Pollution Degree 2.
- ACCURACY:** At 23°C, 85% R.H.; $\pm(0.1\%$ of reading + 2 digits).
- INPUT IMPEDANCE:** 1 M Ω
- INPUT RANGE:** 0 to 600 VAC max. @ 45 to 500 Hz.
Installation Category I, Pollution Degree 2.
- RESOLUTION:** 1 VAC
- ENVIRONMENTAL CONDITIONS:**
Operating Temperature Range: 0° to 60°C
Storage Temperature Range: -40° to 80°C
Operating and Storage Humidity: 85% max. relative humidity (non-condensing) from 0°C to 50°C.
Temperature Coefficient: ± 150 PPM/°C
Altitude: Up to 2000 meters
- READING RATE:** 400 msec., nominal.
- RESPONSE TIME:** 1 sec. nominal for a step change input.

10. 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 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 ¹ 150 KHz - 80 MHz
Simulation of cordless telephone	ENV 50204	Level 3; 10 V/m 900 MHz \pm 5 MHz 200 Hz, 50% duty cycle

Emissions to EN 50081-2

RF interference	EN 55011	Enclosure class B Power mains class B
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Notes:

- Self-recoverable loss of performance during EMI disturbance at 10 V/rms: Measurement error exceeds unit specifications
 For operation without loss of performance:
 Install power line filter to unit input power (Terminals 1 and 2), RLC#LFIL0000 or equivalent
 Refer to the EMC Installation Guidelines section of this bulletin for additional information.


11. **CONSTRUCTION:** Metal die-cast front bezel with black plastic case. Front panel meets NEMA 4/IP65 requirements when properly installed (panel gasket and mounting clips included).

12. **WEIGHT:** 1.2 lbs. (0.54 Kg)


ORDERING INFORMATION

MODEL NO.	DESCRIPTION	PART NUMBERS FOR AVAILABLE SUPPLY VOLTAGES	
		230 VAC	115 VAC
APLHV	Apollo AC Power Line Monitor	APLHV410	APLHV400

For more information on pricing, Enclosures, & Panel Mount Kits see the RLC Catalog or contact your local RLC distributor.



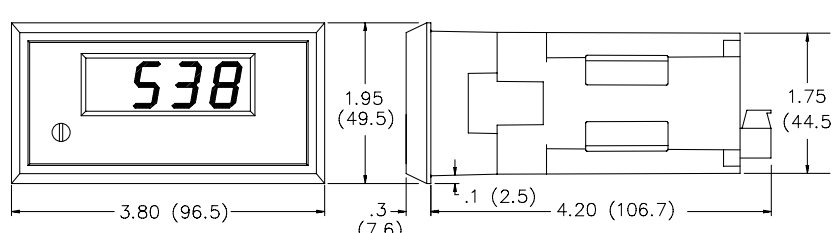
CAUTION: Risk of Danger.
Read complete instructions prior to installation and operation of the unit.



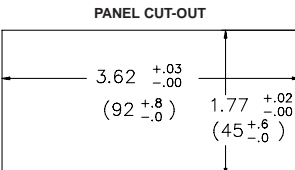
CAUTION: Risk of electric shock.

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.



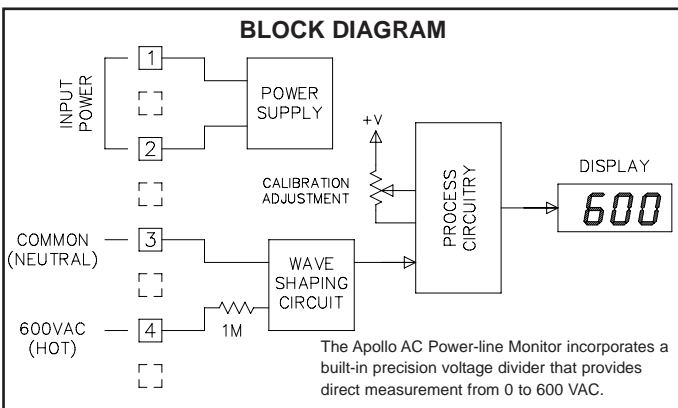
PANEL CUT-OUT



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.

- The unit should be mounted in a metal enclosure, that is properly connected to protective earth.
- 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.
 - Connect the shield only at the panel where the unit is mounted to earth ground (protective earth).
 - Connect the shield to earth ground at both ends of the cable, usually when the noise source frequency is above 1 MHz.
 - Connect the shield to common of the unit and leave the other end of the shield unconnected and insulated from earth ground.
- 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.
- Signal or Control cables within an enclosure should be routed as far away as possible from contactors, control relays, transformers, and other noisy components.
- 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.
- Long cable runs are more susceptible to EMI pickup than short cable runs. Therefore, keep cable runs as short as possible.



WIRING 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.

As depicted in the drawing of the Model APLHV, all connections are made on the double-spaced terminal block located at the rear of the unit.

POWER CONNECTIONS

Primary AC power is connected to terminal 1 and 2 (*Marked A.C. Power; located on the left-hand side of the terminal block*). For best results, the AC power should be relatively "Clean" and within the specified $\pm 10\%$ variation limit. Drawing power from heavily loaded circuits or from circuits that also power loads that cycle on and off, should be avoided.

INPUT CONNECTIONS

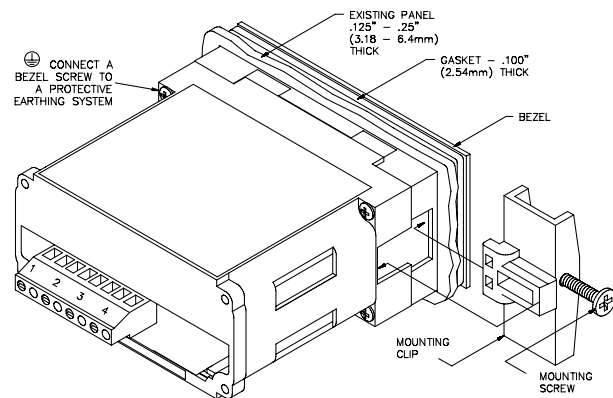
Input connections are made on terminal 3 and 4. When powering the APLHV with the same voltage that is being measured, terminal 3 (COMM.) should be connected to neutral for the most stable reading on the display.

If an unstable display results from measuring a voltage that is isolated from the supply voltage, reversing the supply voltage connections may correct this condition.

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.

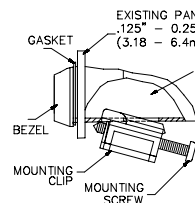


INSTALLATION

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" [3.2 mm]).

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. 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.**



TROUBLESHOOTING

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