

## MODEL APLIT - APOLLO 5 AMP AC CURRENT METER



- 3 1/2-DIGIT, 0.56" (14.2 mm) HIGH LED DISPLAY
- SELECTABLE DECIMAL POINT LOCATION
- BUILT-IN SCALING PROVISIONS
- AUTO ZEROING CIRCUITS
- OVER-RANGE INDICATION
- NEMA 4/IP65 SEALED FRONT METAL BEZEL



### DESCRIPTION

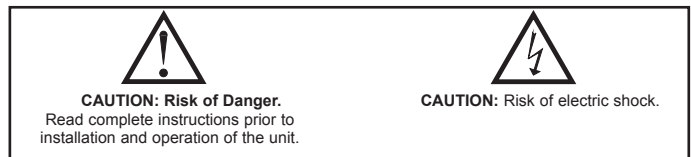
The Model APLIT Apollo 5 amp AC Current Meter provides the capability of measuring large AC currents. The internal current shunt in the APLIT can measure up to 5 amps AC current directly. Using an external current transformer, AC currents of up to 1,999 amps can be measured and displayed.

The APLIT can be scaled, using the coarse scaling potentiometer, to display between 200 and 1999 when measuring full scale current. Using the DIP switch selectable decimal points, the display can be customized for direct readout for practically any application.

The attractive die-cast metal bezel of the Apollo not only enhances the appearances of any panel, it can be sealed in the front panel for use in wash-down areas and tough, dirty industrial environments. The 3 1/2-digit display features 0.56" (14.2 mm) high, 7-segment LEDs for easy reading. Also featured is a removable terminal block on the rear that facilitates installation wiring and change-outs.

### 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.



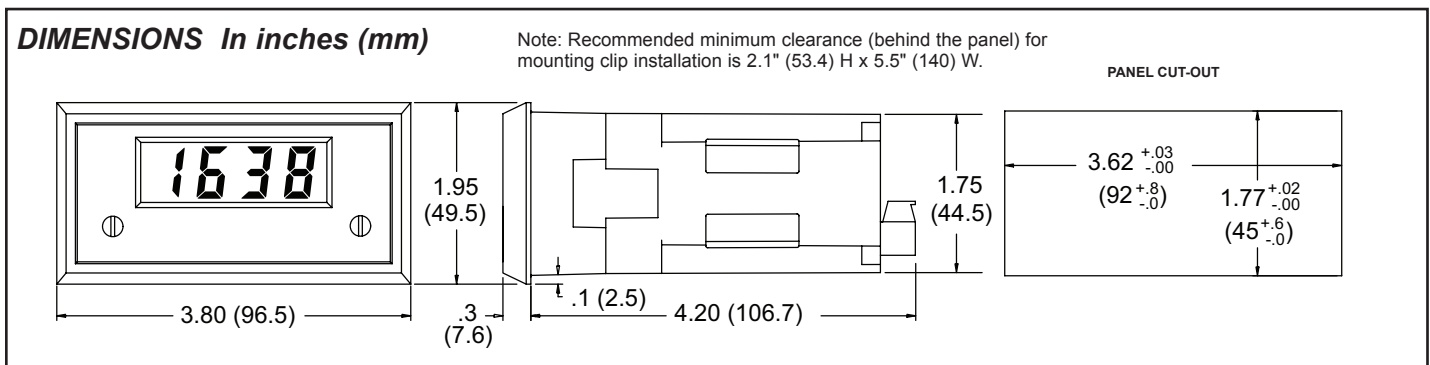
### ORDERING INFORMATION

MODEL NO.	DESCRIPTION	PART NUMBERS
APLIT	Apollo 5 amp AC Current Meter	APLIT405

### SPECIFICATIONS

- DISPLAY:** 3 1/2-digit, 0.56" (14.2 mm) high, 7-segment LED. Decimal points inserted before the 1st, 2nd, or 3rd least significant digits by DIP switch selection.
- POWER:** 115 VAC. Allowable power line variation  $\pm 10\%$ , 50/60 Hz, 6 VA.  
**Isolation:** 2300 Vrms for 1 min. between inputs and supply (300 V working voltage).
- ACCURACY:**  $\pm(0.5\%$  of reading + 5 digits).
- SIGNAL INPUT:**  
**Range:** 0 to 5 Amps AC @ 25 to 400 Hz  
**Resolution:** 2.5 mA
- OVER-RANGE INDICATION:** indicated by blanking 3 least significant digits.
- MAX SHUNT CURRENT:** 50 amps for 1 sec.; 8 amps continuous.

*Caution: In circuits where fault currents can exceed the maximum shunt current, a fast-blow fuse should be installed in series with the input signal. Otherwise, a slow blow 8 amp fuse is recommended that will allow for start-up over current situations, while still protecting the instrument.*



## SPECIFICATIONS (Cont'd)

### 7. ENVIRONMENTAL CONDITIONS:

**Operating Temperature** : 0° to 60°C

**Storage Temperature** : -40° to 80°C

**Temperature Coefficient**: ±200 PPM/°C

**Operating and Storage Humidity**: 85% max. relative humidity (non-condensing) from 0°C to 50°C.

**Altitude**: Up to 2000 meters

### 8. RESPONSE TIME TO STEP CHANGE INPUT: 1 sec. nominal

### 9. READING RATE: 2.5 readings/sec., nominal

### 10. CONSTRUCTION: Metal die-cast front bezel with black, high impact plastic insert case. This unit is rated for NEMA 4/IP65 indoor use when properly installed (panel gasket and mounting clips included). Installation Category II, Pollution Degree 2.

### 11. CERTIFICATIONS AND COMPLIANCES:

#### SAFETY

IEC 1010-1, 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 <sup>1</sup> 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 <sup>2</sup> 150 KHz - 80 MHz
Power frequency magnetic fields	EN 61000-4-8	Level 4; 30 A/m
Simulation of cordless telephone	ENV 50204	Level 3; 10 V/m 900 MHz ± 5 MHz 200 Hz, 50% duty cycle

##### Emissions to EN 50081-2

RF interference	EN 55011	Enclosure class A Power mains class A
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#### Notes:

1. *Self-recoverable loss of performance during EMI disturbance at 10 V/m:  
Process signal may deviate during EMI disturbances.*

*For operation without loss of performance:*

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

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

2. *Self-recoverable loss of performance during EMI disturbance at 10 V/rms:  
Process signal may deviate during EMI disturbances.*

*For operation without loss of performance:*

*Install power line filter, RLC#LFIL0000 or equivalent*

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

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

## FACTORY CALIBRATION

When the unit is shipped from the factory, it is calibrated to read 1,999 with 5 amps AC current input.

## SCALING

The numerical current value displayed by the Apollo can be scaled down to almost any numerical value. The rear panel coarse scale potentiometer can be adjusted to divide the numerical current reading by any division factor between ÷1 and ÷10. The front panel fine scale potentiometer can be adjusted for fine trim scaling.

## DECIMAL POINT SELECTION

The Apollo 5 amp Current Meter has 3 DIP switches located on the side of the unit for the selection of 1 of 3 decimal points for display.

## EMC INSTALLATION GUIDELINES

Although Red Lion Controls Products are 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 a 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 troublesome installation. Listed are some EMI guidelines for a successful installation in an industrial environment.

1. A unit should be mounted in a metal enclosure, which is properly connected to protective earth.
2. Use shielded cables for all Signal and Control inputs. The shield 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 to earth ground (protective earth) at one end where the unit is mounted.
  - b. Connect the shield to earth ground at both ends of the cable, usually when the noise source frequency is over 1 MHz.
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 through 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. Also, Signal or Control cables within an enclosure should be routed as far away as possible from contactors, control relays, transformers, and other noisy components.
4. Long cable runs are more susceptible to EMI pickup than short cable runs.
5. In extremely high EMI environments, the use of external EMI suppression devices such as Ferrite Suppression Cores for signal and control cables is effective. The following EMI suppression devices (or equivalent) are recommended:
  - Fair-Rite part number 0443167251 (RLC part number FCOR0000)
  - Line Filters for input power cables:
    - Schaffner # FN2010-1/07 (Red Lion Controls # LFIL0000)
6. To protect relay contacts that control inductive loads and to minimize radiated and conducted noise (EMI), some type of contact protection network is normally installed across the load, the contacts or both. The most effective location is across the load.
  - a. Using a snubber, which is a resistor-capacitor (RC) network or metal oxide varistor (MOV) across an AC inductive load is very effective at reducing EMI and increasing relay contact life.
  - b. If a DC inductive load (such as a DC relay coil) is controlled by a transistor switch, care must be taken not to exceed the breakdown voltage of the transistor when the load is switched. One of the most effective ways is to place a diode across the inductive load. Most RLC products with solid state outputs have internal zener diode protection. However external diode protection at the load is always a good design practice to limit EMI. Although the use of a snubber or varistor could be used.
    - RLC part numbers: Snubber: SNUB0000
    - Varistor: ILS11500 or ILS23000
7. Care should be taken when connecting input and output devices to the instrument. When a separate input and output common is provided, they should not be mixed. Therefore a sensor common should NOT be connected to an output common. This would cause EMI on the sensitive input common, which could affect the instrument's operation.

Visit RLC's web site at <http://www.redlion.net/Support/InstallationConsiderations.html> for more information on EMI guidelines, Safety and CE issues as they relate to Red Lion Controls products.

## WIRING CONNECTIONS

As depicted in the installation drawing showing the rear view of the Apollo 5 amp current meter, there is a terminal block where all wiring connections are made.

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.

Remove the block for easier access to the terminal screws. To remove the block, pull from the back of the block until it slides clear of the terminal block shroud.



**CAUTION:** Disconnect power to all unit terminals before removing terminal blocks. This includes deenergizing the current transformer primary circuit.

## POWER WIRING

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 that also power loads that cycle on and off, should be avoided.

## SIGNAL WIRING

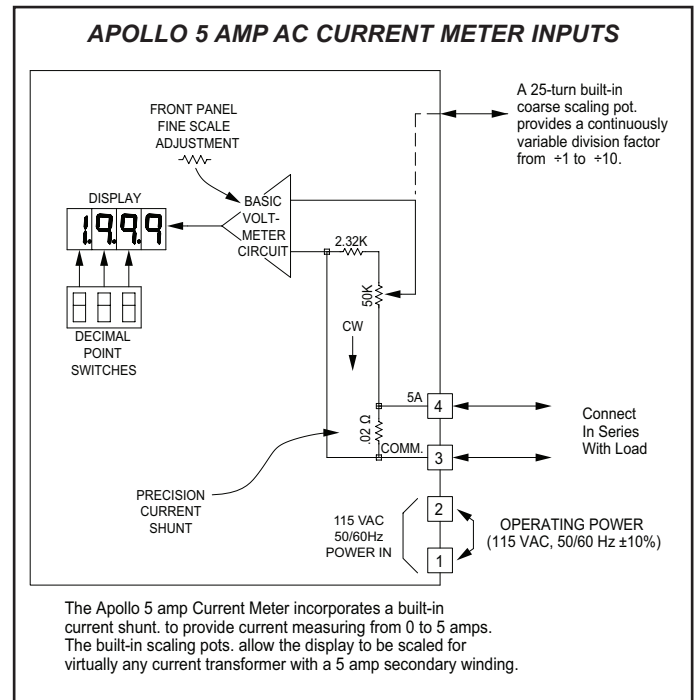
AC signal wires are connected to Terminals 3 and 4.



**CAUTION:** Use without a current transformer will place the meter at the measured circuit’s potential. Meter signal input is not isolated from the front panel fine scale adjustment, rear coarse scale adjustment or the selectable decimal point DIP switches. In order to preserve the safety of the meter application, the signal input must be limited to 30  $V_{RMS}$ , 42.4 V peak non-hazardous live voltages with respect to protective earth ground.



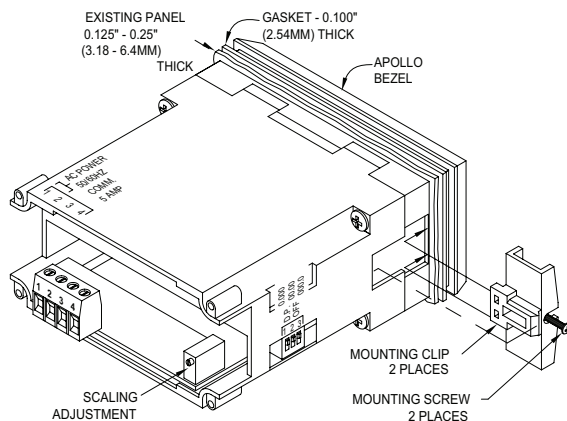
**CAUTION:** It is recommended that the current transformer be internally protected or to provide a voltage clamping circuit preventing dangerous high voltage across the CT secondary windings in case of accidental opening of the secondary output leads when the primary is energized. In order to prevent risk of electric shock ensure CT is installed according to local NEC regulations for installation of current instrument transformers.



## 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.

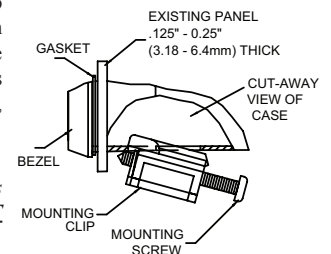


## Installation

The unit meets NEMA 4/IP65 requirements for indoor use when properly installed. The units are intended to be mounted into an enclosed panel

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 gasket over the rear of the unit to the panel. Insert the unit into the panel. As depicted in the drawing, install the screws into the clips until the pointed end just protrudes through the other side. Install each of the two 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** over tighten screws.

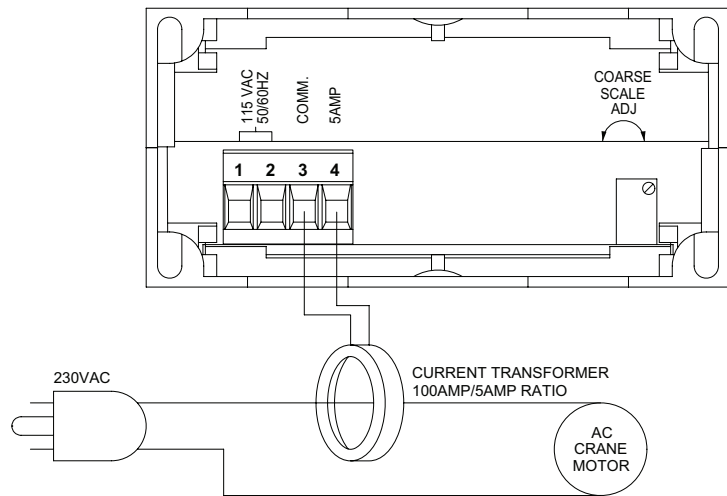
## TROUBLESHOOTING

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

## MOTOR CURRENT MEASUREMENT USING A CURRENT TRANSFORMER

The Apollo 5 amp AC Current Meter is configured by simply connecting the "COMM." (Terminal 3) and the "5AMP" (Terminal 4) to the external current transformer. The current carrying wire to be sensed is passed through the center of the current transformer. The resolution of the display, in this case, is 0.1 amp, therefore "D.P.1" is selected.

The Apollo meter is now ready to be calibrated. The installer has access to a calibrated portable digital current meter capable of measuring the motor current. Calibration will be accomplished by causing the Apollo indicator to agree with the portable digital current meter. The operator turns on the AC motor and lifts a large weight to load the motor. The installer then simply adjusts the "Coarse" scaling adjustment, located at the rear of the unit, until the display is close in value to that indicated on the portable current meter. He then removes the "fine" scaling access plug and adjusts the "fine" scaling adjustment until the display agrees with the portable current meter. He then replaces the access plug to keep dust out of the Apollo. The Apollo 5 amp Current Meter will now indicate the load current of the motor precisely.



## LIMITED WARRANTY

The Company warrants the products it manufactures against defects in materials and workmanship for a period limited to two years from the date of shipment, provided the products have been stored, handled, installed, and used under proper conditions. The Company's liability under this limited warranty shall extend only to the repair or replacement of a defective product, at The Company's option. The Company disclaims all liability for any affirmation, promise or representation with respect to the products.

The customer agrees to hold Red Lion Controls harmless from, defend, and indemnify RLC against damages, claims, and expenses arising out of subsequent sales of RLC products or products containing components manufactured by RLC and based upon personal injuries, deaths, property damage, lost profits, and other matters which Buyer, its employees, or sub-contractors are or may be to any extent liable, including without limitation penalties imposed by the Consumer Product Safety Act (P.L. 92-573) and liability imposed upon any person pursuant to the Magnuson-Moss Warranty Act (P.L. 93-637), as now in effect or as amended hereafter.

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