Apollo
Installation Manual

Apollo1	Apollo2
(Residential)	(Commercial)

INTRODUCTION

The SunReports Apollo energy monitoring system provides installers and users with real-time energy data from Solar PV (electric) and/or Solar Thermal (hot water) installations for residential (Apollo1) and commercial (Apollo2) applications. Some of the systems that the Apollo can monitor are:

- Solar PV (electric)
- Solar Hot Water
- Solar Pool Heating

Instructions for these system types are included with each Apollo unit and allow the for quick installation.

This document provides additional information that may be helpful to first-time installers.

UNIT VARIATIONS

As shown above, there are two types of Apollo units; the Apollo1 which is designed for residential applications, and the Apollo2 which is designed for commercial applications. The following chart illustrates the features of each:

Product Feature Comparison

Feature	Apollo1 (Residential)	Apollo2 (Commercial)
Modular Sensors	X	X
Thermal Monitoring	X	X
PV Monitoring	X	X
Internet Connectivity	X	X
Pump On/Off Detect (AC Detect)	X	X
DHCP Network Support	X	X
Pressure Switch Compatible	X	X
Local LED Indicators	X	X
Wall Mount	X	X
3-Loop Thermal Monitoring		X
Double Thermal Loop Monitoring		X
6 Temperature Sensors		X
Flow Meter Compatible		X
Static IP Network Support		X
On-Line Reporting		
Secure Login	X	X
Installer Portal	X	X
User Portal	X	X
Historical and Current Data	X	X
Configurable Alerts*	X	X
Interactive Google Maps*	X	X
Predicted vs. Actual Charts*	X	X
Energy Equivalence Display	X	X
Double BTU Calculation*		X
Contribution to Total Energy Chart*		X
Thermal Loop Comparison Chart*		X

* Installer Portal Only

SERIAL NUMBER

It is very important to accurately record the unit Serial Number:
- The serial number of the unit must be registered at www.sunreports. com to be able to view the data from the system.
- A 'Configuration Sheet' is included with the Apollo unit that can be used for recording the important information that will be used for registration.
- Two 'peel off' serial number stickers have been included for convenience. One sticker may be left with the end user for their records.

> **IMPORTANT**: The serial number entered into the on-line system MUST match the number on the unit. This is what allows for the mapping, identification and environmental information

TEMPERATURE CABLE

This is a custom built cable that provides multiple temperature sensors in a single harness. This cable may NOT be lengthened or modified in any way or unpredictable temperature readings may result.
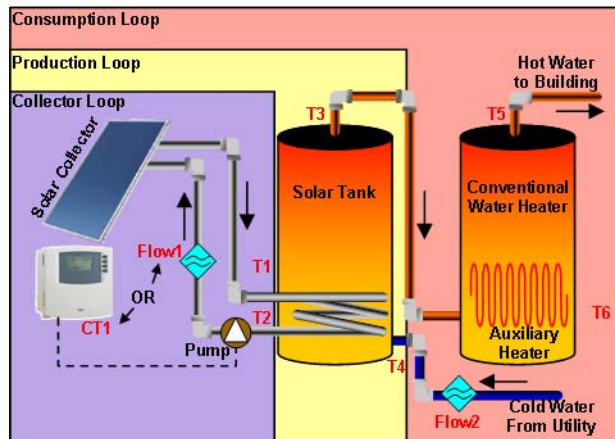
THERMAL LOOPS

In thermal systems BTUs are calculated for various thermal loops. For accurate measurements, it is required that the temperature sensors and the CTs (or Flow Sensors) be installed correctly.

Each loop requires 2 temperatures (a hot and a cold) and a flow. The flow can be measured by a CT or a Flow Sensor. Either of the flow sensors plug into the 'CT1' or 'CT2' ports on the Apollo

The Apollo1 can measure one loop (the collector loop) and the Apollo2 can measure up to 3 loops (Collector, Production, and Consumption Loops).

A typical system diagram with the various loops and sensor locations is shown below.

Typical Sensor Locations

Loop	Sensors Used
Collector	T1 - HOT side of glycol/water FROM solar panels T2 - COLD side of glycol/water TO solar panels CT1 - Connects to the system controller to detect when the pump turns on/off. Flow rate is entered as a static value in the Installer Portal OR Flow1 - Connects to a Grundfos VFS series flow sensor to measure actual flow
	T3 - Optional top of tank temperature CT2 - Optional Auxiliary Heater on/off detection (not available if measuring the Production or Consumption Loops)
Production (Apollo2 Only)	T3 - HOT water FROM solar tank T4 - COLD water TO tank Flow2 - Connects to a Grundfos VFS series flow sensor to measure actual flow and water usage
Consumption (Apollo2 Only)	T5 - HOT water FROM secondary tank T4 - COLD water TO tank Flow2 - Connects to a Grundfos VFS series flow sensor to measure actual flow and water usage
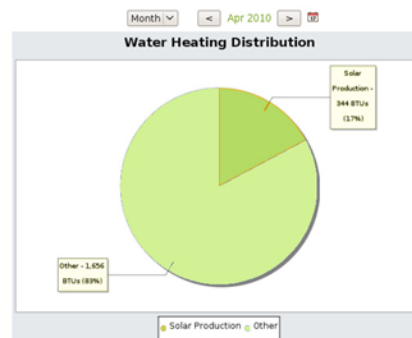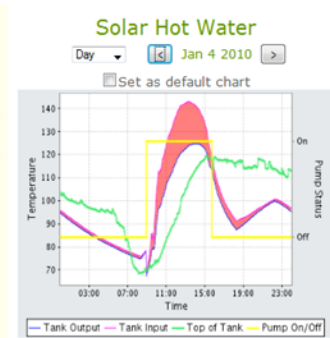
Typical Charts for Collector Loop

Typical Chart showing Production and Consumption Loops

CT1/CT2

The CT1 and CT2 ports on the Apollo are multi-purpose ports that can accommodate either a CT (Current Transformer) or a Flow Sensor. The selection of which is used is specified in the installer portal.

2 CTs are included with each Apollo unit. The flow sensors are sold separately.

The following outlines the options for the CT1 and CT2 ports:

Port	Apollo1 Options	Apollo2 Options
CT1	CT - Detects pump on/off. Static flow rate entered in the installer portal Flow1 - Connects to a flow sensor to measure actual flow	CT - Detects pump on/off. Static flow rate entered in the installer portal Flow1 - Connects to a flow sensor to measure actual flow
CT2	CT - Detects electric auxiliary heater on/off	CT - Detects electric auxiliary heater on/off[Note1] Flow1 - Connects to a flow sensor to measure actual flow of Production and/or Consumption Loops

Note1: This option not available when measuring the Production and/or Consumption Loop

FLOW SENSOR

The Apollo systems support the Grundfos VFS series flow sensors. To connect the flow sensor to the Apollo, the included adapter cable may be used or an adapter cable of custom length may be made by the installer using the following diagram.
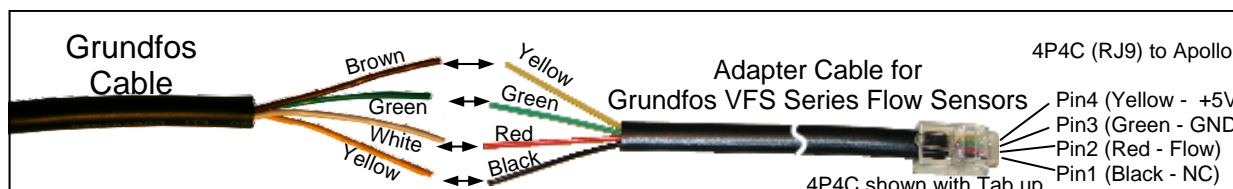
NETWORK

The Apollo systems have been engineered to minimize install time and complexity and use a wired connectivity scheme to the user's network and ultimately to the Internet. This eliminates the need for complicated wireless setup and configuration.

The following are requirements for the network:
- Always on Internet connection - Note: Dial Up is NOT always on
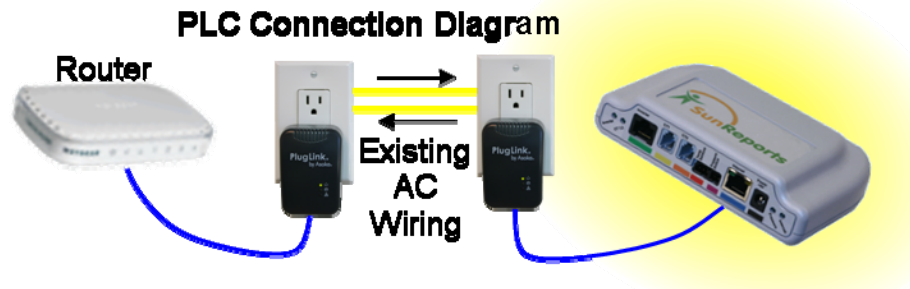- DHCP network configuration (for Apollo1)

The most common and simple network configuration is DHCP, which is how the Apollo is configured out of the box.

> Note: With DHCP, the Apollo device gets its IP Address from the router automatically
>   With Static IP, the Apollo is assigned an IP address from the network administrator

EXTENDING THE NETWORK

If the Apollo unit is not near the router and a long Ethernet cable is not available/desired, a very simple solution is using PLC bridges. The PLC (Power Line Carrier) bridges use the AC wiring that is already in the building to route the Ethernet signals to the router.

The PLC bridges are available at most electronic superstores and from SunReports. It is recommended to use either a Home Plug 1.0 or Home Plug AV compliant PLC bridge to ensure the best connectivity. The diagram below illustrates how the PLC bridges are used.


PLC Connection Diagram

STATIC IP

In the cases of advanced networks, a Static IP network configuration may be required. The Apollo2 accommodates this need by allowing a custom network configuration setup.

Since the Apollo2 is set for DHCP by factory default, the following sequence is required to configure for Static IP:

1. Connect the Apollo2 to a DHCP router
2. Power the Apollo2 on
3. From the router setup screen, determine the IP address given to the Apollo2 (e.g. 192.168.1.15)
4. Open a browser on a computer that is also connected to the DHCP router and enter the IP Address/setup.html in for the address
   (e.g. 192.168.1.15/setup.html)
5. The configuration page will be displayed in the browser (shown below)
6. Enter the Static IP address, Net Mask, Gateway and DNS Servers
7. Select the 'Submit' button
8. Verify the information on the confirmation page is correct (shown below)
9. Connect the Apollo2 to the Static IP network and power cycle it
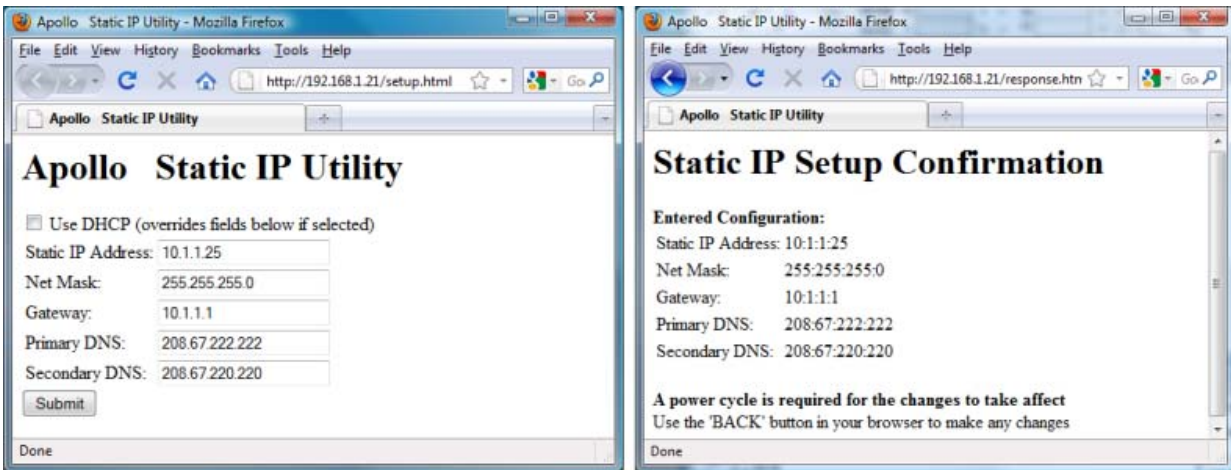
STARTUP ROUTINE

The Apollo units have LEDs on the front I/O panel to indicate status and aid in startup troubleshooting. The following describes how the LEDs can be used during installation.

Standard Startup
- All Lights come on for a moment
- The 'Internet' light flashes while authenticating
- The 'Internet' light turns solid on when authenticated
- The 'Inverter' light flashes while searching for inverters
  ◊ The 'Inverter light turns solid on when an inverter is detected
  ◊ The 'Inverter light turns off when no inverters are detected
- The 'Internet' light flashes while connecting to the SunReports server
- The 'Internet' light turns solid on when the connection is successful

When the Apollo2 is configured for Static IP, the following startup procedure occurs:
- All Lights come on for a moment
- The 2 LED pairs on each side of the Apollo2 alternate on/off for approximately 10 seconds
- The 'Internet' light flashes while authenticating
- The 'Internet' light turns solid on when authenticated
- The 'Inverter' light flashes while searching for inverters
  ◊ The 'Inverter light turns solid on when an inverter is detected
  ◊ The 'Inverter light turns off when no inverters are detected
- The 'Internet' light flashes while connecting to the SunReports server
- The 'Internet' light turns solid on when the connection is successful

Regulatory Information

The Apollo1 complies with the following regulatory standards:

FCC Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
This device may not cause harmful interference.
This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.
Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

EN 55 022 Declaration of Conformance

This is to certify that the Apollo1 is shielded against the generation of radio interference in accordance with the application of Council Directive 89/336/EEC, Article 4a. Conformity is declared by the application of EN 55 022 Class B (CISPR 22).

End User's License Agreement

Available from the 'Register' section of the SunReports website:
www.sunreports.com