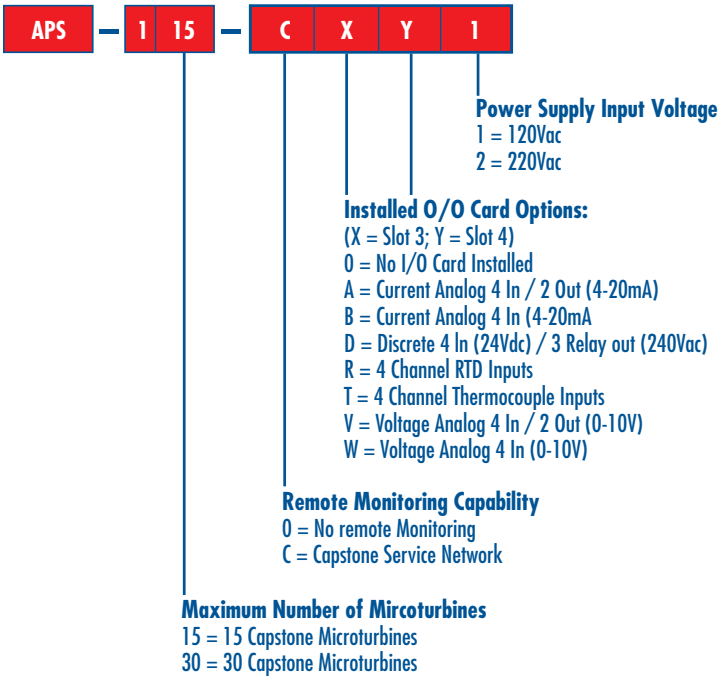
The APS Solution Catalog Structure

The catalog "decoder" below summarizes the options available.
Contact Capstone for detailed ordering instructions and availability.



Basic Installation Information

The table below summarizes the weights, dimensions, and key features of the APS:

	APS-130-000X	APS-115-C00X	APS-130-C00X
Number of Microturbines	1 to 30	1 to 15	1 to 30
Weight [lb]	110	112	*
W x H x Depth [in]	30 x 24 x 9	30 x 24 x 9	*
Discrete Inputs (std)	16	16	16
Discrete Outputs (std)	7	7	7
Slots for Additional I/O	2	2	2
Gateway to CSN System	No	Yes	Yes

*Note: * Contact Capstone for availability and construction details*

Capstone®
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Advanced Power Server

Main Features and Capabilities

The Capstone Advanced Power Server (APS) is an extremely flexible system, able to:

- Automatically control operation of up to 30 microturbines
- Read data from power meters and other third party equipment
- Monitor and control balance of plant equipment
- Provide an internet gateway to the Capstone Service Network
- Communicate with local building management systems
- Interface with the Capstone Dual Mode Controller for fast transfer functions
- Allow manual control of individual microturbines

Advanced Power Server *C65-ICHP*

Microturbine Control

The primary function of the APS is to act as a supervisory control point for Capstone microturbines. The software in the APS can be configured to accommodate a wide range of operating scenarios, letting you gain maximum value from your Capstone microturbine installation.

- **Grouping** – Microturbines can be set up in groups, each group having it's own control scheme for dispatching and operating. This allows complete flexibility to address the unique electrical and thermal load requirements at a given installation.
- **Dispatching** – Each group of microturbines can be set up to start and stop according to time of use schedules, automatic remote control inputs, or manual start/stop commands.

Microturbine Operating Modes	Grid Connect	Stand Alone
Electric Load Following	✔	✔
Thermal Load Following	✔	
Fixed Demand	✔	

This table shows the different operating modes available for each microturbine.

Group Operating Modes	Grid Connect	Stand Alone
Maximum Efficiency	✔	✔
Load Balancing	✔	✔
Power Setpoints	✔	

The power provided by each microturbine in a group can be automatically or manually adjusted, as summarized in this table.

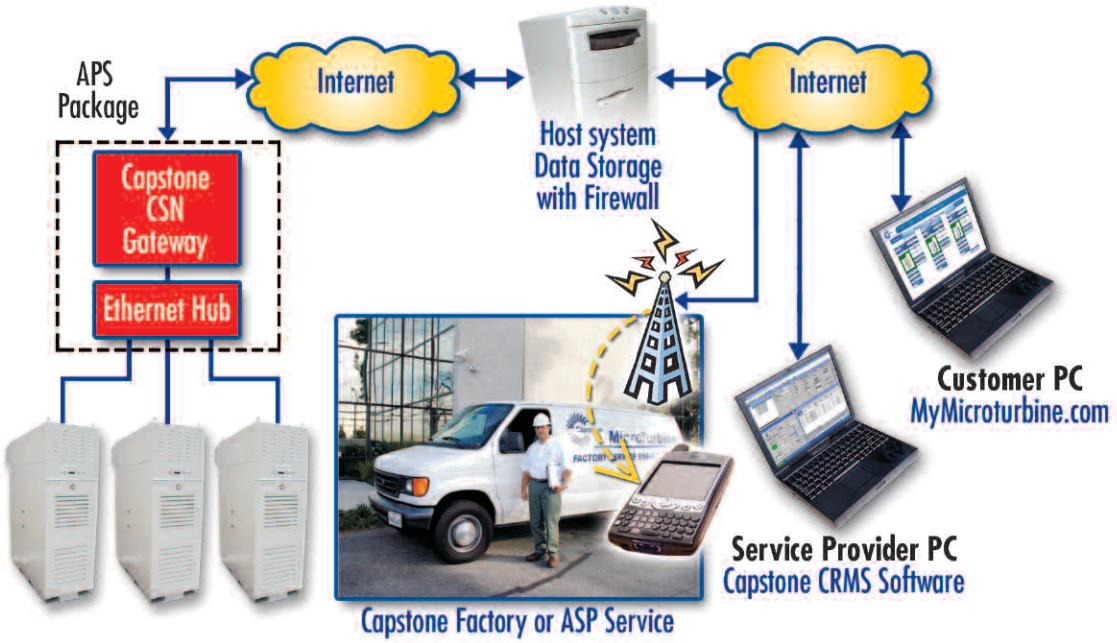
- **Run Time Balancing** – Each group can be set up to automatically turn microturbines on or off to equalize their total operating hours.
- **Dual Mode Control** – When the system is set up for dual mode operation, the APS provides an interface to the Capstone Dual Mode Controller for less than 10 second fast transfer to stand alone operation in case of a utility outage. A minimum power demand can be set so that there is always enough capacity to pick up the critical load.
- **Dynamic Data Register Control** – Because the APS is able to read data from external devices, such as a power meter or building management system, many of the control setpoints for the operating modes above can be dynamically changed based on current values that are written into the APS data registers. This brings remote control to a high level of system integration with flexibility to address changing system requirements.

Balance of Plant Control & Monitoring

The APS includes a built-in Programmable Logic Controller (PLC). The PLC provides a communications portal for the APS' main computer, as well as I/O capability. The base system includes 16 discrete inputs and 7 discrete outputs (24Vdc), with two card slots available to add optional analog current, voltage, thermocouple, RTD, or additional discrete I/O capability. Capstone can write custom PLC software to meet your specific site needs, either for simple monitoring or automatic balance of plant control. Now you have one integrated control and monitoring point for all the equipment associated with your on-site microturbine power solution.

Join the Capstone Service Network

The APS becomes an integral part of the Capstone Service Network when the optional CSN Gateway is included and connected to the internet. This allows the microturbine and balance of plant data to be remotely monitored, and alarms automatically sent in case of out-of-limit conditions or faults. A secure Virtual Private Network (VPN) connection is used to allow remote PC's to access individual microturbines using Capstone Remote Monitoring Software (CRMS). The Capstone Service Network adds the benefits of continuous secure remote monitoring to increase system uptime, better schedule service, automatically record selected performance data, and optimize system operation.

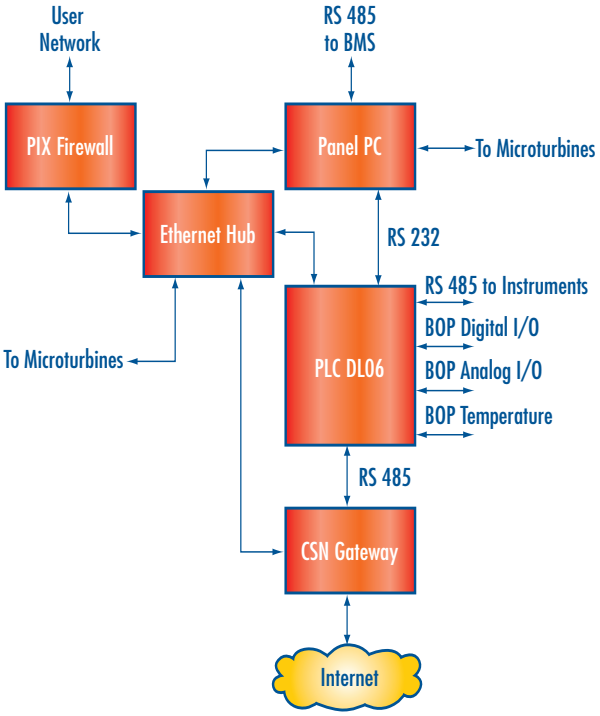


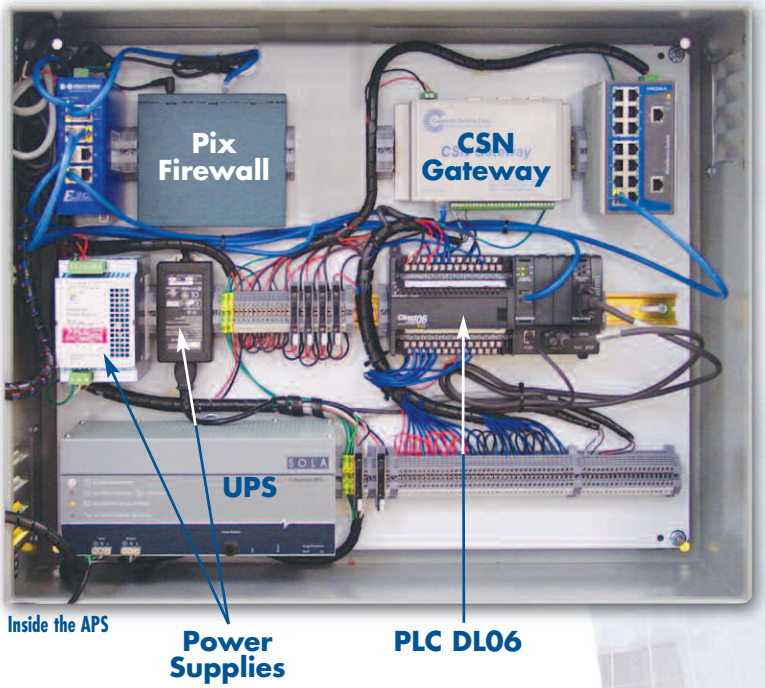
Local Communications – Modbus Master/Slave

The APS can be set up to act as a Modbus master to read information using RS485 serial communications from external devices such as a power meter or protective relay. The data it reads from any Modbus slave device can be communicated remotely through the Capstone Service Network, and/or used to control the microturbines or balance of plant equipment. The APS has a second RS485 port that can be set up as a Modbus slave, and communicate under the control of a building management system. The building management system can request data from the APS, and write values into the APS database to provide dynamic control of the microturbines or any balance of plant equipment. These communications features make it easy to integrate your Capstone microturbine solution with related equipment, and provide an industry-standard interface to existing building management systems.

Building Blocks of the APS Solution

Below is a simple schematic of the main elements in the APS solution. The hardware is industry standard, and meets UL and/or CE requirements. The software was developed by Capstone to provide seamless integration with our microturbines, and uses industry-standard serial communications to connect with other systems.





Configuring your APS Solution

The APS comes with a special version of the Capstone Remote Monitoring System software called APS-CRMS. Load this software onto your laptop, and connect to the user network Ethernet port in the APS. Then walk through the APS-CRMS configuration tool to set up groups, subgroups, operating and dispatch modes, and link the dynamic database to data values from external equipment. The configuration can then be uploaded to the APS, and stored on the PC's hard drive for backup. Disconnect the PC from the APS and you're ready to start operation. The local APS screen shows basic status, and prevents unauthorized personnel from changing configurations or issuing manual control commands. If custom programming is included for balance of plant monitoring and control, a separate disc will be provided for the PLC.