

## Control Panel Guide

AeroMate™ WSC



Non-Incendive, Intrinsically Safe for  
Class I, Group C & D Hazardous Locations

U.S. Patent Nos. 6,194,793 and 6,462,507  
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## Introduction

The Control panel module contains the user interface, general operating system (OpSys™), power module and communications interface for a number of different sensor and control modules. Operating system displays covered in this guide are common to all AeroMate units and may appear in a different display order depending upon the particular Application module attached to the Control panel.

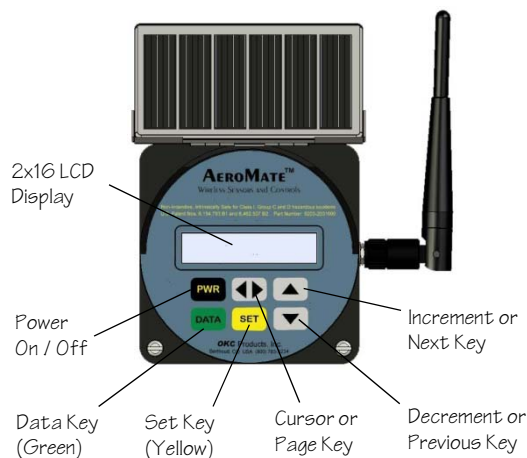
The Control panel is responsible for overall system operation and to load and run application programs stored in flash memory. A free Integrated Device Manager (IDM) PC application allows users to modify existing programs or make their own custom application programs.

Each AeroMate WSC unit has a unique digital Serial number as well as a user entered ModBus "Slave" unit number in the range of 0 to 255. The default ModBus Slave unit number is 100.

ModBus remote access protocol is used via an RS-232 or RS-484 serial port. The AeroMate interacts with ModBus as an RTU slave.

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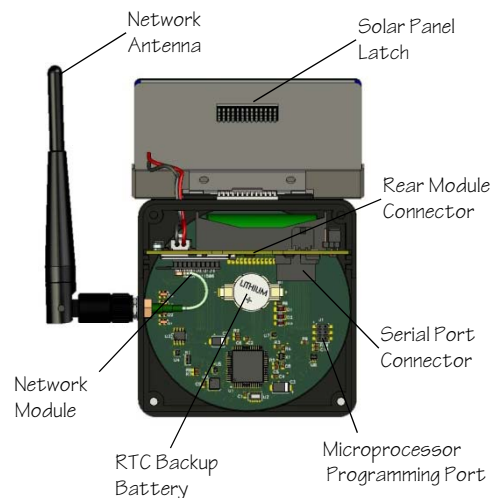
## Control Panel Items



The Control panel provides a user interface for viewing and changing operating parameters. DATA (Green) and SET (Yellow) keys are brightly colored for easy identification. Navigation and change keys are a light grey color similar to the prominent 32-character LCD display.

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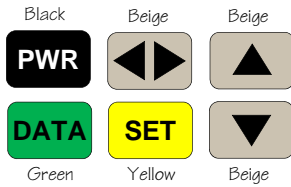
## Rear Panel Connections



Rear panel connections include a socketed "Plug and Go" networking module and RJ-45 serial port connector. All communication with the AeroMate is through the 8-Pin RJ-45 port, including application programming and ModBus communications.

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## Keypad Array



### PWR Key

**PWR**

PWR key toggles power On and Off.

Initial display allows entering BIOS menu.

```
PRESS SET KEY
TO CONFIGURE ...
```

**SET**

The initial power up display allows one second for a user to press the SET key and access a BIOS setup menu. See Advanced User's Guide for setup details.

Ready display shows contact information.

```
OKC Products
(970) 532-1773
```

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## DATA Key

**DATA**

The DATA key provides menus for viewing status and sensor data.

Current status and action indicators such as PGR (\*) and HP OVR, etc.

```
/ON      HP OVR
ToGo 000:47:18
```

Sensor displays can show English as well as Metric units.

```
CSG  TBG  DIFF
0687 0534 0153
```

Full floating point math allows complex gas flow calculations.

```
046.7 MCF/HR
035782.961 MCF
```

Digital switch input displays status of switch I/O's.

```
Switch PGR SLS
STATUS ON  OFF
```



Use the Cursor (<->) key to access the DATA sub-menus. Press the DATA key to sequence through sub-menus.

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## SET Key

**SET**

The SET key provides setup menus to set cycle times, set points and clear stored data..

Set five cycle times.

OFF time  
FALL time  
BakUp time  
ON time  
DELAY time

```
| OFF
  TIME 001:28:37
```

Or digital switch gage set points.

```
Gage1 Low High
SET  0125 500
```

Clear stored data TOTALS. Up or Down key toggles No/Yes.

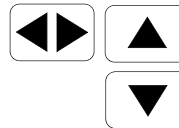
```
| CLEAR
  Stored Data No
```

Use Cursor, Up and Down keys to change set key entries.



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## Navigation Keys



The beige navigation keys are used to set cycle times, set points and toggle display selections. When an entry is selected, a position cursor will appear in the display to indicate the item or value that may be modified using the Up/Down arrow keys.

Entry Update

Entries or changes made to cycle times and other parameters with the SET keys are automatically updated and stored as changes are made.

Changes in any cycle time will not alter or change the current operating cycle time, but rather update to the new time on the next activation of the timing cycle.

Setting Zero Time

When setting times to zero, it is best to begin by setting the HRS to zero, then setting the MIN to zero, and lastly setting the SEC to zero.

Roll Up, Roll Down Feature

A "Roll Up / Roll Down" feature is used to automatically adjust hours, minutes and seconds time. For example, subtracting one minute from the time display 001:00:00 will Roll Down the display to show 000:59:00. A Roll Up works opposite of a Roll Down.

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## Application Module Installation

The Control panel connects to a number of different Application modules. Before attaching an Application module, make sure the Control panel power is OFF.



Once the rear Application module is mated with the Control panel, secure the two modules together with the four (4) panel screws provided. Panel screws need only be hand tight to maintain an effective water seal.

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## RS-232 Serial Port

The RS-232 serial port uses an 8-Pin RJ-45 female jack for connection. The default RS-232 port is a DTE (Data Terminal Equipment) configuration with the following serial port parameters:

Baud Rate 9.6k, 19.2k or 38.4k (default)  
 Parity None  
 Data Bits 8  
 Stop Bits 1  
 Flow Control None

RJ-45 Plug DTE Male	DB-9 Plug DCE Female	DB-9 Plug DTE Male
=====	=====	=====
1 – DSR	6 – DSR	6 – DSR
2 – ***	1 – DCD	1 – DCD
3 – DTR	4 – DTR	4 – DTR
4 – GND	5 – GND	5 – GND
5 – RXD	3 – TXD	2 – RXD
6 – TXD	2 – RXD	3 – TXD
7 – CTS	7 – RTS	8 – CTS
8 – RTS	8 – CTS	7 – RTS

The RJ-45 plug's DSR (1) and DTR (3) pins are tied together internally.

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## RS-485 Serial Port

The RS-485 serial port uses an 8-Pin RJ-45 female jack for connection.

Baud Rate 9.6k, 19.2k or 38.4k (default)  
 Parity None  
 Data Bits 8  
 Stop Bits 1  
 Flow Control None  
 Duplex Half

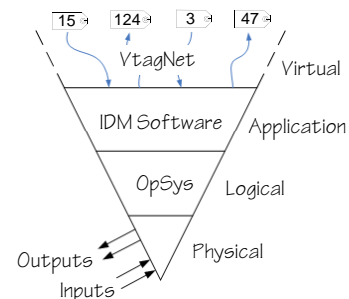
RJ-45 Plug DTE Male	DB-9 Plug 2 Watt
=====	=====
1 – DSR	1 – ***
2 – ***	2 – ***
3 – DTR	6 – ***
4 – GND	5 – GND
5 – RXD	7 – ***
6 – DATA –(B)	3 – DATA –(B)
7 – DTS	8 – ***
8 – DATA –(A)	4 – DATA –(A)

The RJ-45 plug's Pin-1 and Pin-3 are tied together internally.

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## Operating System

The AeroMate employs a proprietary operating system (OpSys™) that manages all the interaction between application programs and the physical hardware components in this new generation of wireless sensors and controls. The layered operating system allows more flexibility in meeting special or customized market requirements.



The virtual or vTagNet™ layer creates an open ended interface for unlimited interaction and collaboration between sensors and controls joined by a local network, a wide area network or the internet via the world wide web.

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## Network Module

The network module uses a Maxstream xBee RF modem for 300 ft. (100 m) short range networks coverage and a XBee-Pro RF modem for wider 3000 ft. (1 km) coverage. xBee network modules are configured by the manufacturer as either a Coordinator (CO) or End Device (ED).

The network Coordinator manages all network communication between individual sensors and controls associated with the network. End Device is a term used to refer to the sensor or control devices. Up to ten End Devices may be associated with a single network Coordinator,

Only one AeroMate unit within a network can be designated as the network Coordinator, whereas many different AeroMate units can be designated as End Devices. A specific AeroMate can be designated as a Coordinator by simply plugging in the correctly configured xBee module.

The network module is field installable and can be added to the Control panel or upgraded to meet longer range requirements as needed.

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## Network Terms

### Coordinator

A Point-to-Point network consists of one Coordinator, up to ten (10) End Devices and any number of "Listener Devices". A network Coordinator (Master) manages and coordinates all interaction between network End Devices (Slaves) and Listener Devices (Slaves).

### End Device

End Devices or "sleeping nodes" are used with discrete sensor and control units joined through the Point-to-Point network and managed by a single Coordinator. End Devices send data to and receive data from the network Coordinator.

### Listener Device

Listener Devices are also "sleeping nodes" that "listen only" to shared data passing through the Point-to-Point network and initiate actions based on the shared network data. Listener Devices are "Output Only" controls such as digital and analog routers or solenoid operated pneumatic valves. Up to 64 Listener Devices may be added to the wireless network.

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## Power Options

The AeroMate's charge voltage and current regulation system allow a wide variety of power options to be used. Solar charging (JP1:<6V) is active only when power is turned ON. External charging (JP1:>6V) is active in both ON and OFF power modes.

The AeroMate's internal 2x 4/3-AA battery pack has a nominal 2.4 Vdc voltage reading. During routine operation, battery voltages in the range of 3.2 Vdc to 2.4 Vdc are considered normal.

### Rechargeable Batteries Removed

With the charging mode jumper set to External charging (JP1:>6V), any 4.5 to 24 Vdc power source may be used. Battery charge voltage is limited to 2.85 Vdc when using the External charging mode.

#### CSA Approval

AeroMate units bearing the CSA Intrinsic Safety label must use only CSA approved external power sources or power jack accessories otherwise intrinsic safety status may be compromised.

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## Application Modules

The Control panel is hardware compatible with a number of sensor and control modules. The Control Panel must be programmed for each specific application. The list below shows available Application modules.

<u>Module Number</u>	<u>Description</u>	<u>GID.FID</u>
<i>Valves</i>		
9203-2035100	2x Solenoid Valve	018.066
9203-2035200	1x Solenoid Valve	018.067
<i>Sensors</i>		
9203-2036100	2x Transducer	018.055
9203-2036200	1x Transducer	018.082
9203-2036300	1x Flow	018.083
9203-2036400	2x Analog Input	018.084
<i>Router</i>		
9203-2037100	4x Analog Output	018.097
<i>Counter</i>		
9203-2038300	3x Digital Counter	034.099
<i>SCADA Uplink</i>		
9203-2039100	Uplink Manager	018.111

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