

Operator's Guide

AeroMate™ WSC – 3x Counter Module



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

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

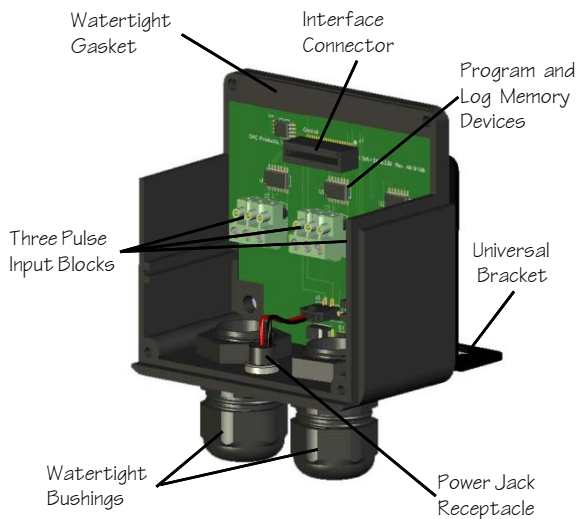
The 3x Counter Module provides three pulse sensing and counting inputs. The counter inputs are rated for 0-5 VDC input pulses. A logic controlled +12 Vdc power source is available at each input terminal block to power pulse output type sensors.

The 3x Counter Module may be used as a stand alone pulse counter or ratemeter, data logger or as a functional component in conjunction with other sensors and controls within a wireless, networked control system.

vTagNet™ technology provides a virtual wire tag system to send numeric count and rate data (nTag) to other analog or numeric devices with corresponding numeric tag assignments. Numeric or analog tag (nTag) numbers are assigned as negative numbers from -001 to -016.

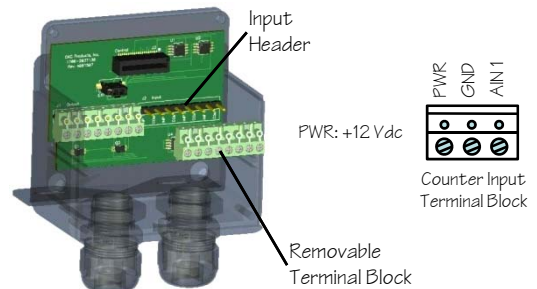
The 3x Counter Module's application program may be modified using the ChartWriter™ programming utility or completely re-programmed as required.

3x Counter Module

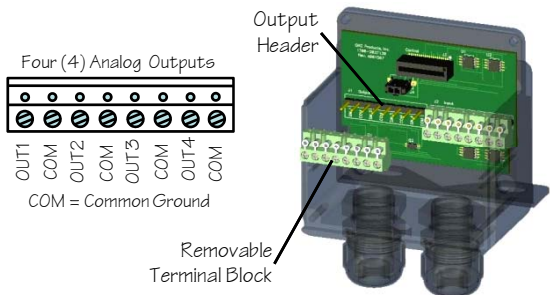


The 3x Counter Module includes three pulse counting inputs, an external power jack receptacle, two ½" watertight cable bushings, a universal 2" pipe or motor valve mount, and rear panel gasket.

Input Connections




Output Connections



Analog Input Setup

Switch inputs allow hookup to dry contact switches or logic inputs with voltages up to 30 Vdc. Each input is 15 kV static protected and de-bounced to minimize multiple triggering associated with noisy switches.

Each input has individual setup parameters for active state, input time constant, and event tag number. Input time constant represents the number of seconds the switch input has to remain active before an event tag is emitted.

Press SET for Input setup. 

In1	TCs	eTAG
LOW	00000	008

Use Cursor key to move between setup fields.   


Note: eTag range is 1 to 127. Use these keys to change selections.

When done with the input setup, press the SET key to move to the next input's setup display. A zero (0) value disables the Time Constant. A zero (0) eTag disables input sensing. The "eTag" label indicates the tag is an input "event" notification tag.

Switch Output Setup

Switch outputs are low-side (NPN) switches capable of switching loads up to 30 Vdc at 2 Amperes. All four outputs have a common ground and should be used to "ground" the load connected to any specific SW connection terminal.

Each output has individual setup parameters for active state, output pulse width, and action tag number. Output pulse width is the minimum time, in seconds, the switch will remain active before returning to the inactive state.

Press SET for Output setup. 

Sw1	PWs	aTAG
HI	00000	004

Use Cursor key to move between setup fields.   

Note: aTag range is 1 to 127. Use these keys to modify selections.

When done with the output setup, press the SET key to move to the next output's setup display. A zero (0) value disables the Pulse Width. A zero (0) aTag disables output control. The "aTag" label indicates the tag is an output "action" tag..

Switch Input Status

The 1st press of the DATA key shows the switch input status display for all four (4) switch inputs. A "ON" status indicates the switch input is active. A "OFF" status indicates the switch input is inactive. When an input switch is in its active state, it emits the event or eTag number.

Press DATA for switch input status. 

In1	In2	In3	In4
ON	OFF	OFF	OFF

Switch Output Status

The 2nd press of the DATA key shows the switch output status display for all four (4) switch outputs. A "ON" status indicates the output switch is active. A "OFF" status indicates the output switch is inactive. A output switch will only go to its active state when an eTag is emitted with the same number as the switch's action or aTag number.

Press DATA for switch output status. 

Sw1	Sw2	Sw3	Sw4
OFF	ON	OFF	ON

Input Switch Setup Options

Each of the four input switch sensors are configurable to meet a wide range of applications. Setup options for each input switch determines when and how long its event or "eTag" is emitted to generate a localized output switch action or to collaborate with other devices within a wireless network. The table below applies to all four switch inputs.

In1 - In4: Select the active input switch state for each switch input terminal INP1, INP2, INP3 and INP 4.

LOW – Input switch is normally open (NO), a logic low level, closed or shorted to COM.

HI – Input switch is normally closed (NC), a logic high level or an open circuit

TCs: Time constant. Number of seconds over which the input switch must maintain an active state before being accepted as a valid event.

00000 – Time constant can range from 00000 (no time constant) up to a maximum of 65535 seconds.

eTag: Event tag number that is emitted whenever its respective input switch is in its active state. The "eTag" number may range from 0 (disabled input) to 127.

Output Switch Setup Options

Each of the four output switches are configurable to meet a wide range of applications. Setup options for each output switch determines the type of output switch action and what tag source causes the output switch action to occur. The table below applies to all four output switches.

Sw1 - Sw4: Select the output switch's action for each output switch terminal SW1, SW2, SW3 and SW4.

LOW – Output switch is normally open (NO), a logic low level, closed or shorted to COM.

HI – Output switch is normally closed (NC), a logic high level or an open circuit

PWs: Pulse width. Minimum time in seconds that the output switch will remain active before being allowed to return to its inactive state.

00000 – Pulse width can range from 00000 (output follows tag status) up to a maximum of 65535 seconds.

aTag: Action tag number that determines when the respective output switch assumes its active state. The "aTag" number may range from 0 (disabled output) to 127.

Response Timing

Switch input sensing detects state changes associated with each individual switch input and generates or emits an event related eTag number to notify switch output hardware and other devices that the Switch Input event occurred. The response of an Output Switch aTag action to a corresponding eTag event is controlled by each unit's Network Update Interval or NUD setting.

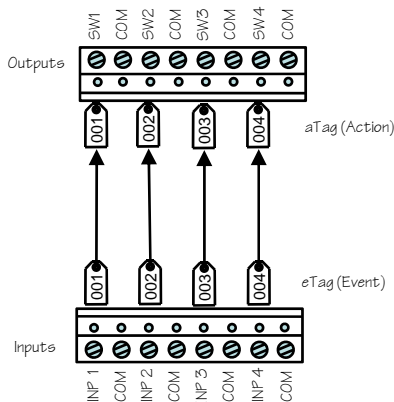
The default, minimum NUD is 3 seconds but this may be set to a longer interval if desired. Network communication consumes a lot of power and the minimum NUD setting is used to limit this form of power consumption. Operating devices on the network at the highest, practical NUD conserves battery power.

With a device's NUD set to the default 3 seconds, registration of eTag events is updated within the local hardware and to other network devices every 3 seconds. A network coordinator re-transmits the eTag event notifications as each network device reports in with their own eTag event updates. This process of updating and reporting may increase aTag action response times out to two times the NUD setting, or as in this example, 6 seconds.

vTagNet Connections

vTagNet technology allows connecting any input event (eTag) to any output action (aTag) simply by assigning tag numbers to the respective inputs and outputs. The following illustrations show only a few of the many input to output control configurations that are possible without special or custom programming required.

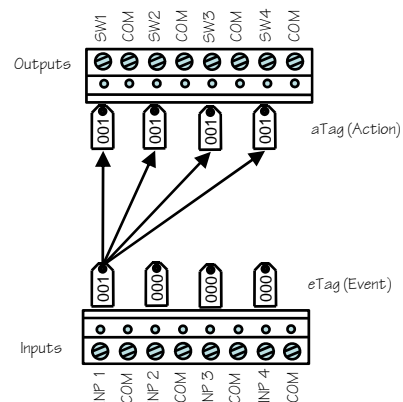
One-to-One connection scheme is illustrated below.



vTagNet Connections

Tags may be used to allow one input to control several outputs, even though each of the outputs are configured differently. Output SW1 may, for example, be configured as a Normally Closed (NC) switch whereas SW2 may be configured as a Normally Open (NO) switch. Whenever input switch INP1 changes from its inactive state to its active state, all tag related outputs will also assume their respective active state.

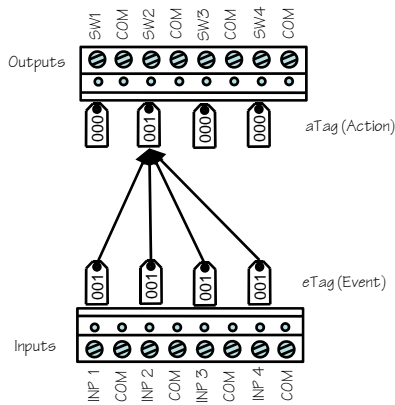
One-to-Many connection scheme is illustrated below.



vTagNet Connections

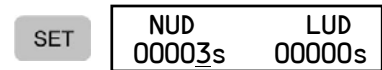
Tags may be also used to allow one output to be controlled by several inputs, even though each of the inputs are configured differently. Input INP1 may, for example, be configured as an active high switch input whereas INP3 may be configured as a Normally Open (NO) input. Whenever any of the input switches change from an inactive state to a active state, the tag related output will also assume its active state.

Many-to-One connection scheme is illustrated below.



Network Update Interval

The Network Update Interval (NUD) is the time interval in seconds that vTagNet information is updated and shared with other devices. The NUD must be set to a non-zero value for the vTagNet system to operate. This is important since it allows the user to disable hardware interaction during initial device "setup" and testing. Once eTag and aTag numbers have been assigned, set the NUD to a non-zero value to activate vTagNet system updates. All wireless devices collaborating over the same network must have their NUD's set to the same value.



Use Cursor key to move between entry fields.



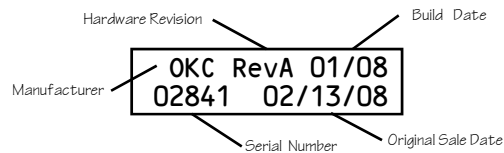
Use these keys to change selections.

The Log Update Interval (LUD) is the regular time interval in seconds that a data log record may be generated and stored. Hardware events may also cause a data log record to be generated and stored, irrespective of the LUD entry. A zero LUD value disables regular, time generated logging activity.

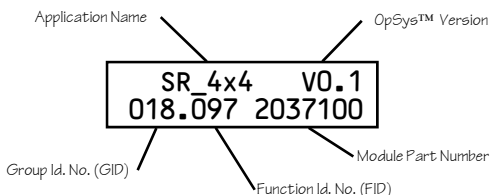
Important Device Information

Each application module has important device related information saved in its non-volatile memory that can be accessed through the LCD display interface. A "business card" sized information card is provided with each unit so that the important information may be noted for future reference.

To access the first display shown below, press the DATA key and then press the cursor (<>) key twice.



Press the DATA key a second time to access the second LCD display shown below.



Accessories

Part Number	Accessory Description
9203-2002110	Pipe Mounting Kit 2-1/4 U-Bolt with extra 5/16" nuts . Uses universal mounting plate.
2503-3231HEY	Watertight Bushing. ½ NPT, Black Nylon. Uses 2503-8463HEY nut.
9203-2032150	Power Jack Assembly. 2.5mm Receptacle. Complete wired assembly.
4160-2032120	Universal Mounting Bracket. Black Zinc Plated #16 GA Steel. 2" Pipe or motor valve mount.
1980-2032400	Wireless XBee Kit. Maxstream 2.4 GHz Module. 300 ft. (100m) Line of Sight range.
1980-2401500	XBee-Pro PKG-U USB. Maxstream 2.4 GHz USB Adapter. 1 mi.(1500m) Line of Sight range.
9200-0852251	Ext. 2 W Solar Panel w/ stand. 8.5 Vdc @ 235 mA charging. 6 ft. Power Jack cable provided.