RACO MANUFACTURING & ENGINEERING COMPANY

AA RTU Installation Manual v3.2

Warranty

RACO Manufacturing and Engineering Company, Emeryville, California warrants this product to be in good working order for a period of two years from date of purchase as a new product. In the event of failure of any part(s) due to defect in material or workmanship occurring within that three year period, RACO will, at its option repair or replace the product at no charge for parts or labor.

Any alteration of the product without instruction from RACO's Engineering Department will automatically void this warranty. If alterations of the unit are authorized by RACO, please complete the authorization form in the Owner's Manual and return the form to RACO to ensure the warranty. Under no circumstances will RACO be responsible for consequential or secondary damages.

The defective product should be returned, insured and freight prepaid, securely packaged to the address listed below. Please include a copy of your sales receipt, the dialer serial number, and a detailed description of the problem you are experiencing.

RACO Manufacturing and Engineering Company
Service Department
1400 62nd Street
Emeryville, CA 94608

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Printing History

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1.0 Welcome to AlarmAgent.com™!

AlarmAgent.com™ is RACO's newest wireless technology, bringing a state-of-the-art, Web-based interface to our complete line of alarm detection and notification products.

AlarmAgent.com is a revolutionary alarm detection and notification system which offers ease-of-use, cost-efficiencies, and around-the-clock access to its users. Wireless, Web-enabled RTUs monitor and collect data from equipment 24 hours a day. Users can easily access and view secured data from any Internet-connected appliance via a secure Web site. Administrators can make administrative changes just as easily. Just go to http://www.alarmagent.com.

RTU stands for Wireless Remote Terminal Unit.

Users receive and acknowledge messages by text or by voice calls, to any combination of land line or cell phones, email, or pager – whatever is the most convenient for them.

There are three classes of AlarmAgent.com™ users with distinct duties and responsibilities.

1) **Installers** receive this manual to assist in the physical installation of the AlarmAgent.com™ RTU.

2) **Users** receive the AlarmAgent.com™ Web Site User's Manual which instructs them on using the system on a non-administrative Basis.

Users receive and acknowledge messages via voice calls to any combination of land line or cell phones, email, or pager – whatever is the most convenient for them. They may also call in to the toll-free 800 number, or log onto the web site to view the status of all RTUs in the system, view reports from individual RTUs, etc.

3) **Customer System Administrators (CSAs)** receive the AlarmAgent.com™ Web Site CSA Manual to instruct them on how to configure the system and individual RTUs on the web site.

Note that in order to use the Test Call feature described later in this manual, it will be necessary for a CSA to have first entered a Test Call Notification Phone Number at the web site.

The following outline describes the basic process for bringing your RTU online:

1. Move Battery Jumper, see Section 2.0

2. Mount RTU, see Section 3.0

3. Mount and wire antenna, if separate, see Appendix A

4. Wire power, see Section 6.0

5. Wire inputs, see Appendix B

6. Set Template, see Section 8.0 & Appendix B

7. Transfer Import Code to CSA, if CSA is at a different location

8. Verify RTU has been imported into system

9. Verify Test Call phone number has been entered at the web site

10. Test RTU, see Sections 12.0, 13.0, & 14.0

SYSTEM ACTIVITY
INDICATOR

BATTERY STATUS
INDICATOR

SIGNAL STRENGTH
BAR GRAPH

ON / OFF
INDICATOR

ARMED /
DISARMED
INDICATOR

ON / OFF
PUSHBUTTON

ARMED /
DISARMED
PUSHBUTTON

AlarmAgent WRTU
- Indoor Enclosure Model Shown -

Overview of the AlarmAgent WRTU
user interface indicators and pushbuttons.
Described in detail later in the manual.
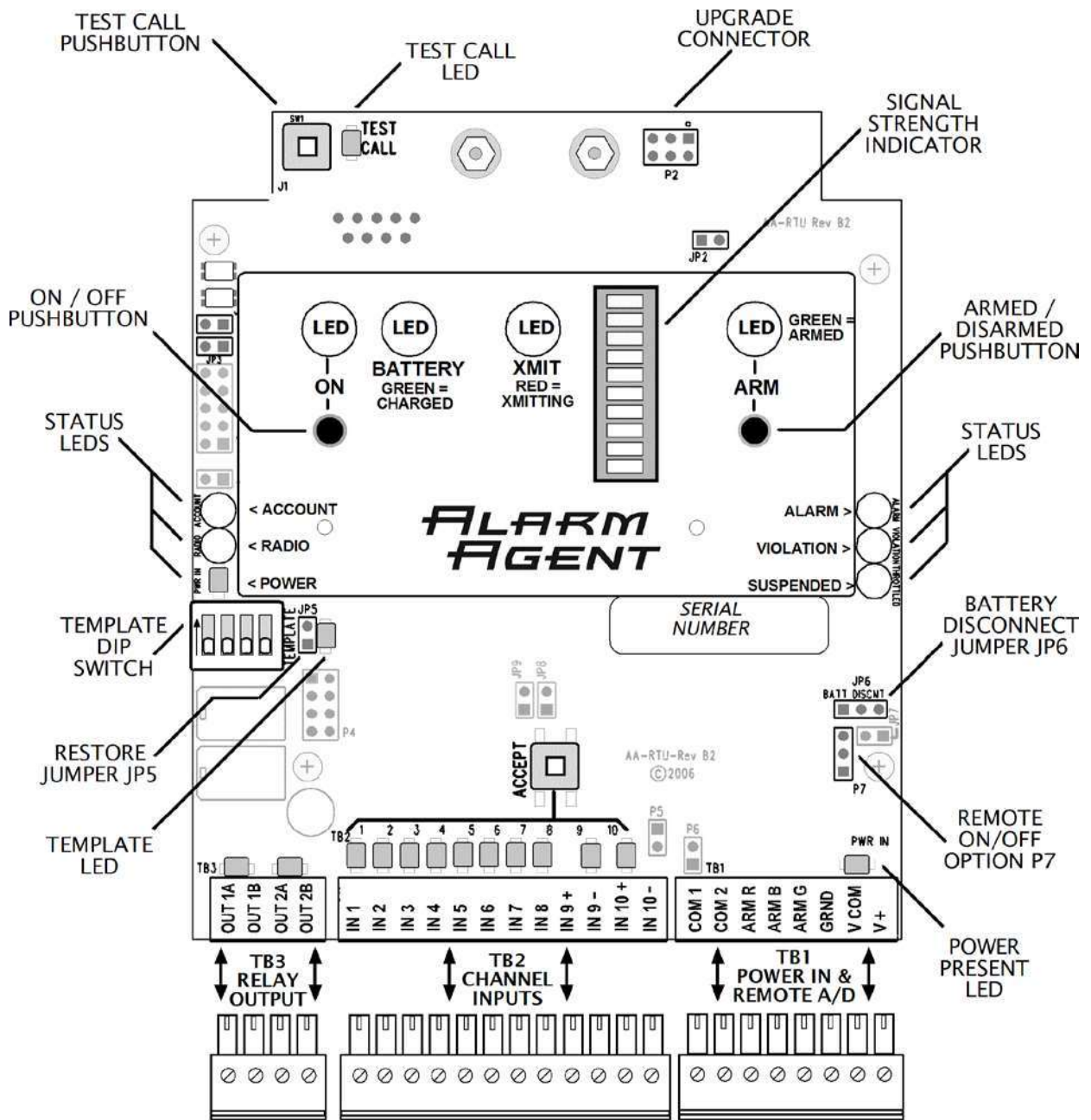
AlarmAgent WRTU

- Interior View -

Overview of the AlarmAgent WRTU
circuit board's components and functions.
Described in detail later in the manual.

RTU Interior View

AA RTU Interior View Call-outs

Call-out	Specification
Test Call Pushbutton	Press this pushbutton when you want to test the connection between the RTU and AlarmAgent.com. Pressing this button will send a message to the website, requesting a test call be generated to the "**Notification Phone Number for Test Calls**" configured on the "**System Wide Settings**" page and is **REQUIRED** or test calls will be **DISABLED**.
Test Call LED [**Green**]	**OFF** = Test Call Pushbutton disabled **ON** = Test Call Pushbutton enabled
Signal Strength Indicator [**Red**]	Each LED represents 10% of maximum signal. For example, 7 LEDs illuminated translates to 70% signal strength.
Armed / Disarmed Pushbutton	Push this button when you want to Disarm or Arm the RTU. The ARM LED is **green** when the unit is armed. The ARM LED is **red** when the unit is disarmed.
Status LED – Alarm [**Red**]	**OFF** = No Alarm Criteria violated **ON** = Alarm Criteria violated
Status LED – Violation [**Amber**]	**OFF** = No Alarm Criteria violated **ON** = Alarm Criteria has been violated, but waiting for Alarm Trip Delay to time-out
Status LED – Suspended [**Red Blinking**]	**OFF** = No Channels Suspended **ON** = Number of channel transitions allowed per day exceeded
Battery Disconnect Jumper JP6	**Right-Side Jumper placement** = Battery disconnected for shipping or long-term storage. **Left-Side Jumper placement** = Battery connected, ready for use
Remote ON / OFF Option P7	This option allows the RTU be remotely turned ON or OFF. For more information, please contact your RACO representative.
Power Present LED [**Amber**]	**ON** = Power present **OFF** = No power present
Accept Pushbutton	Press this pushbutton when all wired inputs are in a NORMAL condition. Channel criteria set to current condition.

|	
Template LED [**Green**]	**ON** = The template in use agrees with that shown by DIP switch setting **OFF** = The template in use does not agree with that shown by DIP switch setting
Restore Jumper JP5	Shorting these pins will result in the RTU sending a configuration report to the website. This report will configure the website to match the template shown by DIP switches.
Template DIP Switch	This switch is used to set the RTU template locally. Please refer to section 8.0 Preliminary Local Configuration of the RTU.
Status LED – Power [**Amber**]	**ON** = AC power is ON **OFF** = AC power is OFF
Status LED – Radio [**Green**]	**BLINKING** (**1 sec. Heartbeat**) = Radio Operations Normal **OFF** = No Service or Reinitializing Radio
Status LED – Account [**Green**]	**ON** = Account ENABLED **OFF** = Account DISABLED
POWER ON/OFF Pushbutton	Toggles Power ON and OFF. Please refer to section 15.0 for the proper shutdown procedure.
POWER LED [**Green**] (visible with cover on)	**ON** = AC Power is ON **OFF** = AC Power is OFF **BLINKING** = AC Power is OFF, unit running on battery

2.0 Connecting the Battery

The AA RTU is shipped with the battery disconnected as a transportation safety measure.

The battery **must** be connected, even when external power is applied. If you do not perform this necessary step, the RTU will turn itself off shortly after you turn it on.

To connect the battery, remove any cover and locate the jumper pins marked **BATT DISCNT** on the right hand edge of the circuit board near the bottom (refer to diagram below). Move the jumper from the right hand position to the left hand position.

```
┌─────────────────────────────┐
│          NOTE:              │
│                             │
│  WHEN TURNING THE RTU       │
│  OFF THERE WILL BE A        │
│  SHORT DELAY BEFORE         │
│  THE LEDS ACTUALLY          │
│  TURN OFF. THIS IS          │
│  NORMAL.                    │
│                             │
│  SEE SECTION 15.0 FOR       │
│  SHUTDOWN PROCEDURE         │
└─────────────────────────────┘
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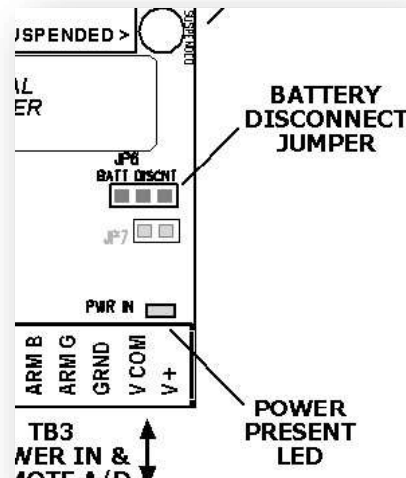

The LEDs should flash rapidly, assuming there is no 12 to 24 VDC power connected yet. (When operating on battery in the absence of power input, the LEDs flash to conserve battery capacity.)

IMPORTANT NOTES
▪ If Solar Mode is configured, the LEDs always flash, but at a different rate.
▪ If the unit is operated with battery power only for the length of the Power Fail Alarm trip delay, the unit will begin attempting to transmit a power failure alarm.
▪ If you ever need to store the RTU, ship the RTU to another location, or need to return the unit to the factory, *you must be sure to disconnect the battery by moving the battery disconnect jumper to the right hand position* before packaging and shipping.
▪ It is very important that the RTU battery does not discharge to a level where the battery is unresponsive to recharge. If the battery is allowed to this level, then the battery must be replaced. Even if the RTU is OFF, the battery can be drained in about 60 to 90 days.
▪ During startup, the Battery LED may be AMBER in color. This indicates that the battery is charging. The Battery LED will turn GREEN when fully charged.

3.0 Choosing a Location for the RTU and Antenna

The location you choose for installing your AlarmAgent™ RTU is important if the antenna is mounted directly on top of the RTU. This is because the antenna location has a lot to do with the signal strength of the wireless connection to the local cellular tower.

If the antenna is to be located separately from the RTU, then the mounting location of the RTU is not as critical.

Note: If you are installing the RTU inside a metal enclosure, it will be necessary to install an antenna at a separate location outside the metal enclosure.

If the RTU is being installed in a control panel at a location other than the final destination, issues of antenna placement and network testing will need to be dealt with separately at the time of final installation at the ultimate RTU site.

To select an optimum location for either the RTU with top-mounted antenna or for a separately located antenna, use the bar-graph LED signal strength indicator built into the RTU. To view the signal strength indication, turn on the RTU.

If input power has not yet been connected, you can still view the bar graph which will flash along with all other LEDs).

The stronger the signal strength is, the more segments that will be illuminated. At least four segments of the bar graph should be lit, allowing for momentary variances. Allow a few seconds for the indication to adjust to any new antenna positioning.

Note: See Appendix A for advanced antenna information

4.0 Mounting the RTU

With the mounting location for the RTU determined, use the enclosed Mounting Template diagram (Appendix G) to establish mounting-hole locations. This diagram includes hole locations for RTUs with three different enclosure options:

1. *Standard Indoor*

2. *NEMA 4X*

5.0 Power and Ground Wiring Connections

Referring to the connection diagram, connect a source of 12 to 24 VDC power to the input terminals indicated on the diagram. The power source should be capable of delivering12 VDC @ 200 ma or 24 VDC @ 100 ma.

RACO offers a 12 VDC outlet adapter as an accessory item

IMPORTANT NOTE: Be sure to connect the terminal marked **GRND** to a good electrical ground. This is important for proper operations and maximum electrical surge protection of equipment. If the RTU is not grounded, it will not work…

Also Note:

The terminal strips are un-pluggable. They accommodate #26 to #16 AWG wire size.

6.0 Determining the Correct Application Template

To simplify configuration of the RTU for different monitoring applications, the RTU incorporates seven different Application Templates. Determine which Application Template that is appropriate for your monitoring application from the listing below:

Note that the choice of Application Template will determine the appropriate wiring connections to be made.

1 - Duplex pump station with no pulse flowmeter installed

2 - Duplex pump station with a pulse flowmeter installed

3 - Triplex pump station with no pulse flowmeter installed

4 - Triplex pump station with a pulse flowmeter installed

5 - Multipurpose Equipment Service: 3 DRT*, 5 digital and 2 universal** Channels

7 - Multipurpose Process Performance: 8 digital and 2 universal** Channels

* DRT CHANNELS MAY BE CONFIGURED AS DISCRETE, RUNTIME, OR TOTALIZING CHANNELS

** UNIVERSAL CHANNELS 9 AND 10 MAY BE CONFIGURED AS EITHER DIGITAL OR ANALOG CHANNELS

7.0 Signal Wiring Connections

Refer to the signal wiring diagrams in Appendix D which are included independently for each specific Application Template.

For optional analog input wiring connections, as well as connections for relay outputs and optional remote Arm/Disarm module, refer to Appendix E.

8.0 Preliminary Local Configuration of the RTU

Virtually all configuration operations can be done remotely from the web site (http://www.alarmagent.com).

However, there are two simple configuration steps which we strongly suggest doing at the RTU.

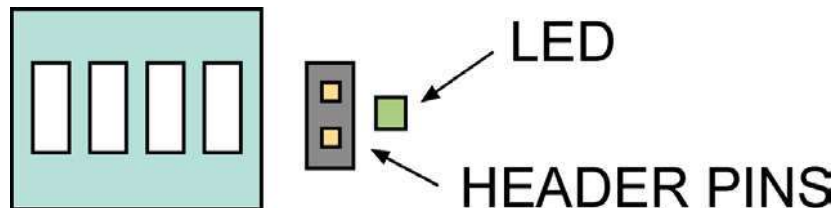## Step 1: Set the Application Template

After determining the correct Application Template from the above information, locate the four-position DIP switch on the left hand edge of the circuit board. Refer to the diagram. With the RTU turned on, set the Application Template according to the following diagram:
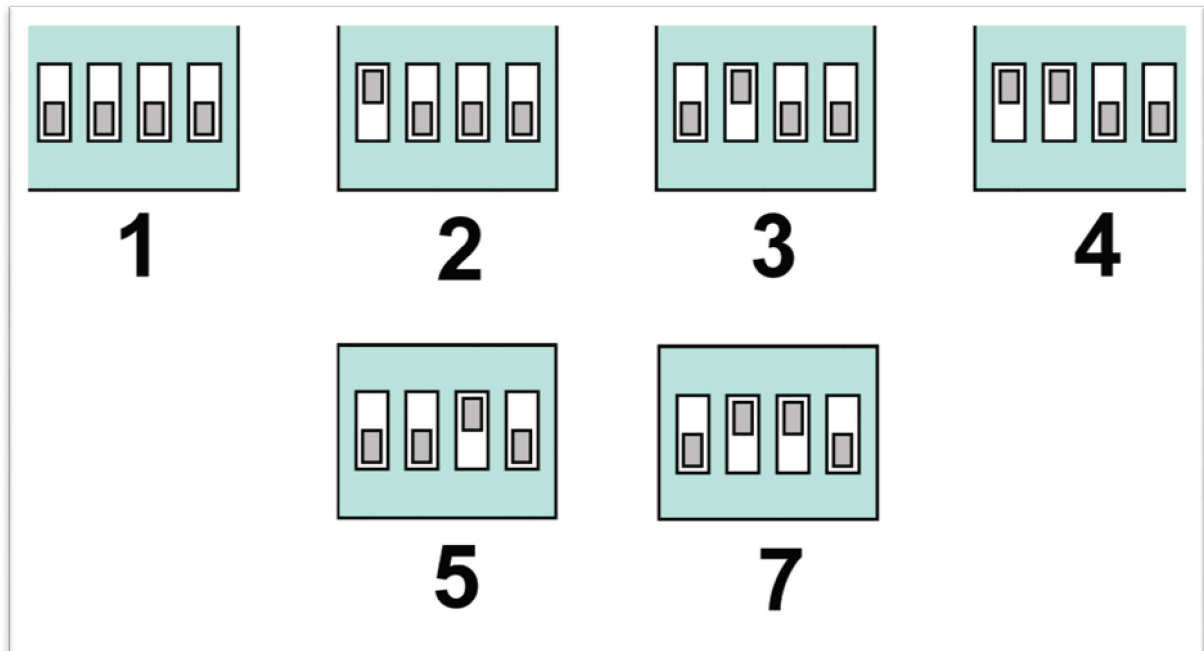
After verifying that the DIP switch setting is correct for your Application Template, observe the green LED to the right of the DIP Switch. If it is not lit when the RTU is turned on, this means that the DIP switch setting has been overridden by either the web site. To restore the ability of the DIP switch to control the Application Template, use a screwdriver to momentarily short the two pins of the two-pin header which is located to the right of the DIP Switch. This should cause the corresponding green LED to activate. Refer to the diagram:

NOTE: IF YOU CHANGE THE TEMPLATE FROM THE DEFAULT OF TEMPLATE 1, IT WILL CAUSE THE RTU TO SEND THE CONFIGURATION CHANGE TO THE WEB SITE WHEN YOU SHORT THE TWO HEADER PINS, AS INDICATED BY A TEMPORARY CHANGE IN COLOR OF THE SYSTEM ACTIVITY (TRANSMIT) LED. TEMPLATE LED WILL THEN TURN ON.

Step 2: Set the Normally Open / Normally Closed Alarm Criteria for All Digital Inputs

Place all alarm-able digital inputs in their normal, non-alarm condition.

Then, with the RTU turned on, momentarily press the ACCEPT pushbutton which is located in the lower center area of the circuit board (Refer to diagram).

This automatically configures the alarm condition for each alarm-able input to the opposite of the current open/closed condition.

9.0 Optional Advanced Configuration of the RTU

For most users, the above two steps will complete most of the configuration needed at the RTU.

For those using analog inputs, in most cases the scaling and set points can be handled at the web site.

10.0 Interpreting LED indications

BAR GRAPH: The number of segments (out of 10 segments total) that are lit indicates the relative signal strength of the wireless link to the local cellular tower.

LARGE LEDS:

	RED	GREEN	AMBER	OFF
ON/OFF		RTU ON		RTU OFF
BATTERY	DISCHARGING	FULLY CHARGED	CHARGING	
XMIT	TRANSMITTING (INTERMITTENT FLASHES)	NORMAL	ACTIVE PACKET RADIO SESSION	NO SERVICE AVAILABLE
ARM/DISARM	DISARMED (FLASHING)	ARMED		ACCOUNT IS DISABLED

SMALL LEDS:

	LOCATION	COLOR	INDICATES
ACCOUNT	LEFT OF LEGEND PLATE	GREEN	THIS RTU'S ACCOUNT IS ACTIVATED
RADIO	LEFT OF LEGEND PLATE	GREEN	FLASHING INDICATES NORMAL (HEARTBEAT)
POWER INPUT	LEFT OF LEGEND PLATE	YELLOW	EXTERNAL POWER PRESENT
ALARM	RIGHT OF LEGEND PLATE	RED	SOME CHANNEL OR CONDITION IS IN ALARM
VIOLATION	RIGHT OF LEGEND PLATE	YELLOW	SOME CHANNEL OR CONDITION HAS PRELIMINARY ALARM VIOLATION
SUSPENDED	RIGHT OF LEGEND PLATE	RED	SOME CHANNEL IS TEMPORARILY DISABLED FROM SENDING ALARM
INPUT CONDITION	ABOVE EACH INPUT	RED	INPUT IS CLOSED CIRCUIT
POWER INPUT	BOTTOM RIGHT	YELLOW	EXTERNAL POWER PRESENT

TEMPLATE	RIGHT OF DIP SWITCH	GREEN	APPLICATION TEMPLATE # AGREES WITH DIP SWITCH SETTING
OUTPUT RELAY #1	ABOVE 4 POINT TS	RED	RELAY # 1 IS ACTIVATED
OUTPUT RELAY #2	ABOVE 4 POINT TS	RED	RELAY #2 IS ACTIVATED
TEST CALL LED D25	RIGHT OF TEST CALL PUSHBUTTON	GREEN	TEST CALLS ARE ENABLED

> **Note**
>
> **The digital inputs each have their own LED indicator directly above their respective connection points. Each LED activates when the corresponding digital input is in the CLOSED condition.**

This allows checking of signal input wiring even at a pre-installation site.

First, put the RTU in the disarmed state as described below. Then you can manipulate the input signal sources to verify that when those input signal sources are closed, the corresponding LED on the circuit board is activated.

11.0 Armed and Disarmed States

Normally the RTU should be left in the armed state (LED shows Green) so that it can send transmissions to the web site when alarm conditions occur.

If you wish to prevent alarm transmissions temporarily, place the RTU in Disarmed state (LED flashes Red). This should be done for example when you are performing maintenance at the RTU site and wish to prevent false alarms.

While in the disarmed state, scheduled report transmissions will still be sent.

Be sure to check the Armed/Disarmed state before leaving the site.

12.0 Verifying the Wireless Network Link to the Web Site

To verify the network link to the web site, the RTU's service must first have been activated, and the RTU must have been imported into your system at the web site.

> **Your company's Customer System Administrator (CSA) can advise you as to whether this has been done.**

13.0 Using the Test Call Feature for Network Verification

To use the Test Call Feature, first verify that the green LED located to the right of the Test Call pushbutton (refer to diagram) is lit. If not, the Test Call feature will not work until re-enabled by RACO.

The Test Call LED is normally lit, but it will be turned off if someone presses the button without a special Test Call Notification Phone Number having been previously entered at the web site by a CSA.

With the Test Call LED lit, and after verifying that your cell phone number has been entered at the web site, momentarily press the Test Call pushbutton.

Within a minute or so, you should receive a corresponding notification test call to your cell phone. The test call will include the signal strength of the signal received by the local tower.

Note that the cellular network requires at least a two minute interval between transmissions from the RTU. Therefore if you were to press the Test Call pushbutton more than once within a two minute span, (this should not be necessary), the second transmission will be delayed.

14.0 Testing by Simulating Alarm Conditions

Testing by artificially creating alarm conditions introduces complications having to do with various timing delays, as well as the fact that the RTU filters out "dithering" alarm inputs. Therefore this method is not recommended unless you trip any given alarm only once, and allow more than two minutes between tripping different alarms.

Note that the power failure alarm, depending upon the configuration, will take longer to trip (5 minutes is the default setting) than other input alarms.

As described above, the red LEDs associated with each digital input can provide confirmation that the wiring to various signal sources is correct. This should generally be done while the RTU is in the Disarmed state in order to prevent unnecessary alarm transmissions.

15.0 Shutdown Procedure

There is a short delay after pressing the Power OFF button before the unit completely shuts down. This is normal and expected. When you turn power off to the unit, the RTU will send a "shutdown report" to the website. This report is to let the website know that the unit has been turned off. This shutdown report will prevent watchdog alarms from escalating. If the unit is not allowed to send this report, you will get repeated watchdog alarms until the unit is powered back on, and then off again.

Once the website receives the shutdown report, it will send acknowledgment (APage) to the RTU. This tells the RTU that it can finish the shutdown. All LEDs will be extinguished. See section 2.0 regarding the placement of battery jumpers for shipment or long-term storage.

It is important to note, that if the power button is pressed again while the RTU is waiting to finish shutting down, the unit will "wake up" and send a "RTU is online" report to the website. The RTU will then ignore the expected APage and remain online and powered up.

16.0 Frequently Asked Questions (FAQs)

Question: Why is the website reporting that my RTU battery is discharging, but the unit power supply is plugged in, and the RTU power LED is showing GREEN?

Answer: The DC power supply is providing DC power to your RTU, but not at a level strong enough to keep your battery charged. The power supply may need to be replaced. Please contact RACO.

Question: I have noticed that the Transmit LED while normally green, will flash red or amber. What can I learn about the blink rates and color changes of the Transmit LED?

Answer: The following is a chart outlining the various blink rates and color changes:

OVERVIEW	▪ Off – No Signal or No Packet Radio Service ▪ Green, Amber, Red - Service
OFF	No Signal, Packet Radio Service Not Available
GREEN	Service Available, All is Normal
AMBER	Radio Currently Connected to Website – Active Session in Progress
RED	(Flashes) Packets Being Sent to Website

Question: I just plugged in the unit and I only have two little power lights only. Why aren't the large lights or the strength meter on?

Answer: You have not put the battery disconnect jumper in the proper position. Please refer to Chapter 2.0 Connecting the Battery.

Question: Why are all of the lights on a solar unit flashing after the battery jumper has been moved?

Answer: This is expected. The LEDs on solar units flash, instead of stay steady on, to conserve power.

Question: Should I press the "Test Call Button" if the web site has not been set up?

Answer: No, this will disable the test call function.

Question: Are all the commons for electrical connections the same, including V COM?

Answer: Yes.

Question: What should I do with the little white slip of paper inside the unit?

Answer: The slip of paper included with the unit is used to import the unit into the AlarmAgent web site. **Do not throw away.** The information included on the paper is the RTU serial number and the RTU import ID. This information needs to be provided to the CSA so the unit can be imported into the system.

Question: I have now installed the unit and completed the wiring and want to shut down the unit until the rest of the project is complete. How do I shut down the unit properly?

Answer: You should use the Power On/Off pushbutton on the unit (See Chapter 15 for the proper shutdown procedure).This will send a shutdown report to the website. If you simply remove power, you will get a power failure alarm. If power remains off, a watchdog alarm will be created, since the web site has not received a shutdown report. If you need to remove power completely, wait until the unit is completely shut down (meaning the unit has sent the shutdown report, and the web site acknowledged receipt. If the unit is to be without power for a long period of time, you will need to put the battery disconnect jumper back into the right-hand position. See Chapter 2 regarding the battery disconnect jumper.

Question: Do I leave the unit powered on when I leave to set up the unit on the Alarm Agent web site?

Answer: Yes. You need to leave the power to the unit on, and bring the import information with you.

Question: Channels on my RTU are being reported as suspended. What is suspension and how can I clear it?

Answer: A channel is suspended if it has been subjected to excess alarm activity. The suspended state will clear within 24 hours, or it may be cleared manually. If any given channel goes into alarm, then returns to normal, then goes into alarm again within the indicated Suspension Timer period, it will not be allowed to send additional alarms for the duration of the Suspension Timer period. This suspension time begins at the time of the initial alarm. If you wish to clear the suspended status of an RTU channel before it would

otherwise time out, temporarily disarm and then rearm the RTU, either from the web site or by visiting the RTU site.

Question: I am getting frequent watchdog alarms because the location of the RTU has poor signal strength. What can I do to improve signal strength?

Answer: Please contact your RACO representative. There are a variety of antenna options available. We will be able to find the right solution to your problem (see Appendix A – Advanced Antenna Topics).

Appendix A: Advanced Antenna Topics

Antenna options for your AlarmAgent^{TM} RTU depend in part upon whether or not the RTU is installed within a metallic cabinet or metal building.

If the RTU is installed within a metal cabinet or metal building:

If the RTU is installed within a metal cabinet, the antenna will need to be located separately outside the enclosure. This in turn will require a "cabinet cable" which runs from the RTU to somewhere on the outer surface of the cabinet. Cabinet cables are available in 18" and 36" lengths, or other lengths on special order.

The same is true if the RTU is installed inside a metal building, except that a longer extension cable will be required in lieu of the cabinet cable, to reach a suitable outer surface of the building. Extension cables are available in 10' and 30' lengths, or other lengths on special order.

Cable Length:

> *Signal loss is proportional to cable length. For that reason, long cable runs are discouraged. If your installation requires a long cable, contact RACO about custom lengths and low-loss cables.*

Rule of Thumb
If your cell phone works outside the building but not inside the building at the RTU location, you can assume that a separately located external antenna will be required.

If the RTU is installed indoors, but not inside a metal cabinet or metal building:

If the RTU is installed indoors, but not inside a metal cabinet or metal building, which standard antenna to use depends upon the RTUs enclosure option.

1. A "whip" antenna is standard for the Indoor Enclosure or Open Chassis option.

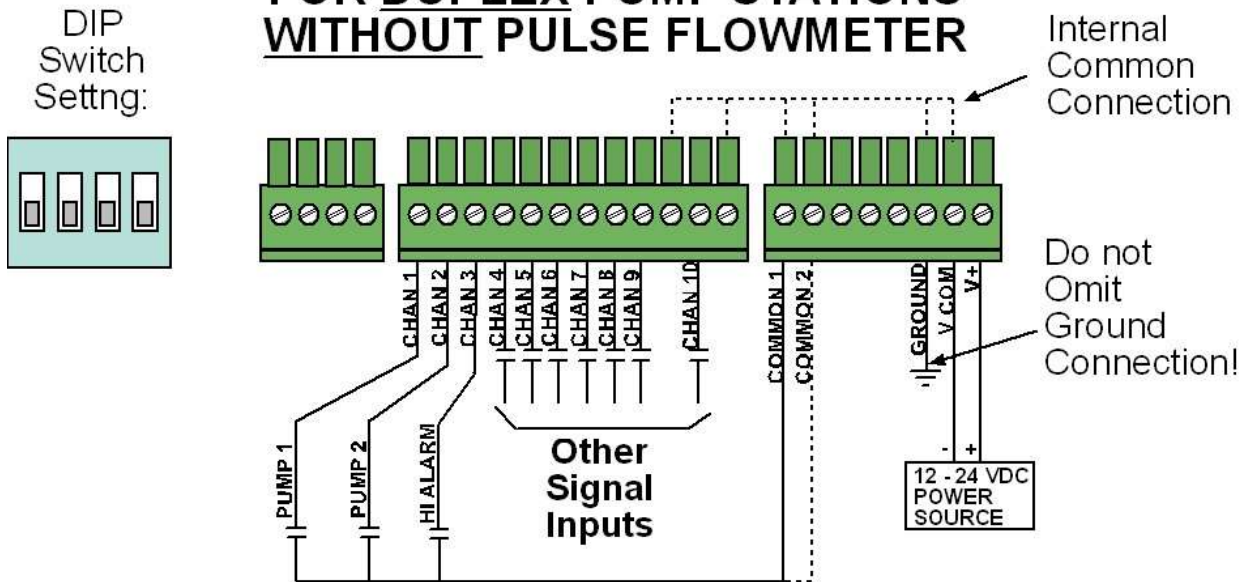2. A RM3 conical shaped antenna is standard for the outdoor NEMA 4X enclosure option.

Appendix B: Signal Input wiring for each Application Template

TEMPLATE 1 WIRING

FOR DUPLEX PUMP STATIONS WITHOUT PULSE FLOWMETER

NOTES:

- Dry (non-powered) contact inputs only!

- Pump Inputs require Closed Contact (pump is running).

- Pump 1 Input: Closed when Pump 1 runs.

- Pump 2 Input: Closed when pump 2 runs.

- High (or low) level alarm can be either Normally Closed or Normally Open.

- To use Channels 9 or 10 as analog inputs, see separate diagram.

- Ground connection is important for surge protection.
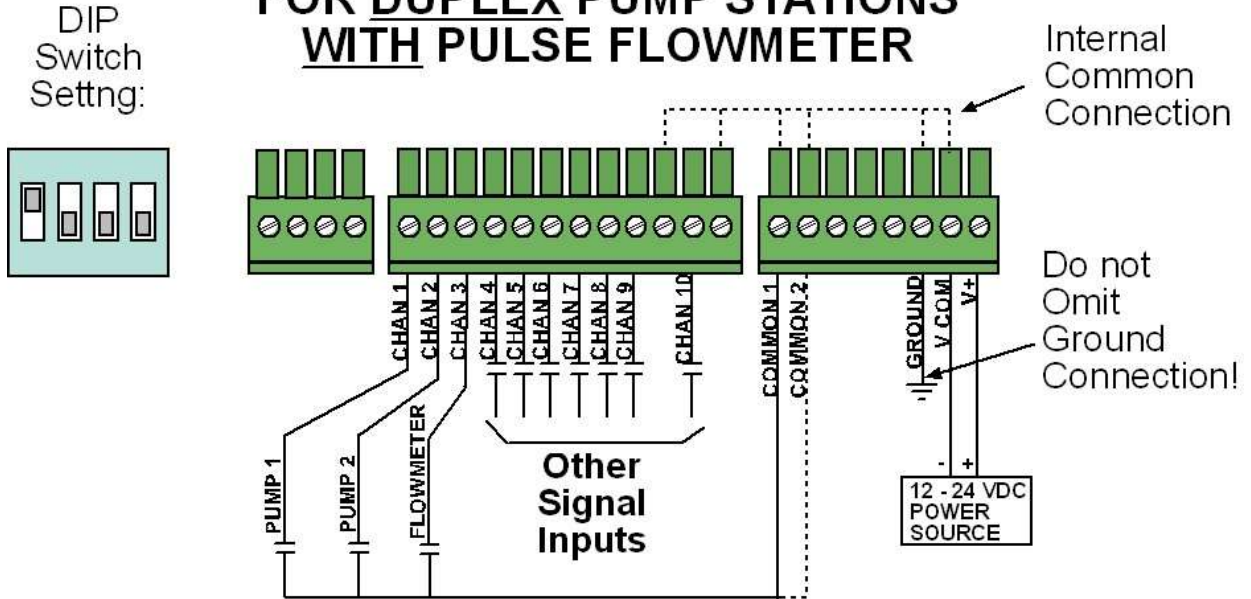
- Terminals accommodate #16 to #26 wire size.

WIRING INSTRUCTIONS FOR TEMPLATE 1:

1) Turn RTU on, and Disarm it (so that the right hand Arm/Disarm LED blinks).

2) Designate (identify) a Pump 1 and Pump 2 for the purposes of AlarmAgent monitoring.

3) Verify that all contact inputs are dry (<u>non-powered</u>). Otherwise, RTU will be damaged.

4) Connect contact inputs for Pump 1, Pump 2 and a high (or low) level float switch or other signal source

5) Connect any other desired inputs to channels 4 through 10   See separate instructions and diagram for using Channels 9 and 10 as analog inputs.

6) Place any contact inputs to Channels 4 through 10 in their normal, non-alarm state. Press the ACCEPT BUTTON. This automatically configures Channels 4 through 10 to alarm on the opposite input state.

7) TEST WIRING! Verify the following:

   a) Channel 1 LED activates when Pump 1 runs.

   b) Channel 2 LED activates when Pump 2 runs.

   c) When High (or Low) alarm switch is tripped, Channel 3 LED responds accordingly. It should activate whenever the switch is closed.

Test wiring for any remaining inputs by manipulating their state and verifying that the corresponding Channel LED activates when the input is closed (and deactivates when the input is open).

TEMPLATE 2 WIRING

FOR <u>DUPLEX</u> PUMP STATIONS <u>WITH</u> PULSE FLOWMETER

NOTES:

- Dry (<u>non-powered</u>) contact inputs only!

- Pump Inputs require Closed Contact (pump is running).

- Pump 1 Input: Closed when Pump 1 runs.

- Pump 2 Input: Closed when pump 2 runs.

- Totalizer pulses must be at least 50 milliseconds (.05 seconds) duration, 10 pulses per second maximum

- To use Channels 9 or 10 as analog inputs, see separate diagram.

- Ground connection is important for surge protection.

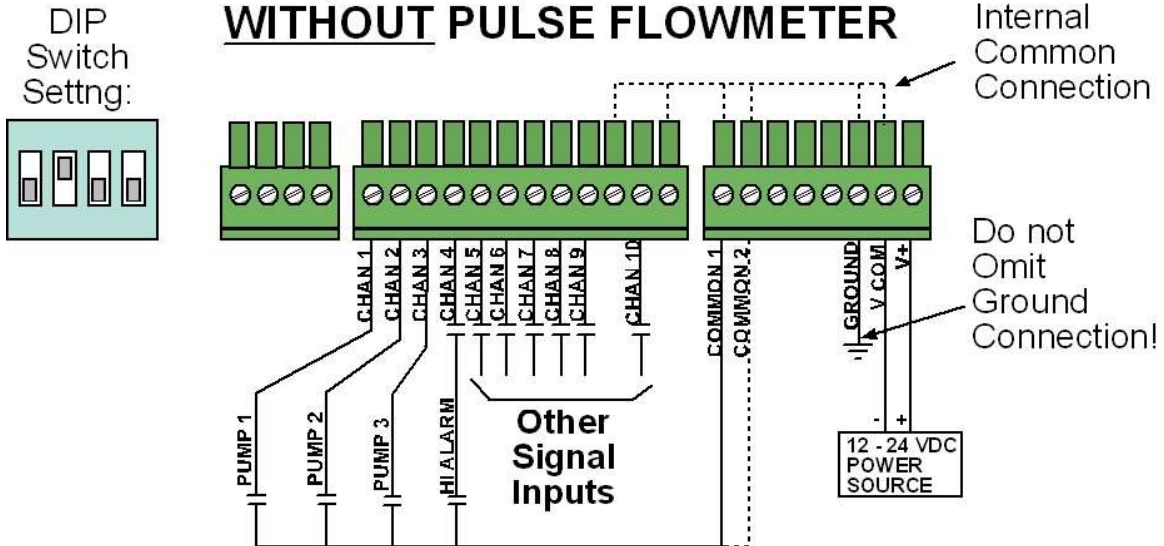- Terminals accommodate #16 to #26 wire size.

WIRING INSTRUCTIONS FOR TEMPLATE 2:

1) Turn RTU on, and Disarm it (so that the right hand Arm/Disarm LED blinks).

2) Designate (identify) a Pump 1 and Pump 2 for the purposes of AlarmAgent monitoring.

3) Verify that all contact inputs are dry (<u>non-powered</u>). Otherwise, RTU will be damaged.

4) Connect contact inputs for Pump 1, Pump 2 and totalizer

5) Connect any other desired inputs to channels 4 through 10   See separate instructions and diagram for using Channels 9 and 10 as analog inputs.

6) Place any contact inputs to Channels 4 through 10 in their normal, non-alarm state. Press the ACCEPT BUTTON. This automatically configures Channels 4 through 10 to alarm on the opposite input state.

7) TEST WIRING! Verify the following:

    a) Channel 1 LED activates when Pump 1 runs.

    b) Channel 2 LED activates when Pump 2 runs.

    c) Channel 3 LED pulses on and off when flow is occurring through the flowmeter.

Test wiring for any remaining inputs by manipulating their state and verifying that the corresponding Channel LED activates when the input is closed (and deactivates when the input is open).

TEMPLATE 3 WIRING

FOR <u>TRIPLEX</u> PUMP STATIONS <u>WITHOUT</u> PULSE FLOWMETER

DIP Switch Settng:

Internal Common Connection

CHAN 1, CHAN 2, CHAN 3, CHAN 4, CHAN 5, CHAN 6, CHAN 7, CHAN 8, CHAN 9, CHAN 10, COMMON 1, COMMON 2, GROUND, V COM, V+

Do not Omit Ground Connection!

PUMP 1, PUMP 2, PUMP 3, HI ALARM

Other Signal Inputs

12 - 24 VDC POWER SOURCE

NOTES:

- Dry (<u>non-powered</u>) contact inputs only!

- Pump Inputs require Closed Contact (pump is running).

- Pump 1 Input: Closed when Pump 1 runs.

- Pump 2 Input: Closed when pump 2 runs.

- Pump 3 Input: Closed when pump 3 runs.

- To use Channels 9 or 10 as analog inputs, see separate diagram.

- Ground connection is important for surge protection.

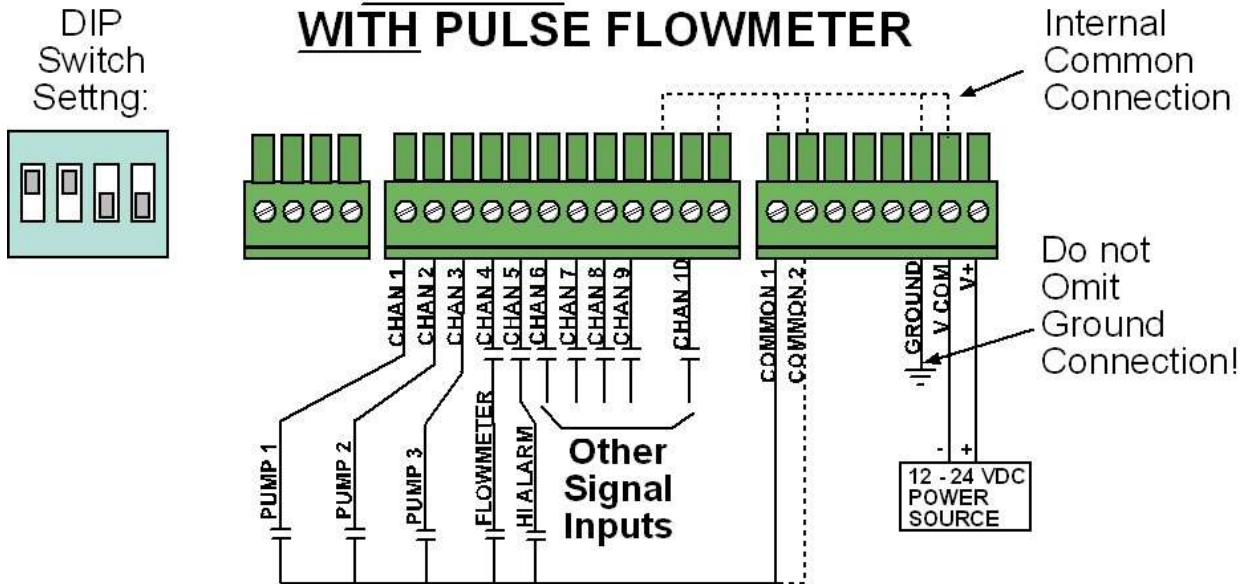- Terminals accommodate #16 to #26 wire size.

WIRING INSTRUCTIONS FOR TEMPLATE 3:

1) Turn RTU on, and Disarm it (so that the right hand Arm/Disarm LED blinks).

2) Designate (identify) a Pump 1, Pump 2 and Pump 3 for the purposes of AlarmAgent monitoring.

3) Verify that all contact inputs are dry (<u>non-powered</u>). Otherwise, RTU will be damaged.

4) Connect contact inputs for Pump 1, Pump 2 and Pump 3.

5) Connect any other desired inputs to channels 4 through 10   See separate instructions and diagram for using Channels 9 and 10 as analog inputs.

6) Place any contact inputs to Channels 4 through 10 in their normal, non-alarm state. Press the ACCEPT pushbutton. This automatically configures Channels 4 through 10 to alarm on the opposite input state.

7) TEST WIRING! Verify the following:

   a) Channel 1 LED activates when Pump 1 runs.

   b) Channel 2 LED activates when Pump 2 runs.

   c) Channel 3 LED activates when Pump 3 runs.

Test wiring for any remaining inputs by manipulating their state and verifying that the corresponding Channel LED activates when the input is closed (and deactivates when the input is open).

TEMPLATE 4 WIRING

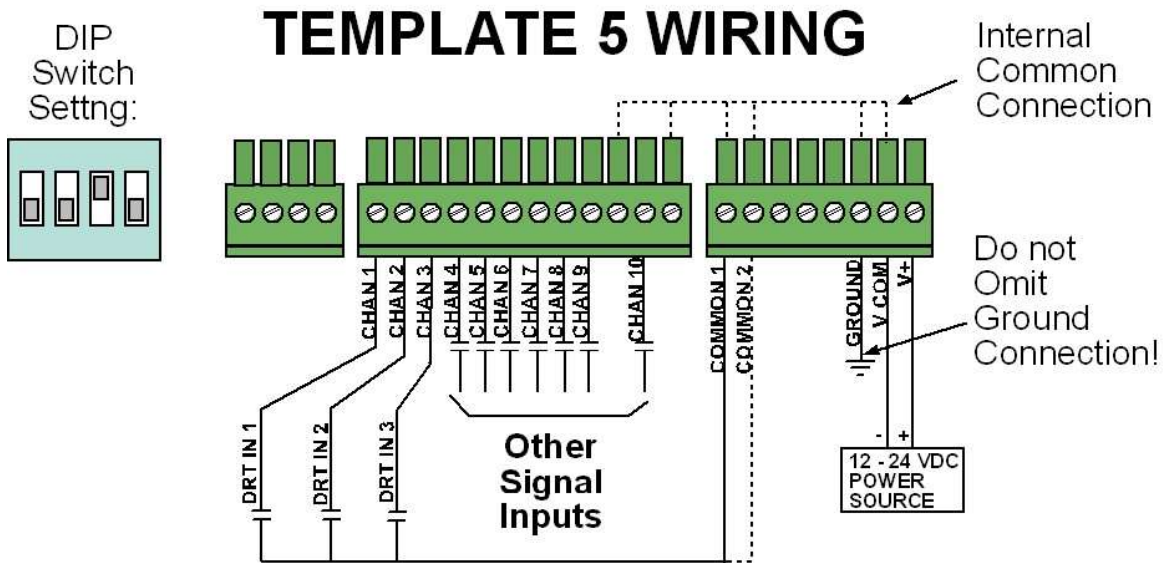## FOR TRIPLEX PUMP STATIONS WITH PULSE FLOWMETER

NOTES:

- Dry (non-powered) contact inputs only!

- Pump Inputs require Closed Contact (pump is running).

- Pump 1 Input: Closed when Pump 1 runs.

- Pump 2 Input: Closed when pump 2 runs.

- Pump 3 Input: Closed when pump 3 runs.

- Channel 4: Digital Pulse Flowmeter input must have minimum closure duration of 50 milliseconds and pulse rate less than 10 pulses per second. 5 volt logic outputs can be used.

- To use Channels 9 or 10 as analog inputs, see separate diagram.

- Ground connection is important for surge protection.

- Terminals accommodate #16 to #26 wire size.

WIRING INSTRUCTIONS FOR TEMPLATE 4:

1) Turn RTU on, and Disarm it (so that the right hand Arm/Disarm LED blinks).

2) Designate (identify) a Pump 1, Pump 2 and Pump 3 for the purposes of AlarmAgent monitoring.

3) Verify that all contact inputs are dry (<u>non-powered</u>). Otherwise, RTU will be damaged.

4) Connect contact inputs for Pump 1, Pump 2 and Pump 3.

5) Connect digital pulse flowmeter input to Channel 4.

6) Connect any other desired inputs to channels 5 through 10   See separate instructions and diagram for using Channels 9 and 10 as analog inputs.

7) Place any contact inputs to Channels 5 through 10 in their normal, non-alarm state. Press the ACCEPT pushbutton. This automatically configures Channels 4 through 10 to alarm on the opposite input state.

8) TEST WIRING! Verify the following:

   a) Channel 1 LED activates when Pump 1 runs.

   b) Channel 2 LED activates when Pump 2 runs.

   c) Channel 3 LED activates when Pump 3 runs.

   d) Channel 4 LED pulses when flow through flowmeter is occurring

Test wiring for any remaining inputs by manipulating their state and verifying that the corresponding Channel LED activates when the input is closed (and deactivates when the input is open).

TEMPLATE 5 WIRING

DIP Switch Settng:

Internal Common Connection

CHAN 1, CHAN 2, CHAN 3, CHAN 4, CHAN 5, CHAN 6, CHAN 7, CHAN 8, CHAN 9, CHAN 10

DRT IN 1, DRT IN 2, DRT IN 3

Other Signal Inputs

COMMON 1, COMMON 2

GROUND, V COM, V+

Do not Omit Ground Connection!

12 - 24 VDC POWER SOURCE

NOTES:

- Dry (non-powered) contact inputs only!

- Channels 1, 2 and 3 may be independently configured for pulse totalizing, run time accumulation or simple digital inputs via the web site.

- To use Channels 9 or 10 as analog inputs, see separate diagram.

- Ground connection is important for surge protection.

- Terminals accommodate #16 to #26 wire size.

WIRING INSTRUCTIONS FOR TEMPLATE 5:

1) Turn RTU on, and Disarm it (so that the right hand Arm/Disarm LED blinks).

2) Connect input wiring as needed per the above diagram.

3) Place all inputs in their normal, non-alarm state. Press the ACCEPT pushbutton. This automatically configures inputs to alarm on the opposite input state.

4) If any inputs (such as run time or totalizer inputs) are to be non-alarming, after using the Accept pushbutton, configure those inputs as Status Only via the web site.

5) TEST WIRING! Test input wiring by manipulating the state of inputs and verifying that the corresponding Channel LED activates when the input is closed (and deactivates when the input is open).
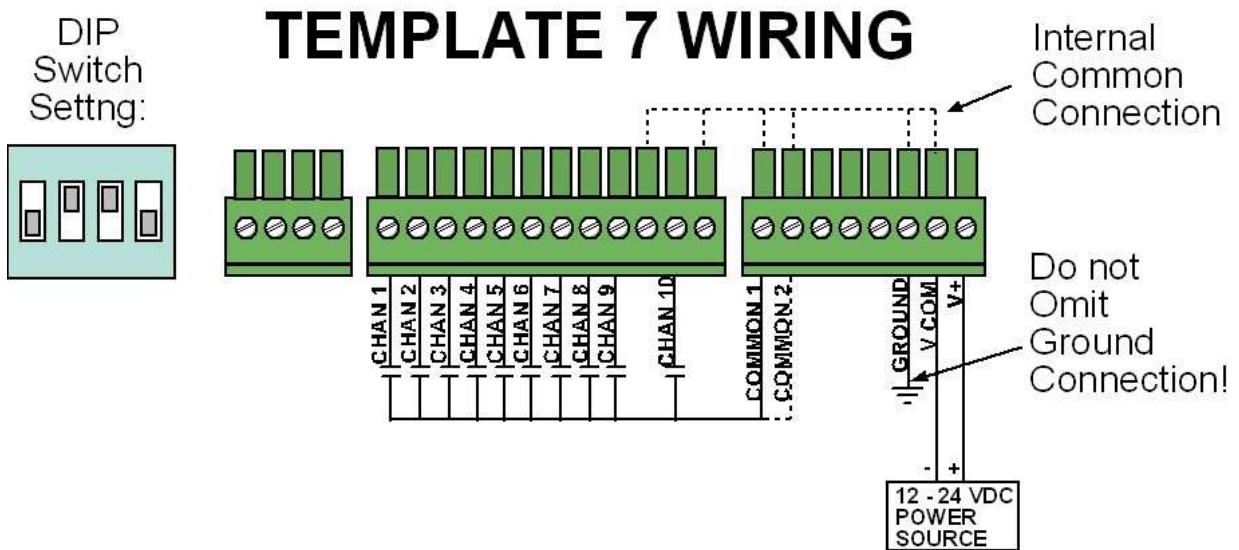
NOTES:

- Dry (<u>non-powered</u>) contact inputs only!

- To use Channels 9 or 10 as analog inputs, see separate diagram.

- Ground connection is important for surge protection.

- Terminals accommodate #16 to #26 wire size.

WIRING INSTRUCTIONS:

1) Turn RTU on, and Disarm it (so that the right hand Arm/Disarm LED blinks).

2) Connect input wiring as needed per the above diagram.

3) Place all inputs in their normal, non-alarm state. Press the ACCEPT pushbutton. This automatically configures inputs to alarm on the opposite input state.

4) If any inputs are to be non-alarming, after using the Accept pushbutton, configure those inputs as Status-Only via the web site.

5) TEST WIRING! Test input wiring by manipulating the state of inputs and verifying that the corresponding Channel LED activates when the input is closed (and deactivates when the input is open).
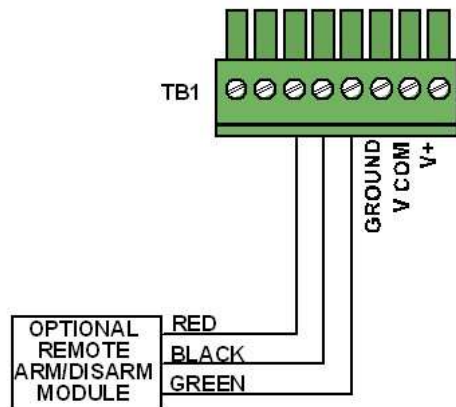
Appendix C: AlarmAgent™ Analog Input, Relay Output and Remote Arm/Disarm Module Wiring Connections
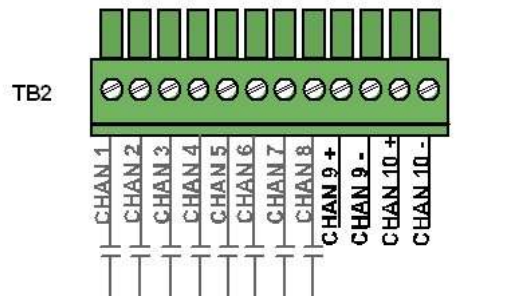

OPTIONAL RELAY
OUTPUT CONNECTIONS

TB3

RELAY #1 OUTPUT A
RELAY #1 OUTPUT B
RELAY #2 OUTPUT A
RELAY #2 OUTPUT B
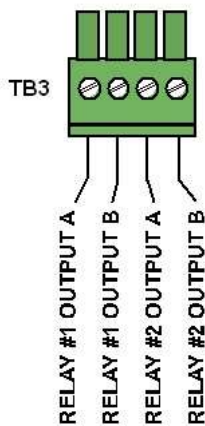
MAX CURRENT 0.5A
@ 120 VAX OR 24 VDC

OPTIONAL REMOTE
ARM/DISARM CONNCECTIONS

TB1

GROUND
V COM
V+

OPTIONAL REMOTE ARM/DISARM MODULE — RED, BLACK, GREEN

USING CHANNELS 9 AND 10
AS ANALOG INPUTS:

TB2

CHAN 1
CHAN 2
CHAN 3
CHAN 4
CHAN 5
CHAN 6
CHAN 7
CHAN 8
CHAN 9 +
CHAN 9 -
CHAN 10 +
CHAN 10 -

CONNECT TO 4-20 MA SIGNAL SOURCES.
INPUTS ARE SINGLE ENDED, MEANING THE COMMON SIDE
OF EACH IS INTERNALLY CONNECTED TO COMMON GROUND.
THIS MEANS THAT NO OTHER POINT IN THE LOOP SHOULD BE GROUNDED.

NOTE: THE DEFAULT CONFIGURATION FOR CHANNELS
9 & 10 IS DIGITAL INPUT, ALARMING ON CLOSED CIRCUIT.

TO USE ANALOG INPUTS, THE CHANNEL(S) MUST BE CONFIGURED
AS ANALOG INPUTS VIA THE SERIAL PORT OR VIA THE WEB SITE.

Appendix D: Solar Power Mode Specification

The Solar Power Mode behaves in a different way than the standard version:

- There are two sets of batteries in a solar unit:

    1. **SOLAR BATTERY BANK**: The *solar array* provides power to the unit when there is adequate sunlight. During periods of inadequate sunlight, power is supplied by a large solar battery bank.

    2. **RTU BACKUP BATTERY**: The RTU still has its own backup battery, although there are two of those same types of batteries.

- To conserve power, LEDs will flash at a slow rate (22Hz)
- Power Failure occurs due to solar battery bank discharge instead of AC power
- Circuitry controlling POWER-ON after total battery discharge, included hysteresis to reduce oscillation. Battery discharged threshold changed to allow charging without turning on the unit

The input power connector, labeled as "TB1 – POWER IN & REMOTE A/D" shown with the large gauge wires coming from the SunGuard regulator on the left, is shipped DISCONNECTED. The wires have been pulled off its mating connector on the RTU circuit board. These wires must be plugged in, to connect primary power to the unit (which for the solar unit is the solar array and solar battery bank).
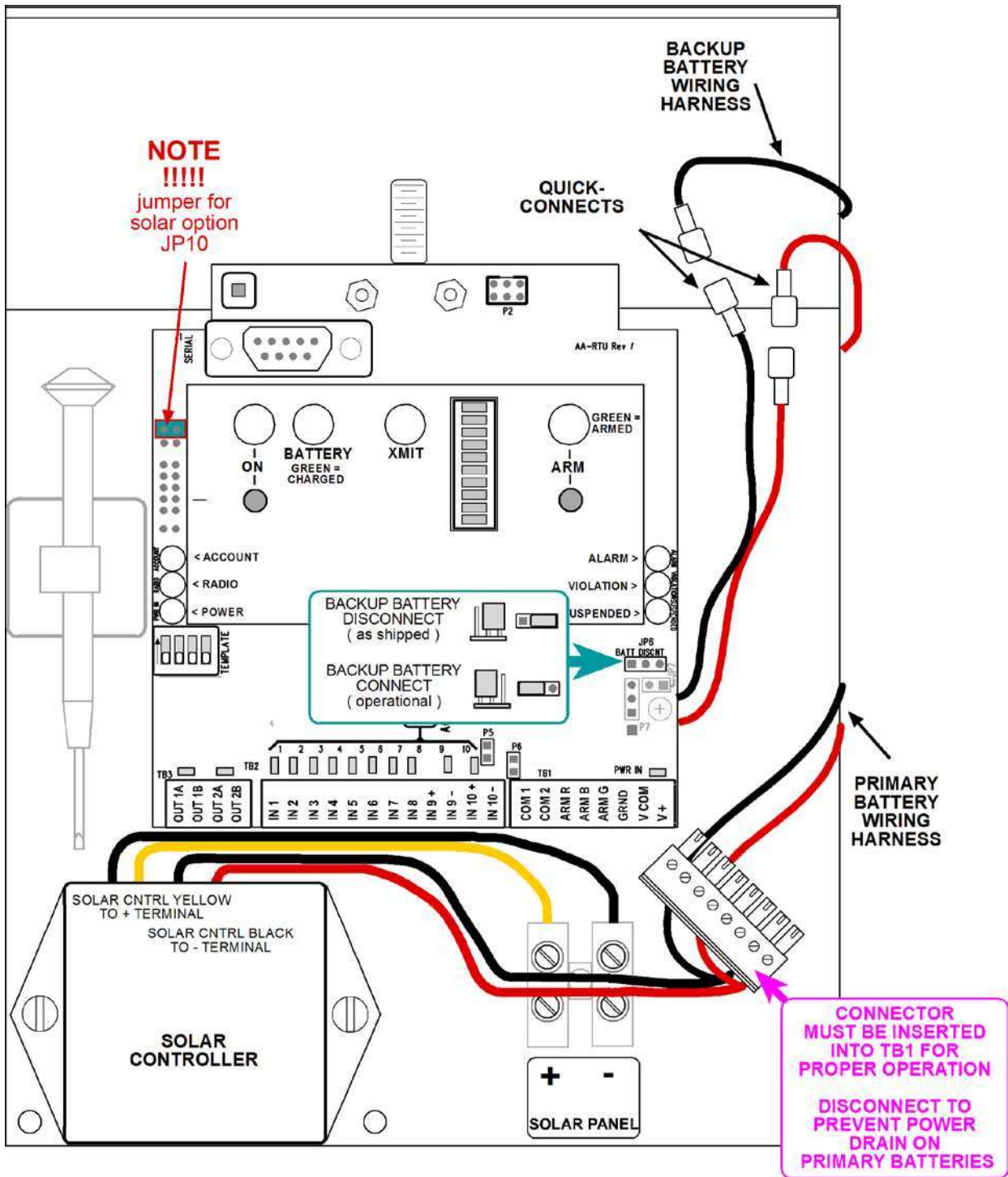
> **IMPORTANT NOTE**
>
> DO NOT LEAVE THE BATTERY CONNECTED WHEN THE UNIT IS NOT CONNECTED TO PRIMARY POWER. BATTERIES CAN DRAIN TO THE POINT WHERE THEY WILL NO LONGER CHARGE, IN WHICH CASE THE BATTERY MUST BE REPLACED.

The battery disconnect jumper (see "Chapter 2.0, Connecting the Battery") must be moved from the right-hand position to the left-hand position when the RTU is placed into service.

If the RTU needs to be taken out of service for an extended period or returned to RACO for service, you need to remove the wires from TB1, and also move the battery jumper shunt (JP6) to the right-hand position to disconnect the battery.

For more information on Solar Power Mode specifications, please refer to the following drawings and mounting diagrams, or contact your RACO representative.
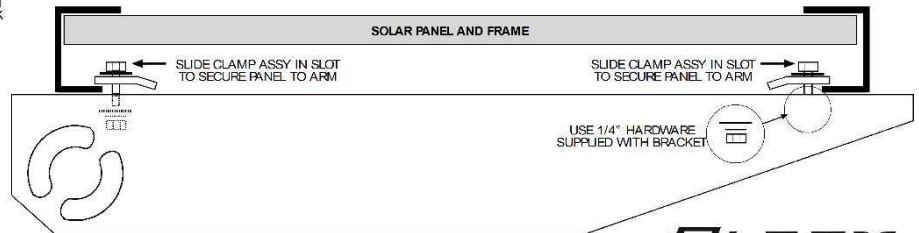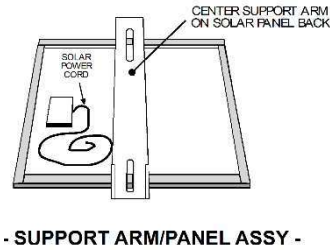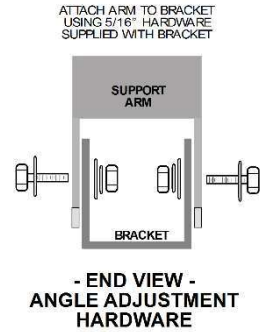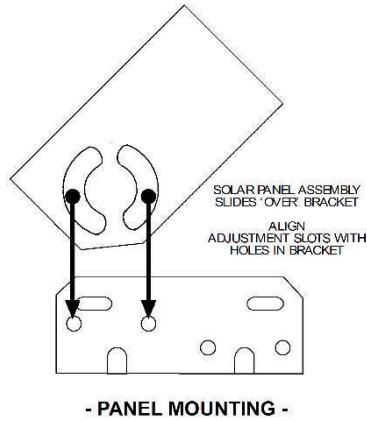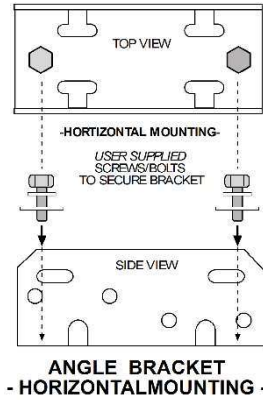
Solar Power Mode Wiring Diagram
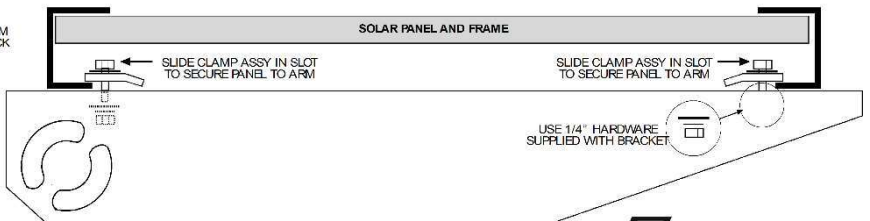
ALARMAGENT SOLAR ENCLOSURE
MOUNTING DIMENSIONS

5.63"

1.5"
Typical
Antenna Ht.

11.10"

ENCLOSURE MOUNTING:
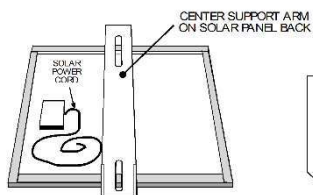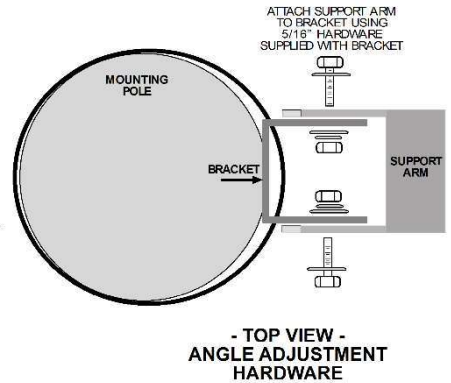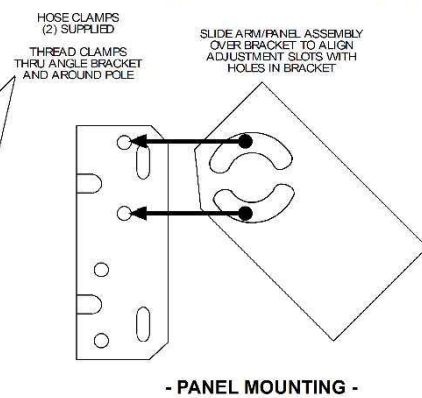4 HOLES MARKED **A**
5.63" x 11.10" CENTERS; 5/16" DIA.

10.5"l x 8.5"w x 5.5"h
NEMA4
Solar Enclosure

HORIZONTAL SOLAR PANEL MOUNTING DETAIL

TOP VIEW

-HORTIZONTAL MOUNTING-

USER SUPPLIED
SCREWS/BOLTS
TO SECURE BRACKET

SIDE VIEW

ANGLE BRACKET
- HORIZONTALMOUNTING -

SOLAR PANEL ASSEMBLY
SLIDES 'OVER' BRACKET

ALIGN
ADJUSTMENT SLOTS WITH
HOLES IN BRACKET

- PANEL MOUNTING -

ATTACH ARM TO BRACKET
USING 5/16" HARDWARE
SUPPLIED WITH BRACKET

SUPPORT
ARM

BRACKET

- END VIEW -
ANGLE ADJUSTMENT
HARDWARE

CENTER SUPPORT ARM
ON SOLAR PANEL BACK

SOLAR
POWER
CORD

- SUPPORT ARM/PANEL ASSY -

SOLAR PANEL AND FRAME

SLIDE CLAMP ASSY IN SLOT
TO SECURE PANEL TO ARM

SLIDE CLAMP ASSY IN SLOT
TO SECURE PANEL TO ARM

USE 1/4" HARDWARE
SUPPLIED WITH BRACKET

VERTICAL SOLAR PANEL DETAIL

HOSE CLAMPS
(2) SUPPLIED

THREAD CLAMPS
THRU ANGLE BRACKET
AND AROUND POLE

USER
SUPPLIED
HARDWARE
IF NOT USING
HOSE CLAMPS

ATTACH BRACKET TO POLE,
USING HOSE CLAMPS
FOR POLE 1.87" - 5.0" DIA.

FOR WALL,
OR VERTICAL SURFACE,
USE SCREWS/BOLTS
TO SECURE BRACKET

ANGLE BRACKET
- VERTICAL MOUNTING -

SLIDE ARM/PANEL ASSEMBLY
OVER BRACKET TO ALIGN
ADJUSTMENT SLOTS WITH
HOLES IN BRACKET

- PANEL MOUNTING -

ATTACH SUPPORT ARM
TO BRACKET USING
5/16" HARDWARE
SUPPLIED WITH BRACKET

MOUNTING
POLE

BRACKET

SUPPORT
ARM

- TOP VIEW -
ANGLE ADJUSTMENT
HARDWARE

CENTER SUPPORT ARM
ON SOLAR PANEL BACK

SOLAR
POWER
CORD

- SUPPORT ARM/PANEL ASSY -

SOLAR PANEL AND FRAME

SLIDE CLAMP ASSY IN SLOT
TO SECURE PANEL TO ARM

SLIDE CLAMP ASSY IN SLOT
TO SECURE PANEL TO ARM

USE 1/4" HARDWARE
SUPPLIED WITH BRACKET

ALARMAGENT SOLAR COLLECTOR MOUNTING OPTIONS

20 WATT SOLAR PANEL MODULE

SOLAR CELL POWER LINE TO ALARMAGENT

SOLAR PANEL

MOUNTING HARDWARE

FOR BEST SOLAR PERFORMANCE ADJUST PANEL DIRECTION AND ANGLE ACCORDING TO OPTIMIZATION CHARTS

VERTICAL / POLE MOUNTING

ATTACH SOLAR POWER LINE TO TERMINAL *OBSERVE POLARITY!*

SOLAR CONTROLLER

19.6"

16.7"

20 WATT SOLAR PANEL MODULE

SOLAR POWER LINE TO ALARMAGENT

FOR BEST SOLAR PERFORMANCE ADJUST PANEL DIRECTION AND ANGLE ACCORDING TO OPTIMIZATION CHARTS

SOLAR CELL

MOUNTING HARDWARE

HORIZONTAL MOUNTING

Appendix E: AlarmAgentTM RTU Specification

MODELS

AlarmAgent.com Wireless Remote Terminal
Units (RTU) are offered in 2 different models:
AA-102DC AlarmAgent.com RTU
with NEMA 1 Enclosure
AA-102DCNEMA4X AlarmAgent.com RTU with
NEMA 4X Enclosure and Outdoor Antenna

ELECTRICAL

Eight Digital Inputs: For connection to dry
(unpowered) contacts. Open circuit voltage
5VDC; closed circuit current 2mA DC.
Pulse Totalizing: Minimum closed pulse width 50 millisaconds;
maximum pulse rate 10 pps.
Two Universal Signal Inputs:
Digital: Open circuit voltage 5VDC; closed
circuit current 2mA DC.
Analog: 4-20MA, single ended. Maximum
voltage drop 2.5 VDC.
Resolution: 0.1%, absolute accuracy is 0.25%.
Two Relay Outputs: Normally Open Relays,
0.5-ampere @ 120VAC
Battery Backup: 24 hours, 12 volt @ 1.2 Amp Hr
Power Management: System intelligently
manages power during power failure.
Power Requirements:
User supplied. The RTU operates on
12 to 24 VDC power input.
With 12 VDC input, current is
1-ampere peak, 200 mA average.
With 24 VDC input, current is
0.5-ampere peak, 100 mA average.
Battery Charging: Precision voltage controlled
to maximize battery life and rapidly recharge
the battery after power failure.
Power Failure: Automatic alarm for external
power failure and low battery detection.
Power Consumption: 2 watts nominal
Solar Power: In solar power mode, average
current is 60 ma @ 12 VDC (0.72 watts)
Surge Protection:
Digital inputs are opto-isolated and rated
at 5,000 volts.
Universal inputs are rated at 600 watts.
Power input is protected to 1,500 watts peak.
The fuse is automatically reset.

PHYSICAL

Enclosure:
Open chassis: 9.6" H x 4.0" W x 2.44" D
NEMA 1 enclosure: 9.6" H x 4.35" W x 2.75" D
NEMA 4X enclosure: 11.5" H x 4.33" W x 5.5" D
Mounting Centers:
Open chassis: 3-1/2" x 5-15/16"
NEMA 1 enclosure: 3-1/2" x 6-19/32"
NEMA 4X enclosure: 4" x 8-3/4"

Weight:
Open chassis: 2.4 lbs w/Indoor antenna
NEMA 1 enclosure: 2.7 lbs w/Indoor antenna
NEMA 4X enclosure: 5.5 lbs w/Conical Outdoor antenna

ENVIRONMENTAL

Temperature range:
Operating, -30 to + 70°C (-22 to +158°F)
Storage, -40 to + 85°C (-40 to +185°F)
Humidity: 0 to 95% non-condensing

COMMUNICATIONS

Bi-directional RTU communications are handled
by the AlarmAgent.com secure server via the
wireless cellular network.

SYSTEM CONFIGURATION

The RTU is configurable via two possible
means: via dipswitch, or wirelessly via
AlarmAgent.com. In most cases, a notebook
computer connection is not required. By selecting
from 4 templates that are optimized for duplex
pump stations with or without totalizer and triplex
pump stations with or without totalizer, rapid
installation and error proof startup are virtually
guaranteed. Three additional templates are
available for more general applications.

ALARM AND SYSTEM MESSAGES

User defined alarm and system messages
are delivered via voice calls, SMS messages,
alphanumeric pagers, and e-mail to an unlimited
number of user specified destinations. Authorized
personnel acknowledge alarms during voice calls
via a toll free number, e-mail, or through the
AlarmAgent.com Web site.

OPERATOR INTERFACE

The AlarmAgent.com RTU includes pushbuttons
to turn the unit on or off, to arm or disarm the unit,
to cause a special Test Call to be generated, and a
digital input Accept function to assist in the setup
of the RTU.
LEDs are used extensively throughout to indicate
the status of the following subsystems: AC power
status, battery status, network service availability,
a 10 segment LED bar graph for service signal
strength, actively transmitting, test report, customer
account status, template setting status, individual
input channel state, individual relay output state,
and if any channels have exceeded their daily
limit of transmissions.

WARRANTY

Three year parts and labor warranty,
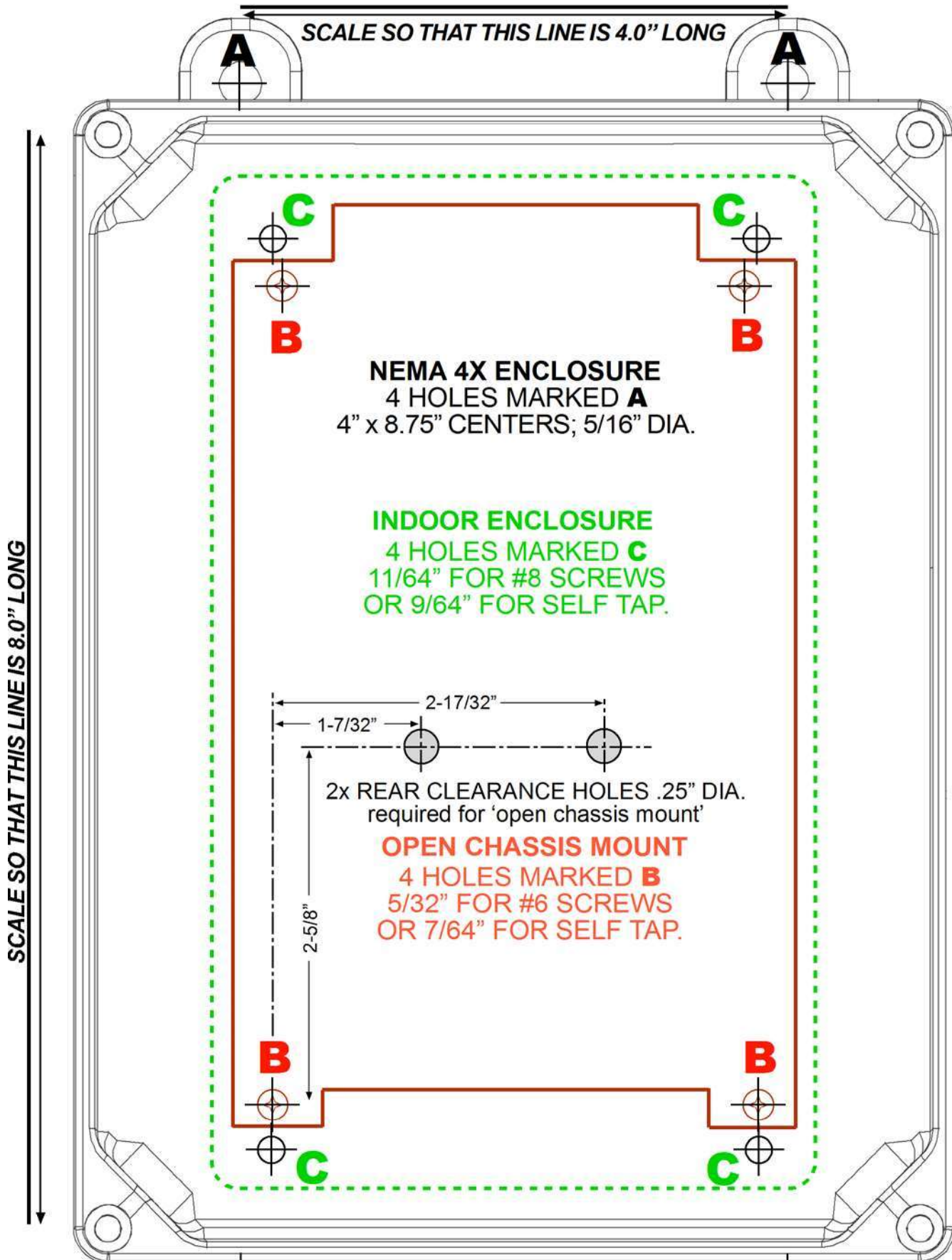FOB factory Emeryville, CA

FIELD UPGRADES

AlarmAgent.com RTU firmware is
field upgradeable.

Appendix F: AlarmAgent™ RTU Mounting Templates

This page intended to be blank so the following mounting template can

be removed from the manual as required.

ALARMAGENT MOUNTING TEMPLATES

SCALE SO THAT THIS LINE IS 4.0" LONG

A   **A**

SCALE SO THAT THIS LINE IS 8.0" LONG

C   **C**

B   **B**

NEMA 4X ENCLOSURE
4 HOLES MARKED **A**
4" x 8.75" CENTERS; 5/16" DIA.

INDOOR ENCLOSURE
4 HOLES MARKED **C**
11/64" FOR #8 SCREWS
OR 9/64" FOR SELF TAP.

2-17/32"

1-7/32"

2-5/8"

2x REAR CLEARANCE HOLES .25" DIA.
required for 'open chassis mount'

OPEN CHASSIS MOUNT
4 HOLES MARKED **B**
5/32" FOR #6 SCREWS
OR 7/64" FOR SELF TAP.

B   **B**

C   **C**

ALARM AGENT.com

Appendix G: AlarmAgent™ RTU Digital Upgrade Field Wiring Worksheets

AlarmAgent wiring template

OUT 1A OUT 1B OUT 2A OUT 2B

IN 1 IN 2 IN 3 IN 4 IN 5 IN 6 IN 7 IN 8 IN 9+ IN 9- IN 10+ IN 10-

COM 1 COM 2 ARM R ARM B ARM G GRND V COM V +
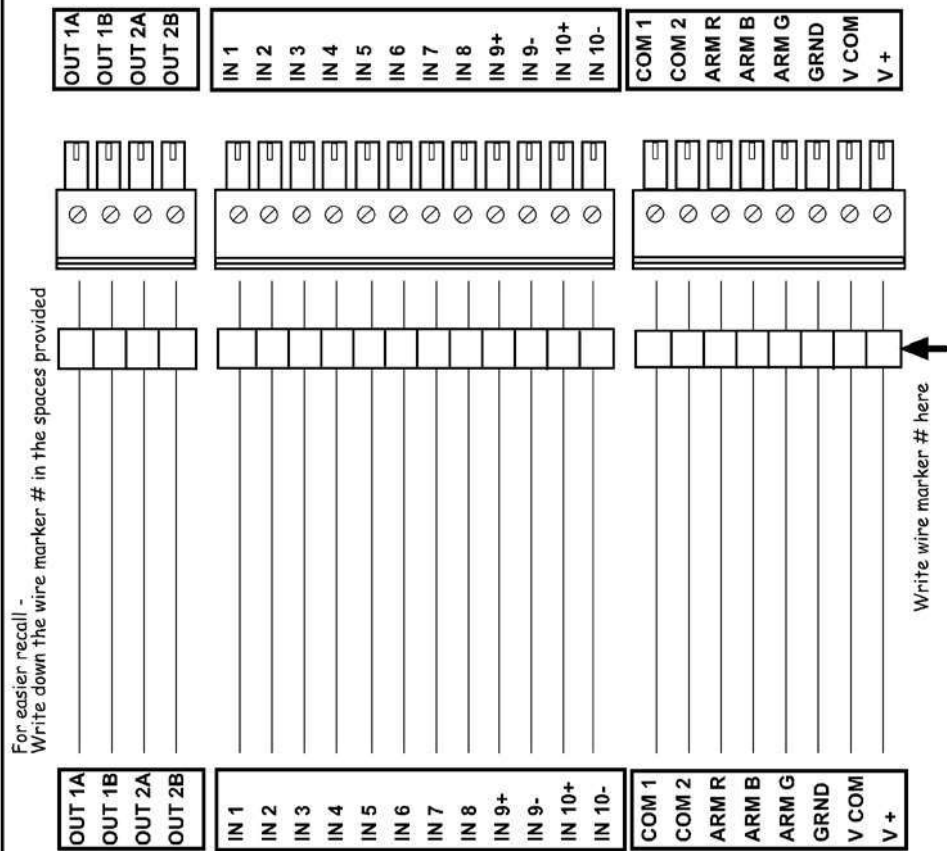
For easier recall -
Write down the wire marker # in the spaces provided

Write wire marker # here

OUT 1A OUT 1B OUT 2A OUT 2B

IN 1 IN 2 IN 3 IN 4 IN 5 IN 6 IN 7 IN 8 IN 9+ IN 9- IN 10+ IN 10-

COM 1 COM 2 ARM R ARM B ARM G GRND V COM V +

use this sheet and the supplied
wire markers to document
your connections

REMOVE ALL WIRES & TERMINAL CONNECTORS
* SAVE THE CONNECTORS *
you will need these
to connect to the
new unit

2

RACO
SINCE 1948
REMOTE ALARMS AND CONTROLS

CUSTOMER SUPPORT
1-800-449-4539

AlarmAgent Upgrade Preparation
Battery Jumper / Wiring   - aacs1-

ALARM AGENT
.com

INDEX