



Stealth Reader
Quick Installers Guide



Version A.01
Copyright 2013 Axiometric, LLC

Table of Contents

Introduction.....	3
Specifications	3
FCC Compliance.....	4
Pre-Installation	4
Supplies/Equipment.....	4
Installation.....	6
Considerations.....	6
Procedure	6
Preparing the Meter.....	6
Connecting to the Register.....	6
Splicing Techniques	10
Mounting	11
Pit Mounting	11
Proper/ Improper Mounting	11
Configuration.....	12
LED Behavior.....	13
Shipping and Handling.....	14
Trouble Shooting.....	14
Problems with the SMiRF.....	14
Register isn't moving	14

Introduction

Specifications



Working Environment: The Stealth Reader's operating environment should reside in an area that has the temperature range of -40C to +85C. Also do not submerge the Stealth Reader for more than 30 minutes at a depth of 1 meter. Any longer and the Stealth Reader will receive damage.

Operating Temperature: -40 °C to +85 °C

Battery: 2 Wuhan Voltec ER34615 LiSOC12 Batteries

Battery Life: 10+ years

FCC Compliance

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.

FCC ID: VE4-WM2E

Caution: Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

To comply with FCC RF exposure requirements, the device and the antenna for this device must be installed to ensure a minimum separation distance of 20 cm or more from a person's body. Other operating configurations should be avoided.

Pre-Installation

Before Installing the Stealth Reader some equipment needs to be gathered. This section is to list the materials needed to successfully install the Stealth Reader to be used effectively.

Supplies/Equipment

In order to install the Stealth Reader properly the following Equipment is needed:

- The Stealth Reader
- A Register
- Wire-end Connectors
- Lid Lock
- SMiRF
- Any other equipment that goes with the desired mounting.

The Supplies that are needed for installing the register are listed in the following:

- Razor blade or chisel or wire strippers
- Non Pumice Fast Orange
- Cloth rags

Stealth Reader

- 99% Isopropyl Rubbing Alcohol
- Cotton Squares (lint free)
- Plumber's Goop Adhesive #15112
- Wire Cutter
- 9 volt battery

In order to install the Stealth Reader without **Any** chance of water damage these materials are needed:

- Devcon Mark 5 epoxy gun for 50ml cartridge
- Mixing Nozzle for the Gun #14285
- UY Connectors
 - 3M IDC Connector-Yellow Part No. 34-7035-9854-9
 - 3M IDC Connector-Red Part No. 78-8064-7439-7
 - AMP Tel-Splice Connector 2 Wire 19-26 AWG-Part No. 1-552795-2
 - AMP Tel-Splice Connector 3 Wire 19-26 AWG-Part No. 1-552678-2
- Burial Pod
 - UY connector/Burial pod combination (*Connector Kings Corp* 800-822-6608)
 - 3-3M UY Meter Kit SA1013E {3-3M Gels for each plastic pod}
 - 3M Direct Burial Splice Pod – Part No. 054007-09964 (0110 Firmware Wire-end D4100 MOSAIC or higher)
- Devcon Polystrate 2 Ton Epoxy Cartridge #14260
- 2-Ton Epoxy Devcon Polystrate 2-Ton epoxy 14260
- Loctite Quick Set Epoxy gel QM-50 81501

Installation

Installation of the Stealth Reader consists of several different steps. This section goes over the installation of the Stealth Reader and the mounting process with considerations to have in mind.

Considerations

1. Signal distance depends on the location of the Stealth Reader's antenna. When the Stealth Reader's antenna is higher the signal is generally stronger.
2. The Pit Lid or Vault may affect the transmission range. The different material can cause the range to decrease or increase, it depends on what it is, for instance a plastic lid has a larger range compared to a cast iron lid.
3. The installation takes about 5-10 minutes, but it will depend on the location and mounting. If the lid uses the Screw Top and Nut assembly as well as a hole for the unit to go into. Make sure there is enough space between the box lid and the ground for the Stealth reader to sit and operate. If there isn't enough space so the Stealth reader to sit properly, remove some dirt from the area. **Do not over-tighten lid locks!**

Procedure

Preparing the Meter

1. Check the Meter for anything that could be wrong.
2. Clean the lens/face by using Fast Orange non-pumice cleaner and a cloth or cotton swab to remove any residue.
3. Now clean the meter face/lens again only now with 99% isopropyl alcohol and a **New** lint-free cotton swab.
4. Continue to wipe the surface of the lens with a new cotton swab, till the cotton swab comes up clean, also clean leans squeaks when wiped.
5. When the cleaning is done, make sure that the lens is **Completely** dry, to make sure the alcohol has evaporated.

Note:

Only use Isopropyl rubbing alcohol marked "99% by volume". Lower concentrations, such as the commonly available 91%, does **not** clean or evaporate well.

Connecting to the Register

When connecting the Stealth Reader to the clean Register there are steps to be followed when connecting the wires together. First when connecting the Stealth Reader to the Register there are wires that are needed to be hooked up properly. If the wires aren't hooked up to the right wires, the Stealth Reader will not work properly. The following table matches the type of Register and the wires that need to be connected for each type.

Brand	Model	Register Type	SR Wires	Register Wires
ABB/Kent	Scancoder	Encoded	Red	Green
			Green	Red
			Black	Black
Hersey	Translator	Encoded	Red	Red

Stealth Reader

			Green	Green
			Black	Black
Mesh Master	Dialog	Encoded	Red	Green
			Green	Green
			Black	Red
Metron	Prolink	Encoded	Brown	Red
			White	Green
			Black	Black
Neptune	T-8	Encoded	Red	1 Post
			Green	2 Post
			Black	3 Post
Neptune	AUTO	Encoded	Red	Black
			Green	Red
			Black	Green
Rockwell	ECR	Encoded	Red	Red
	3 Wire		Green	Green
			Black	Black
Rockwell	ECR	Encoded	Red	Red
	2 Wire		Green	Red
			Black	Black
Rockwell	Touchread	Encoded	Red	Red
	3 Wire		Green	Green
			Black	Black
Rockwell	Touchread	Encoded	Red	Red
	2 Wire		Green	Red
			Black	Black
Schlumberger	ARB V	Encoded	Red	Black
			Green	Red
			Black	Green
Schlumberger	ARB VI	Encoded	Red	Black
			Green	Red
			Black	Green
Schlumberger	AUTO	Encoded	Red	Black
			Green	Red
			Black	Green
Sensus	SR II	Encoded	Red	Red

Stealth Reader

	3 Wire		Green	Green
			Black	Black
Sensus	SR II	Encoded	Red	Red
	2 Wire		Green	Red
Invensys	AMR System	Encoded	Black	Black
			Red	Red
Neptune	E-coder	Encoded	Green	Green
			Black	Black
			Red	Black
Badger	Absolute Encoder	Encoded	Green	Red
			Black	Green
			Red	Red
Metron	Spectrum 22	Encoded	Green	Green
			Black	Black
			Red	Red
AMCO	InVision	Encoded	Black	Black
			Red	Green
			White	Red
Invensys/Sensus	ICE	Encoded	Black	Black
			Red	Red
			Green	Green
			Black	Black

When connecting the Stealth Reader to the Register there are screws or wires connected to the Register. The screws will be labeled with either the word or the starting letter of the colors. So there maybe a "R, G, B, etc." next to there own nob. This is done so that the wiring can be done properly, and get the wires connected to the right color.

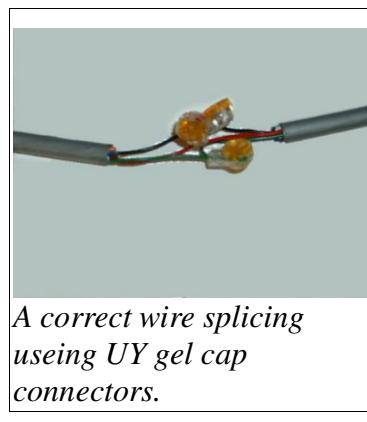
When actually connecting the Stealth Reader to the Register please follow the following procedure.

1. Check the Chart above to see what wires need to be connected together based on the Brand and Model of the Register.
2. Connect the wires using the UY gel cap connectors. If the wires are stripped, cut off the stripped ends. Wires must have unstripped ends in order to use the gel cap connectors. Use the Klein Crimping tool to secure the gel cap connectors.

Note:

Once connected to the register, test the Stealth Reader connections by programming the unit and receiving the encoded setup message.

3. Pulse registers don't have pre-install test capabilities. So be sure the



wires are connected correctly before filling pods with epoxy.

If the wires are hooked up wrong and need to go back and redo them these are the steps to fix the problem.

1. Cut off the wires where they go into the UY gel caps.
2. Repeat procedures 2-4 from the section above.

There are some registers that do not connect through wires. Instead they have screws that are next to the indicator that shows which color it would be in the previous chart. Below are the steps to connect the wires to that type of register.

1. Look at the chart to find out which wires go to what for that specific register.
2. Wrap the correct wire around the screw clockwise.
3. Tighten the screws while also making sure the wire stays in place. In doing this if the wires are wrapped around the correct way, it will tighten itself when the screw is being tightened.

Splicing Techniques

This is the method to make sure the wire connections are completely water proof.

Water Pit Splice Method using burial pods

- Fill the burial pod up to a half to two-thirds of the way full with epoxy.
- Insert the UY connection into the burial pod so the cables come out on either side of the pod.
- Completely fill the empty space left in the pod with approved 2-ton epoxy.
- Tap to the Burial pod against a hard surface to release any air bubbles.
- Close the burial pod by snapping it shut and allow 30 minutes of drying time.



Water Pit Splice Method for Direct Register Connections

- Strip the wires back 4 inches.
- Cut excess wires and direct connect to meter according to wire connections guide per register type.
- Put remaining wires in black pod and fill with epoxy per approved method.

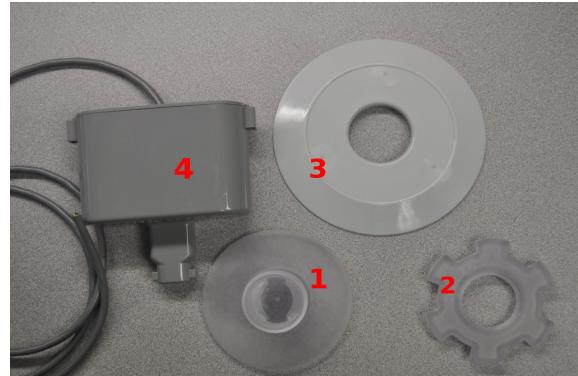


Mounting

When putting a Meter and Register in a certain location it has to be properly mounted. The mounting that will be described in this Manuel will be Pit Mounting. There are other ways to mount compatible with the Stealth Reader, Wall and Pole mounting.

Pit Mounting

1. Get the materials for the mounting like in the picture to the right. (Not including Lid)
2. Take the Lid of the Pit Mount and put the Screw Top, into the hole in the Lid having the threaded part pointing down into the inside of the pit.
3. To raise the antenna for better signal put the Raiser, between the Screw Top and the Lid.
4. To Secure the Screw top onto the Lid take the Nut and twist it onto the Screw Top until it can't tighten anymore, but do **Not** overtighten it.
5. Now take the top of the Stealth Repeater, the end that isn't hooked up to the register, and put it into the Screw top. Turn it until a click is heard, this click means the Stealth Reader is locked into the Screw Top.
6. Now place the register into the pit and lay the lid and check to see if it will close all the way without putting weight on the Stealth Reader. **Never** let the weight of the Lid be on the Stealth Reader, it will cause damage.
7. Pick up all trash in the area and in the pit.
8. When the Lid can close turn the bolt clockwise, so the Lid is locked.



1 = Screw Top, 2 = Nut, 3 = Raiser, 4 = Stealth Reader

Proper/ Improper Mounting

When mounting the Stealth Reader it can be done correctly and incorrectly. This section will help clarify what is improper mounting and how to fix it.

Pit

The Pit Mounting is done so the Stealth Reader is sitting correctly and the lid can close securely to seal up properly. The picture to the right shows an improper installation of the Stealth Reader. The Reader is sitting too high and the lid can't close properly. To fix this problem remove some dirt underneath the reader till the lid can close properly without putting any weight on the Stealth Reader. Also check to see if the Stealth Reader isn't messed up, like the device isn't in the Screw Top properly or anything of that nature that can cause a problem. This problem needs to be fixed because the Stealth Reader isn't safe with the lid not over it, it can be stolen, and or damaged. Also in the situation like in the picture, the weight of the lid is on the Stealth Reader. This can cause internal problems as well as damage the device itself.



Configuration

In order to configure the Stealth Reader it has to be fully Installed go to the SMiRF.

MIU installations are typically performed in response to an assigned workorder (task). MIUs may also be installed independently by a technician (e.g. for a demonstration or as a repeater to extend range). The installation processes for task assigned and independent installs are very similar. They are described below and the differences are noted.



To install an MIU without a workorder, tap "Install". Then select the type of MIU to be installed. If it is a workorder go to Tasks and start from that window. The windows are the same as follows.



When connecting an MIU to an absolute encoder or pulse register, the software displays wiring hints for connecting the MIU to the register. After correctly wiring the devices, tap "OK" to continue.

If the MIU location and meter ID have not already been provided in a workorder, a form is presented for the technician to enter the Meter Id, Address, City, and State. If installing a Repeater there will be no Meter Id. The Meter ID and the Address are required fields. You may not proceed without filling out all of the required fields.



When connecting an MIU to a register, enter the number of moving and painted dials. Tap on the numbers to adjust them to match the dials on the face of the register being installed.

Pulse information, if installing a encoder the constant and ratio wouldn't be shown.

If the MIU is being connected to a pulse register, you must also set the initial register reading, the pulse constant and pulse ratio. To set the initial reading, tap the moving dials and pick their proper number from the list shown; this tells the MIU what the current register reading is. Your system administrator should provide the pulse constant and ratio values. The pulse constant is a multiplier applied to each pulse from the register, the pulse ratio is a divisor. For example, for a register that generates a pulse for every 5 gallons consumed, enter a pulse constant of 10 and a pulse ratio of 2. Tap the numbers to adjust them to the correct values.

When done tap, "Next".

The SMiRF then prompts you to activate the MIU so it can communicate with the MIU. Activate the MIU by placing a magnet on the activation location on the MIU. When the MIU has been successfully activated, it will initiate radio communication with the SMiRF and in a few seconds the SMiRF will beep to indicate that the MIU has been detected; it will then gather information about the MIU using radio communications and display it on a screen for review.



It is critical to confirm that this information is correct, **especially the MIU ID**. When many technicians are working in the same area, it is possible that the SMiRF received a message from a different MIU that was activated by another technician. It is very important to check the Meter Id and MIU ID to ensure the installation is properly recorded. If any of this data is in error, tap "Back" and correct it. When everything is correct tap "Next".

The SMiRF performs the installation using the entered data and the acquired GPS information. If GPS information is not available an warning message is displayed. Upon successfully installing the device an installation summary window is shown for review. When done evaluating the information, tap "OK".



LED Behavior

When operating the Stealth Reader and when installing LED lights will illuminate and blink according to the active problem if any. Below is a chart that specifies what the problems are according to what state the lights are in.

Red Light	Green Light	Problem
Fast Blink	Off	Running from bootloader
Off	Fast Blink	Date and Time not set
Slow Blink	Active	No register detected
Fast Blink	Active	Pulser detected with under 5 counts or Error reading encoder
Solid	Active	Encoder successfully read or Pulser with 5 or more counts
Active	Slow Blink	Has not received mesh timing
Active	Fast Blink	Has received mesh timing but not received a message since last mag swipe
Active	Solid	Has received mesh timing
Note: Active above means slow blink, fast blink, or solid on, just not off.		
Solid	Off	Status for one second indicates detected mag swipe
Active	Fast Blink	Has not received a message since last reset
Active	Solid	Message received since last reset
Solid	Active	Last encode reading was successful
Fast Blink	Active	Last encode reading was not successful

Shipping and Handling

When sending products to a location, here are guidelines and warnings about shipping and handling the Stealth Reader.

- Do **NOT** ship the Stealth Reader on a Plane or any aircraft. The lithium-ion batteries don't handle the plane ride well and can cause a fire that can't be extinguished by aircraft personal.

Trouble Shooting

If something hasn't gone the way that was described in this Manuel refer to the proper sections below. This section is when there is a problem that happened while installing, it will tell the solution to ease stress.

Problems with the SMiRF

If there is a problem with the SMiRF, like it isn't installing properly, it froze, etc. Please refer to the SMiRF documentation to see what might have gone wrong and how to fix it.

Register isn't moving

If the register numbers aren't moving or haven't been for a certain length of time. Check the connection between the Stealth Reader and the register. Please refer also to the chart on page Error: Reference source not found to check if the correct wires are hooked up correctly. If hooked up incorrectly refer to page Error: Reference source not found to find out which wires need to be adjusted, and how to properly connect the right wires. If the wires have disconnected, reconnect the wires properly. If none of these are the problem refer to the register's Manuel.