TURNTIDE®

Installation Guide

Upgrading RMK-002 to RMK+ Long-Range

Document Version 2.0
March 31, 2022

Installation Guide Instructions for:

Item Number	Description
KIT-RMK-US-LR	Kit for upgrading RMK to RMK+ Long-Range Wi-Fi (USA)
KIT-RMK-CA-LR	Kit for upgrading RMK to RMK+ Long-Range Wi-Fi (Canada)

WWW -

Family

RMK - Remote Monitoring Kit

KIT - Kit of parts for field install

XXX -

Type

002 - Cloud Monitoring

003 - Cloud Energy Monitoring

RPT - Wifi Signal Repeater

RMK - RMK+ upgrade kit for standard RMK
Only used when WWW = KIT

YY -

Country Code

CA - Canada

US - United States
or US/Canada for Repeaters

None - United States

ZZ

Range

None - standard range <= 40ft (12 m)

LR - RMK+ long range <=150ft (46 m)

Revision History

Revision Number	Description	Date
1.0	Initial Release	February 7, 2022
1.1	• Once the **Ubiquity antenna** is installed, it will replace the original modem SSID. (Network ID) Hide/remove the old SSID sticker on the NEMA box and stick the updated sticker with the new SSID. The SSID is the **last 4 characters** of the antenna's serial # - The network name should be "TT-####" where #### is the serial number of the Ubiquiti. • Highlighted instruction to reuse wire • Instruction to use ¾" connector if necessary • PoE, troubleshoot polarity based on LED illumination • Some photographs have been replaced with drawings • Dotted wiring reference	February 24, 2022

2.0	• Removed content for MR (Mid-Range) antenna
	• New images for regular versus RMK+ long-range benefits
	• Clarified "Reuse the existing 24VAC wiring to the RMK (if it's suitable) **OR** Replace it with the 10' of 18/2 wiring (included in the kit)" instructions.
	• Included parts:
	  ○ 10' of 18 gauge wire (for transformer)
	  ○ 2' of 18 gauge wire (for the PoE 24 VAC in)
	  ○ 3' of 14 gauge wire
	  ○ 3/4" Weather Tite connector
	  ○ Screws for mounting the transformer
		March 31, 2022

Conventions

Bold	Used in procedures for names of interface elements, such as buttons, fields, and menu items.
Italics	Used for emphasis, typically when introducing a new concept.
Note:	Indicates information that can help a customer make better use of a Turntide product.
Caution icon	Indicates an instruction that draws attention to the risk of damage to the product, process, or surroundings.
Warning icon	Indicates an instruction that draws attention to risk of injury or death and tells the customer how to avoid the potential problem.

Legal

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Audience 5
Installation Prerequisite 5
Overview 6
Benefits of Upgrading RMK-002 to RMK+ Long-Range Versions 6
RMK Signal Radius 6
Tools and Fixtures You'll Need 7
RMK Upgrade Kit Assembly 8
Upgrading 9
Transfer Network to Improve Signal Strength 9
Wiring Diagram for Upgraded RMK 10
Upgrade Instructions 11
Step 1: Assemble the new Ubiquiti antenna 11
Step 2: Assemble the router 12
Step 3: Assemble the PoE Injector 13
Step 4: Wire the 24VAC to the PoE Injector 14
Step 5: Install the CAT6 Ethernet Cables 15
Step 6: Install the Control Transformer 17
Step 7: Start up the system 20
Appendix 22
Full RMK Product List 22

Audience

The instructions in this guide are intended for a mechanical technician who is used to working with commercial HVAC equipment but may not be used to working with networking equipment (Cloud connectivity and wireless networks).

You will have access to Remote Support from Turntide Technical Services:

877.776.8470

support@turntide.com

Installation Prerequisite

Installers are required to complete our online training courses for this product prior to performing installations. See Turntide Academy: www.turntideacademy.com

We strongly recommend the following:

- Review this installation guide and available installation training videos before beginning.
- Follow all local and national electrical codes, safety compliance requirements, and common installation procedures

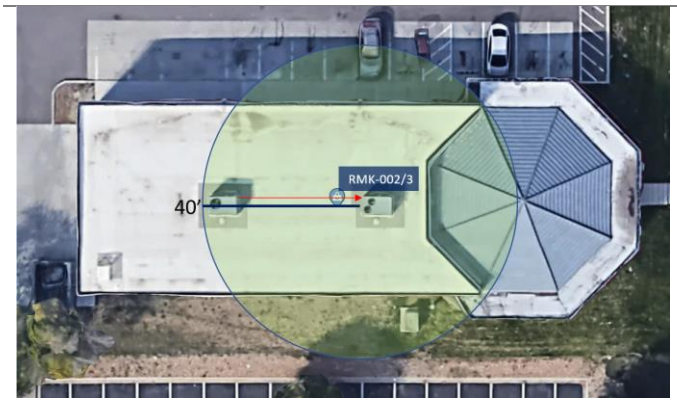
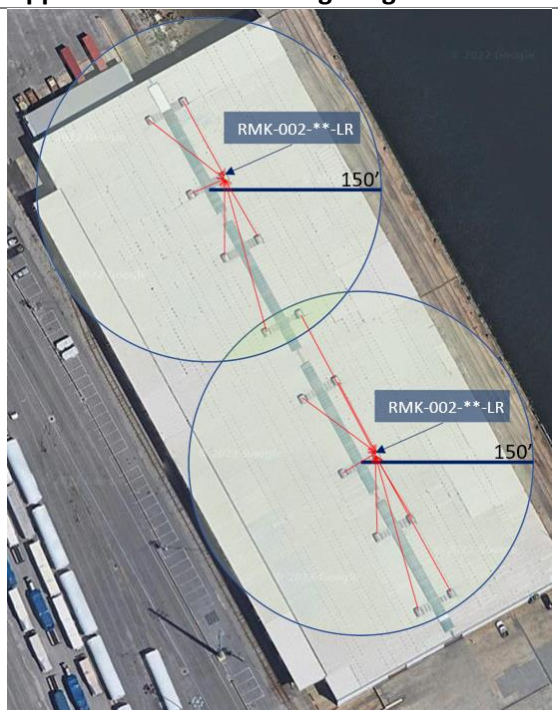
Overview

A Remote Monitoring Kit (RMK) typically consists of the cellular modem and a Turntide Supervisor controller. The RMK product is the primary means of connecting a motor controller to the Turntide Cloud applications using Wi-Fi and cellular 4G communications.

Benefits of Upgrading RMK-002 to RMK+ Long-Range Versions

Long-range versions of the RMK product *(herein after called **RMK+**)* increase Wi-Fi signals so that Turntide® Smart Motor Systems™ can be installed farther away from the RMK. Increasing the range of one RMK increases the number of motors that can be added to a single RMK and therefore reduces the total number of RMKs on a roof.

By using more cable networking hardware, the reliability of wireless communications between RMK and the Turntide Smart Motor System increases. This helps to reduce nuisance alerts from the Turntide Cloud for intermittent communications issues.

RMK-### = 40ft radius	**Appended with LR for long-range = 150ft radius**
	

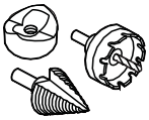
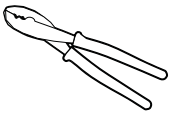
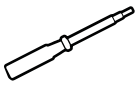
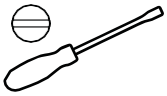
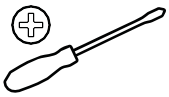
RMK Signal Radius

Use the following signal radius distances *only as guidelines*. Actual radius depends on signal strength, which is also affected by such factors as physical barriers and signal interference.

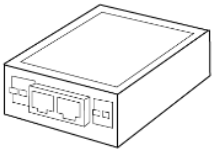
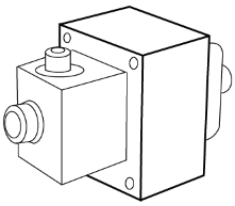
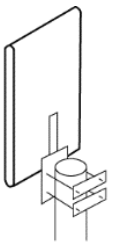
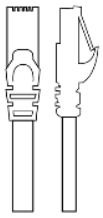
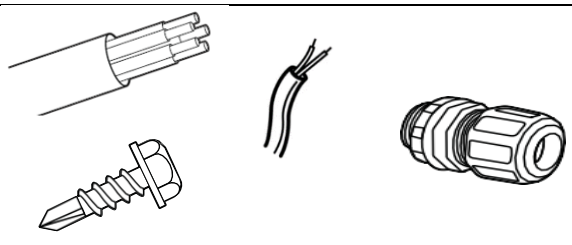
- RMK-### = 40ft radius
- Appended with **LR** for long-range = 150ft radius

Tools and Fixtures You'll Need

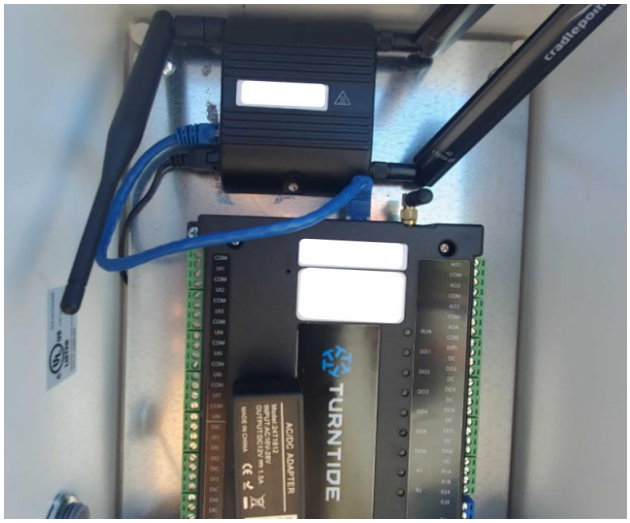
The following common tools are required to Upgrade the Turntide Remote Monitoring Kit. Every application is different, and additional tools may be required.

Cordless Drill	 Uni-bit, Hole Sawor Knock Outs *for 1/2", 3/4" & 1" EMT*	Drill Bit Index up to 1/2"	Clamp Amp Meter
 Terminal (Spade) Crimp Tool	Wire Strippers	Multi-VOM Meter	Nut Driver 1/4" and 5/16"
Adjustable Pliers	Needle Nose Pliers	 Screwdriver Small terminating	 Screwdriver Slot
 Screwdriver Phillips	Measuring Tape	**Technician Kit:** • Velcro • Double-sided tape	**Recommended** • Zip ties

RMK Upgrade Kit Assembly

PoE Injector	
MikroTik Router with SFP Port and PoE out	
Control Transformer, 24 VAC 75 VA, multi-tap input **Note**: The supplied control transformer is multi-ta. You must ensure that you are connecting to the correct primary leads of the transformer.	
Ubiquiti Antenna UniFi AC AP Mesh Pro **long-range.** Includes new SSID label for network ID.	
15’ CAT6 ethernet cable, Qty 1 1’ CAT6 ethernet cable, Qty 3 Rated for outdoor use (UV resistant, waterproof, direct burial rated)	
10' of 18 gauge wire (for transformer) 2' of 18 gauge wire (for the PoE 24 VAC in) 3' of 14 gauge wire 3/4" Weather Tite connector Screws for mounting the transformer	

Upgrading

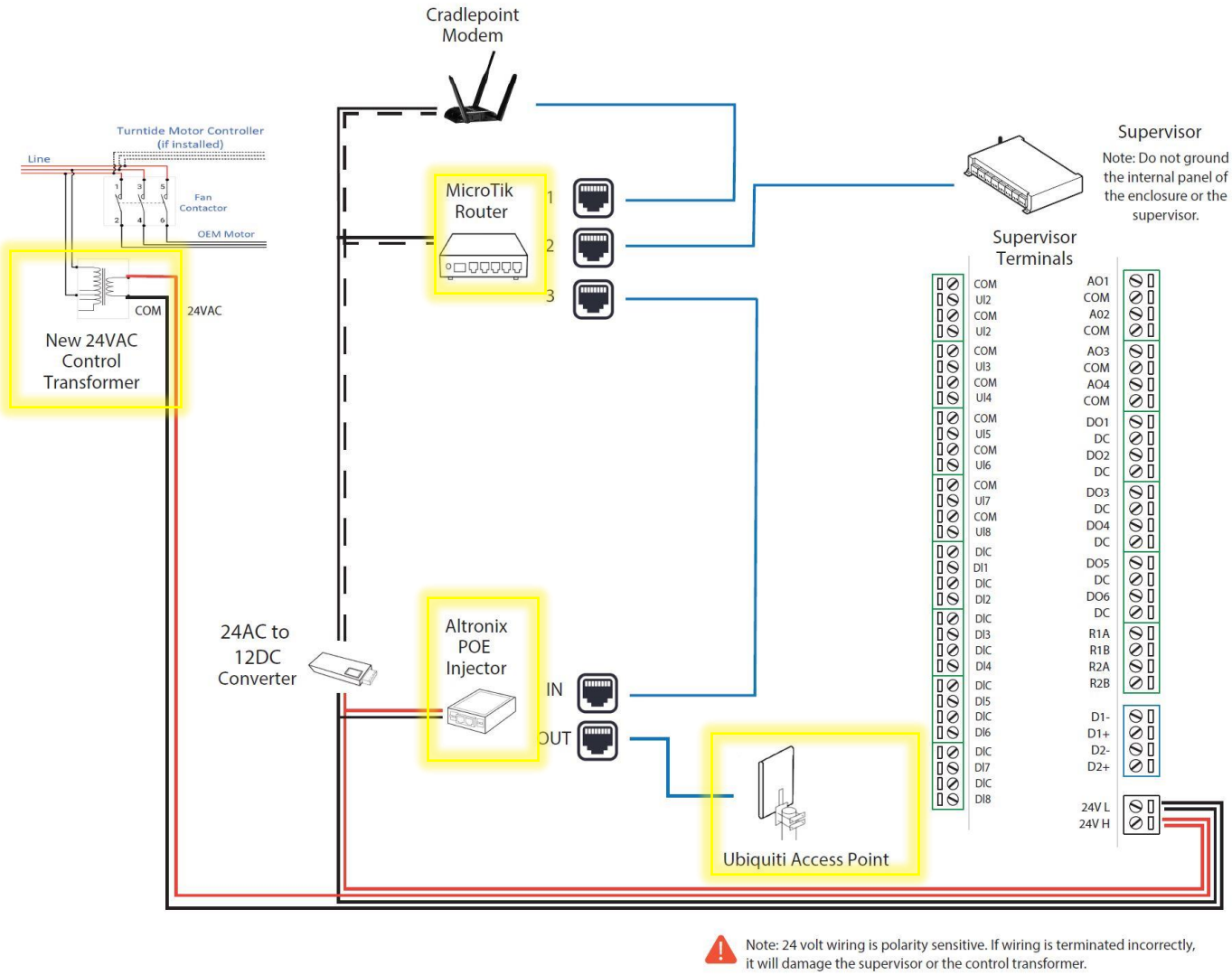
Your existing RMK may resemble:	Your upgraded version (RMK+) should resemble:
	

Transfer Network to Improve Signal Strength

When upgrading to an RMK+, you may be asked to transfer motor controllers from one RMK network to another to improve signal strength on the roof. Contact your Turntide representative if these details have not been made clear to you. For details, see how to connect a motor controller to a network in Motor System Installation Guide on Turntide Academy: www.turntideacademy.com.

Wiring Diagram for Upgraded RMK

To distinguish the existing RMK items from new items, the **Upgrade Kit** items are highlighted in yellow in the following diagram:



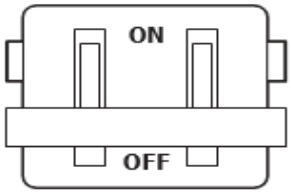
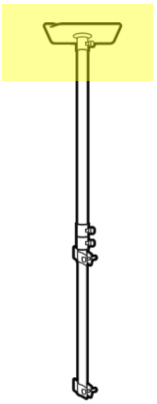
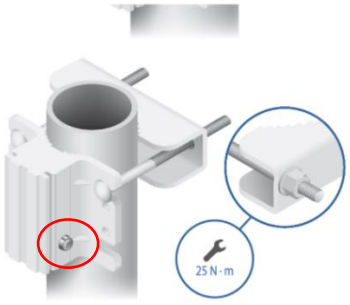
Upgrade Instructions

Follow all local codes and common installation practices.

Assemble new antenna → Assemble the router → Assemble the PoE Injector → Wire the 24VAC to the PoE Injector → Install CAT6 cables → Install the Control Transformer → Start up the system

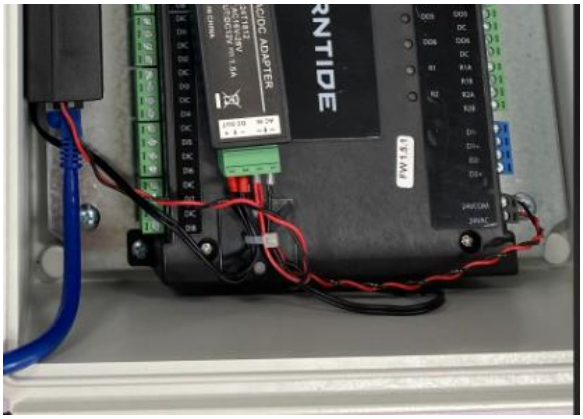
Step 1: Assemble the new Ubiquiti antenna

We recommend that you assemble the antenna mount ***before*** starting the work on the rooftop unit.

1	**Turn OFF the power to the unit.**	
2	Unterminate/unwire the existing antenna**.** Dismantle the antenna riser to remove the electrical box cover as it could potentially restrict the wireless range of the Ubiquiti antenna.	
3	**For a long-range antenna:** Using the Ubiquiti pole mount kit, attach the **mounting bracket** to the conduit. For detailed assembly instructions, see https://dl.ui.com/qsg/UAP-AC-M-PRO/UAP-AC-M-PRO_EN.html	 The chrome locking push-buttons should be mounted on the **bottom**.

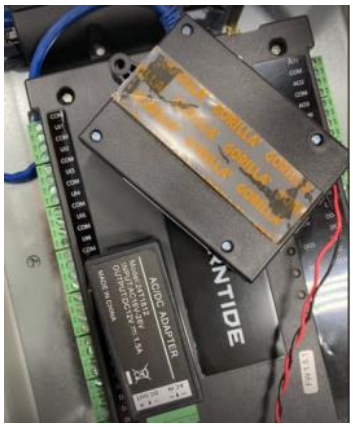
Step 2: Assemble the router

1	Remove the **MikroTik router** from the box and set aside the DC adapter power cable. (The power cable is 2’ long with only the barrel connector intact. You will be using it later.)	
2	Remove the 4 rubber stands on the bottom of the **MikroTik router** to make the base leveled.	
3	Apply double-sided tape on the bottom of the router. Do **NOT** adhere the tape to the cooling vent.	

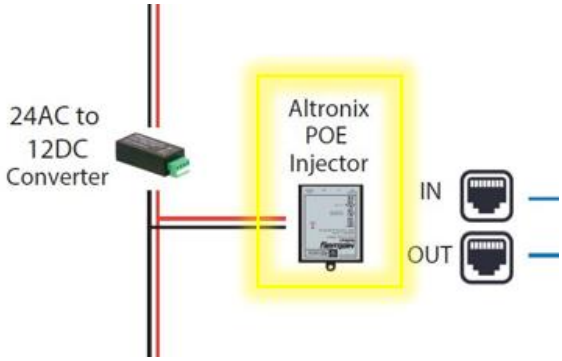
4	Secure the MikroTik router in the NEMA enclosure, positioning the router on the **top-right** of the inside of the front panel. The LED side of the router should be touching the top side of the NEMA enclosure as shown. Ensure that the router is positioned close to the top lip of the NEMA enclosure with NO access to the **Reset** button.	
5	Wire the bare wire side of the MikroTik power cable to the **12VDC side** of the 24VAC to 12VDC converter. **Note**: Dotted wire is negative, and non-dotted wire is positive.	

Step 3: Assemble the PoE Injector

1	Remove the **Altronix NETWAY 1 PoE Injector** from the packaging.	

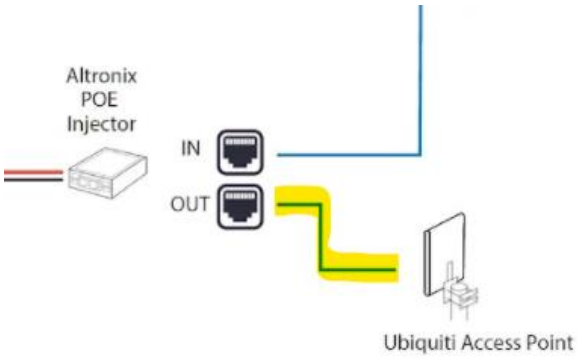
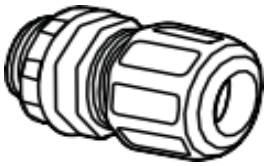
2	Apply double-sided tape on the bottom of the **Altronix NETWAY 1 PoE injector**.	
3	Attach the **Altronix NETWAY 1 PoE injector** on the left interior wall of the NEMA enclosure.	

Step 4: Wire the 24VAC to the PoE Injector

1	1. Terminate the new **18- gauge wire** into 24VAC input of the **Altronix NETWAY 1 PoE injector**. 2. Wire the other side of the 18-gauge wire to the "AC IN" terminals on the 24VAC to 12 VDC converter. Be careful to not disconnect the 24VAC power source wiring.	

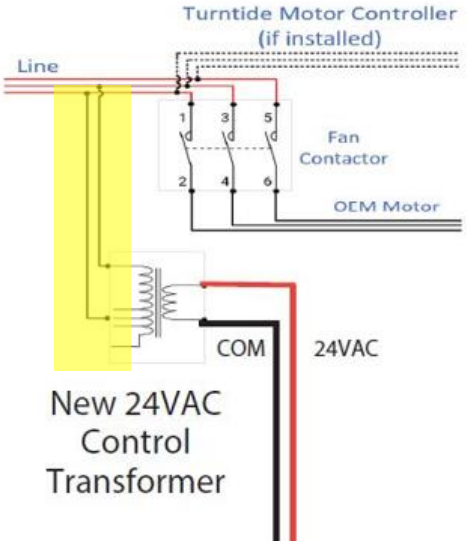
Step 5: Install the CAT6 Ethernet Cables

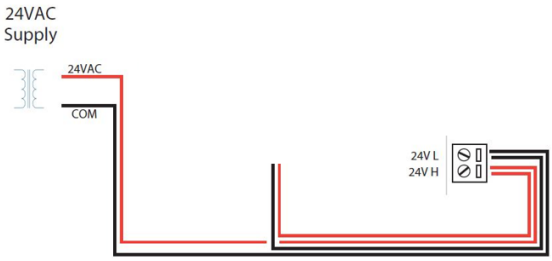
1	Remove the blue ethernet cable from the **Turntide Supervisor**.	
2	Connect the CAT6 ethernet cable (from step 1) between the LAN 1 port of the **Cradlepoint modem** and **Port 1** of the **MikroTik router**. *An additional 1' CAT6 cable has been included with this kit if the CAT6 cable in the existing RMK cannot be rerouted.*	
3	Connect the 1' CAT6 Ethernet cable from the **Turntide Supervisor** to **Port 2** on the **MikroTik router**.	
4	Connect the 1' CAT6 Ethernet cable from the **Altronix NETWAY 1 PoE Injector** "IN" port to **Port 3** on the **MikroTik router.**	

5	1. Plug one end of the 15' CAT6 ethernet cable into the **OUT** of the **PoE Injector** and *route it through the enclosure* and plug it into the **Ubiquiti antenna.** Route the cable through the hole that was previously used by the **Cradlepoint** antenna. **NOTE**: You many need to remove the old connector and re-drill the hole and use a ¾" **Weather Tite connector.** 2. Secure the cable with zip ties to the conduit. Ensure that you neatly tighten down all slack in the ethernet cables in a safe location.	 **Important**: Once the **Ubiquity antenna** is installed, it will replace the original modem SSID. 
6	To ensure protection from outdoor conditions, install the Ethernet cable through the rubber gasket on the Ubiquiti antenna port cover. Reinstall the power cover once the cable is installed. Secure the cable with zip ties to the conduit. **Ensure that you neatly tighten down all slack in the ethernet cables in a safe location.** Once the Ubiquity antenna is installed, it will replace the original modem SSID (Network ID). Hide/remove the old SSID sticker on the NEMA box and stick the updated sticker with the new SSID.	 The SSID is the last 4 characters of the antenna's serial # - The network name should be "TT-####" where #### is the serial number of the Ubiquiti.

7	Plug in the **MikroTik router** power connector.	

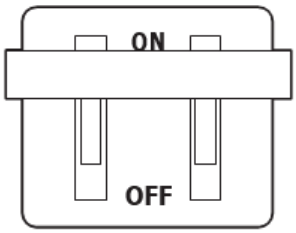
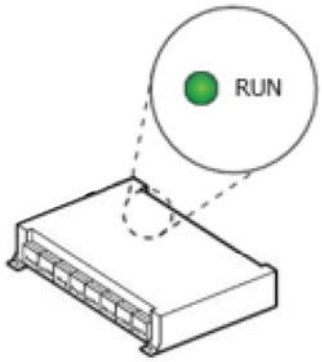
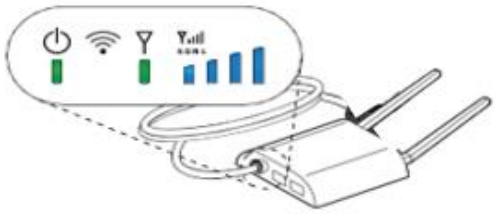
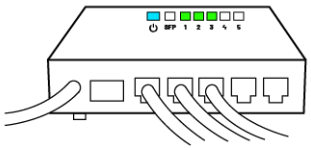
Step 6: Install the Control Transformer

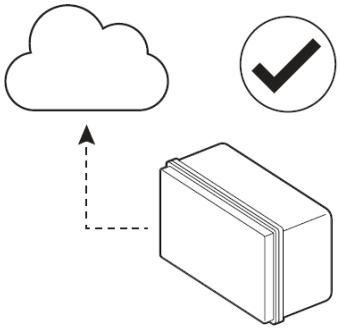
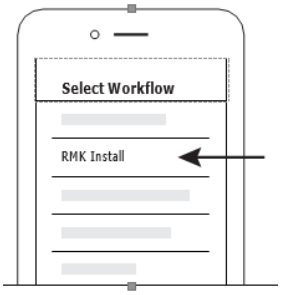
Reminder: Ensure that the power is OFF to the unit.		
1	Find an adequate location within the controls cabinet to mount **the 24VAC transformer**. Use the provided **14-gauge wiring** to terminate the transformer primary winding onto the **line side** of the indoor fan contactor. Be sure to connect the proper primary winding to match the voltage of the **line side** power.	

2	Terminate power from the secondary side of the **24VAC transformer** to the **Turntide Supervisor**. • You may **reuse** the existing 24VAC wiring to the RMK (*if it's suitable*) **OR** • Replace it with the 10' of 18/2 wiring (*included in the kit*). **COM** (common) on the **transformer** wires to **24V L** terminal on the **Turntide Supervisor** **24VAC** on the **transformer** wires to **24V H** terminal on the **Turntide Supervisor** Use the ***existing conduit and connectors*** to route the 24VAC from the new control transformer. **Note**: The wires preinstalled on the Supervisor's 24 VAC input terminal, which supply power to the 12 VDC converter, should remain installed after installing the power wiring from the transformer.	 **Caution: 24-volt wiring is polarity sensitive!** If wiring is terminated incorrectly, it will damage the Turntide Supervisor or the control transformer.

3	Check the final assembly for layout.	
4	If your kit includes a laminated wiring diagram, tape it to the inside lid of the enclosure.	
5	Remount the assembled antenna riser to the non-removable panel of the HVAC (rooftop) unit using the two conduit hangers and sheet metal screws. The conduit should be screwed/bolted to the side of HVAC (rooftop) unit.	

Step 7: Start up the system

1	Turn **ON** the power unit.	
2	Verify that the **Turntide Supervisor** has power and is running by checking the green RUN LED.	
3	Verify the LED on the **Cradlepoint modem** is on: **Green LED** = Power and Connection to cell **Blue LED** = Cell strength **Note**: The **Cradlepoint modem** Wi-Fi will be disabled (turned off) ***after*** you contact Turntide Technical Services to verify operation. At that point the Wi-Fi LED should NOT be green.	
4	Ensure that the router is powered up. View the LED display on the **MikroTik** router. **Note**: PoE Injector is polarity-sensitive. If the LED lights are not illuminated, the polarity was set up incorrectly.	

5	Contact Turntide (877-776-8470) to confirm the RMK is operating and posting data to the Cloud. **Important**: Verify that the SIM card door is closed on the Cradlepoint modem**. An open SIM card door is the most common cause of an RMK not communicating.** For a video demonstration, see RMK Commissioning.	 **Reminder**: A Turntide Technical Services representative will disable the **Cradlepoint modem** Wi-Fi network during this step to prevent accidental reconnections in the future.
6	After installation is finished, complete the ***01C. Remote Monitoring Kit - Upgrade to RMK+ Installation*** workflow on the XOi mobile app.	

Appendix

Full RMK Product List

Item Number	Description
RMK-002-US-LR	Long-range cloud monitoring kit (USA)
RMK-003-US-LR	Long-range cloud energy monitoring kit (USA)
RMK-002-CA-LR	Long-range cloud monitoring kit (Canada)
RMK-003-CA-LR	Long-range cloud energy monitoring kit (Canada)
KIT-RPT-US-LR	Long-Range Wi-Fi Signal Repeater, required RMK LR (USA & Canada)
KIT-RMK-US-LR	Kit for upgrading RMK to RMK+ Long-Range Wi-Fi (USA)
KIT-RMK-CA-LR	Kit for upgrading RMK to RMK+ Long-Range Wi-Fi (Canada)

WWW -

Family

RMK - Remote Monitoring Kit

KIT - Kit of parts for field install

XXX -

Type

002 - Cloud Monitoring

003 - Cloud Energy Monitoring

RPT - Wifi Signal Repeater

RMK - RMK+ upgrade kit for standard RMK
Only used when WWW = KIT

YY -

Country Code

CA - Canada

US - United States
or US/Canada for Repeaters

None - United States

ZZ

Range

None - standard range <= 40ft (12 m)

LR - RMK+ long range <=150ft (46 m)