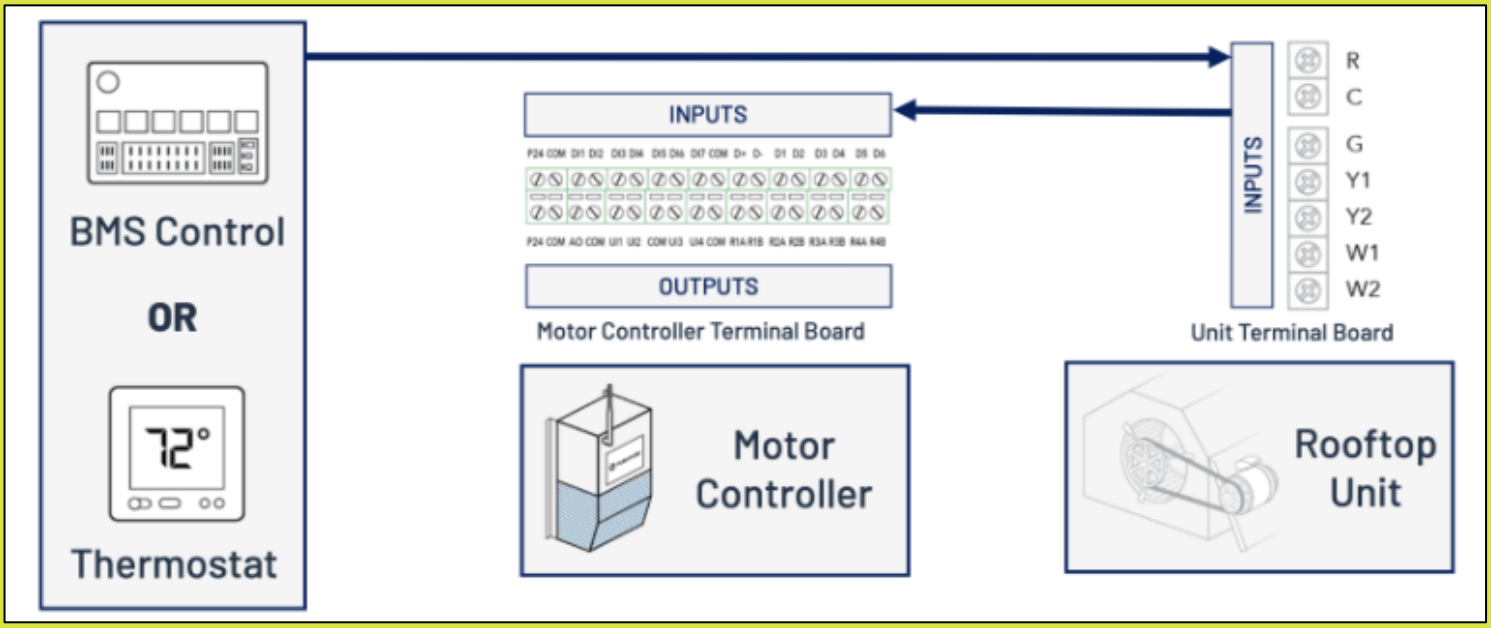
This manual is intended for use by qualified personnel only. It is not intended to supplant HVAC or electrical safety training.

Turntide Smart Motor System for RTU

Monitor Only

with Pre-Wired Motors

Document Version 2.0
November 14, 2025



Revision History

Document Revision Number	Description	Date
2.0	**Revised** • Turntide address and contact Information **Removed** • P04, P05, and SL120 installation content *(retained information where pertinent)* • RMK content (*retained information where pertinent)* • Cloud and networking content	**November 14, 2025**
1.2	**Added:** • Disclaimer on cover: "This manual is intended for use by qualified personnel only. It is not intended to supplant HVAC or electrical safety training." • **Special Case: Replacing Old Turntide Motor Controller with a P06 or SL121 Motor Controller** **Removed**: • References to Vision XOi app and replaced with Turntide Technician App. • Reference to P04 motor controller. • Prerequisite. Now technician is NO longer required to take Turntide training course. • Stipulation to ensure motor controller is installed in any position but upside-down. No longer necessary. • Removed P06 and SL121 manual Wi-Fi disconnect **Clarification** • See **Antenna usage on controllers.** • See **Remote Monitoring Kit (RMK).** **Correction to instructions in Air Sensor installation**: • See **Air Sensor**. **Moved** **Fan Pulley and Motor Pulley** Alignment to **Appendix**	**May 1, 2023**
1.1	**Correction to P06 controller orientation during install:** Mount the controller (**ideally**) in an upright (vertical), sideways (horizontal), or flat position to/on a rigid surface with a minimum clear space of 3 inches on top and bottom. **The antenna location indicates the top of the controller.** See **P06 Motor Controller.**	**February 23, 2023**
1.0	Initial release in this format with updates to original content: **Added** • Caution: Ensure that motor controller wires are isolated by a minimum of 6mm or 0.25in from power cables	**February 21, 2023**

Document Revision Number	Description	Date
	• Disclaimer**:** For proper installation and grounding of the antenna, please refer to national and local codes (e.g., U.S.: NFPA 70, National Electrical Code, Article 810, Canada: Canadian Electrical Code, Section 54). • Caution: Motor power harnesses are rated to 600 V and the Turntide controller and motor nameplates indicate operation up to 680 V. • Warning: Ensure that input power ground is terminated on the controller. If not properly grounded, the motor controller may not function correctly and could pose a safety hazard. • Instructions for proper motor-pulley alignment and belt tension • More tool recommendations • Links to documents on https://support.turntide.com/ • ***New!*** Wiring and information on SL121 and P06 motor controllers • **New** Cord Grip Kit - cable fittings to seal or to provide strain relief to the terminals in which the conductors are connected • **Appendix** with steps for Noise Isolation Feet installation, Supply and Return Air Sensors, How to Disable Wi-Fi through Hardware on P06 and Sl121 Motor Controllers, Troubleshooting a Stalled Motor **Deleted** • SL160 Motor Controller content and wiring **Clarification** • Feet spacer bolts supplied with V01 and V02-D motors and mounting plate bolt sleeves supplied with V01 and V02 motors	

Conventions

Bold	• Used in procedures for names of interface elements, such as buttons, fields, and menu items. • For names of apps. • For emphasis, typically when introducing a new concept or for the adverb “NOT.” • For measurements when necessary to distinguish from surrounding text
Italics	References for names of additional Turntide guides and documents.
Links	Blue font for cross-references within document and to external sources.
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

Contact

support@turntide.com|11720 Amber Park Drive, Suite 160, Alpharetta, GA 30009|www.turntide.com

Contents

Audience

The instructions in this guide are intended for a mechanical technician who is familiar working with commercial HVAC systems such as rooftop units (RTUs), air handling units (AHUs), and other similar equipment.

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

https://support.turntide.com/

Required: Follow all local and national electrical codes, safety compliance requirements, and common installation procedures.

About this Installation Guide

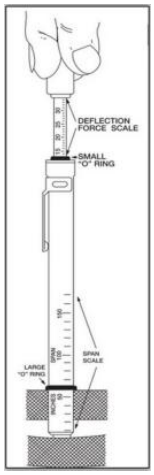
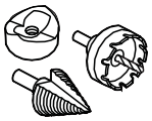
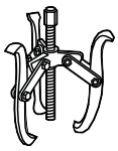
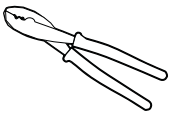
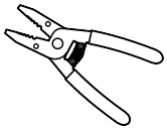
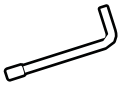
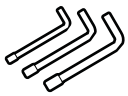
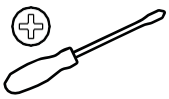
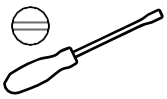
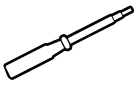
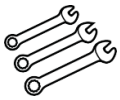
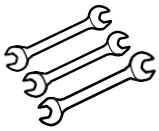
This guide provides instructions on how to install and set up the Turntide Motor System, consisting of the Turntide Smart Motor and the Turntide Motor Controller. The contents of kits and recommended tools are also listed.

The following motors and motor controllers are featured in this guide:

- V series motors: V01, V02, and V03
- P06 series motor controllers
- SL121 series motor controllers

Tools You'll Need

Table 1 Tools List

 Belt tension gauge	 Uni-bit, hole sawor knock outs (for drilling hole into the RTU for the external unit antenna) **7/8in bit**	 Drill bit index up to **1/2in**	 Wheel puller 3-jaw for removing existing motor pulley
		 Cordless drill	 Torque wrench
 Terminal (spade) crimp tool	 Wire strippers	 Multi-VOM meter	 Clamp amp meter
 Adjustable pliers	 Needle nose pliers	 Hex wrenches **2mm and 5mm**	 Hex wrench set **1/8in - 3/8in**
 Screwdriver Phillips	 Screwdriver slot	 Screwdriver, small terminating	 Nut driver **1/4in** and **5/16in**
 Combo Box/Open-End wrenches up to **3/4in** Ratcheting type recommended.	 Thin head access wrenches	 **90-degree** offset wrenches	Additional supplies: • Silicon caulk • Retaining compound • Degreaser

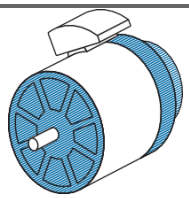
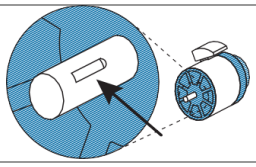
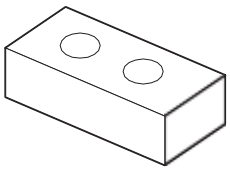
Included Items

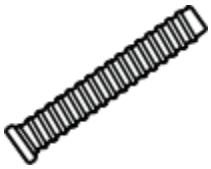
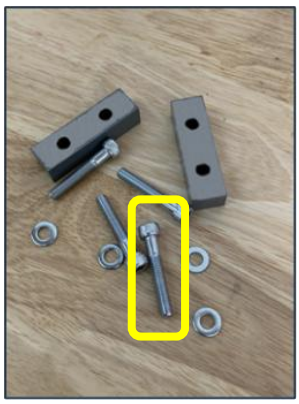
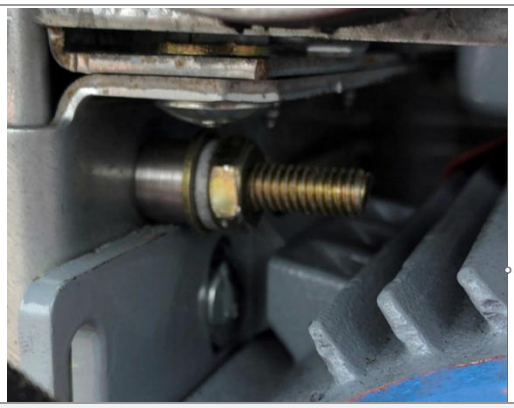
Everything typically required to install the Turntide Smart Motor System arrives in separate boxes:

- Box 1: Turntide Smart Motor
- Box 2: Turntide Motor Controller
- Box 3: Turntide Motor Systems (RTU) Installation Kit
- Box 4: Motor Noise Isolation Feet Installation Kit (*may not be included in your installation*)

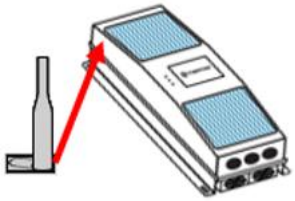
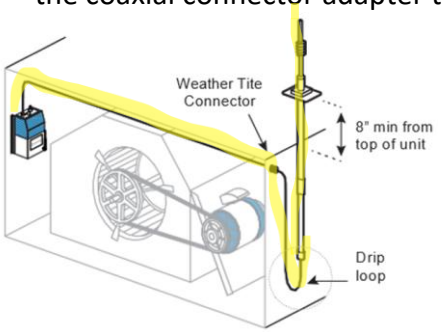
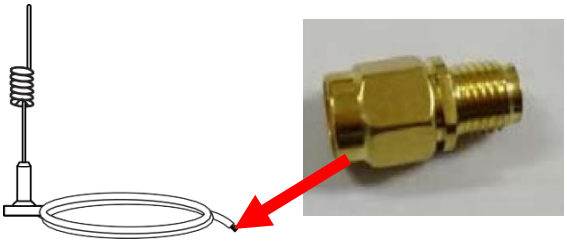
Note: Not all components in a kit will be used on every installation. Also, for unique applications, additional supplies may be required.

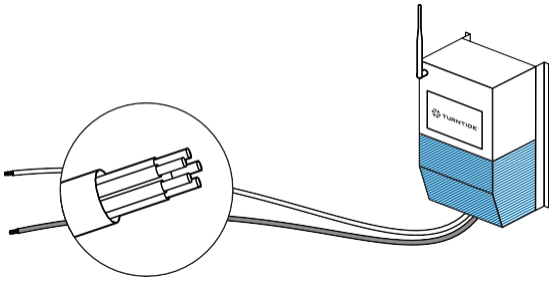
Box 1: Turntide Smart Motor

Item	Quantity
Turntide motor Use appropriate equipment and ensure safe handling when moving/lifting motors. For motor weights, see the *Quick Reference Guide* on **https://support.turntide.com/** 	**1**
Shaft Adapter & Key (included only V01 Frame C motors) 	**1**
 **Caution**: Motor power harnesses are rated to 600 V and the Turntide controller and motor nameplates indicate operation up to 680 V. Power cable Voltage rating on power cabling is AC voltage and any reference to 680 V is DC. • 600 VAC cable is acceptable to hold 680 VDC • 230 VAC solutions may reference up to 340 VDC • 460 VAC solutions may refer up to 680 VDC • 575 VAC solutions may refer up to 850 VDC 	**1**
Feet spacers supplied with V01 and V02-D motors, which allow for better wrench access. (Do **NOT** use with noise isolation feet.)   	**2**

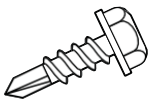
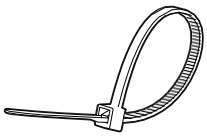
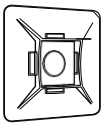
Item	Quantity
Bolts for feet spacers supplied with V01 and V02-D motors (M6 x 1mm x 25 mm)  	**4**
Mounting plate bolt sleeves (5/16in x 9/16in x 3/8in) supplied with V01 and V02 motors, which allows uniform tightening of the nut. (Do **NOT** use with noise isolation feet.)  	**4**

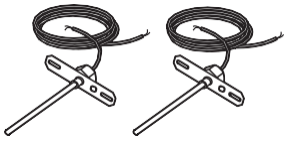
Box 2: Turntide Smart Motor Controller

Item	Quantity
Small antenna pre-installed on P06 and SL121 motor controllers  P06 **Two Scenarios:** 1. **New installation of Turntide motor system at the site**: The small antenna is pre-installed on the P06 and SL121 motor controllers, so no further action is required for these models. 2. **You are replacing an existing Turntide motor controller (for example, P04, P05, or SL120) with a newer motor controller (for example, P06 or SL121) AND you already have an RMK installed:** You will use the existing External Dual-Band Wi-Fi antenna with 3m wire that is already wired through the RTU (for RMK) and attach it to the P06 or SL121 using the coaxial connector adapter that is provided.   Cord Grip Kit *(or fittings already attached to blue cable)* for **SL121** and **P06** motor controllers for wi-fi antenna riser associated with RMK. **1 Kit** 	

(Pre-wired) Motor Controller and Control Cables  **SL121** Turntide Motor Controller models are available for different motor configurations. Their installation is described in this guide. • The SL121 and P06 motor controllers are prewired with a **blue** input cable, **600 V rating.** **All cables provided by Turntide are NOT rated for outdoor use.**	**1 Motor Controller and cable(s)**

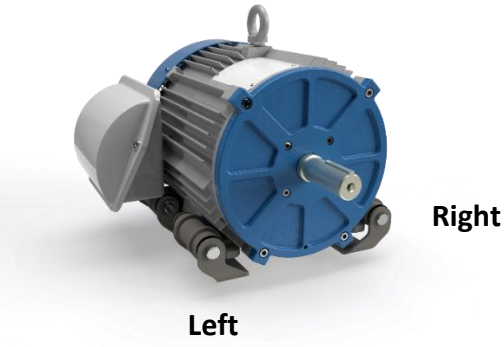
Box 3: Turntide Motor Systems (RTU) Installation Kit

Item	Quantity
Wire nuts – **tan** and **red** for motor power cable 	**6 of each**
Wire nuts – **blue** for thermostat 	**8**
Hex head screws #10 x ¾ in 	**6**
Cable ties, 8 in 	**10**
Snap-in bushing – ½ in 	**6**
Snap-in bushing – ¾ in 	**6**
Snap-in bushing – 1 ¼ in 	**2**
Washer for #10 screw, ¼in ID and 9/16 inch OD 	**4**
Cable tie holder, center mount 	**6**

Item	Quantity
May arrive in a separate box. Air temp sensors and a 10-inch wire included if applicable. Sensor appearance may vary. 	**2**
Turntide and Caution labels 	**1 each**

Box 4: Motor Noise Isolation Feet Installation Kit

May not be required on every motor installation.

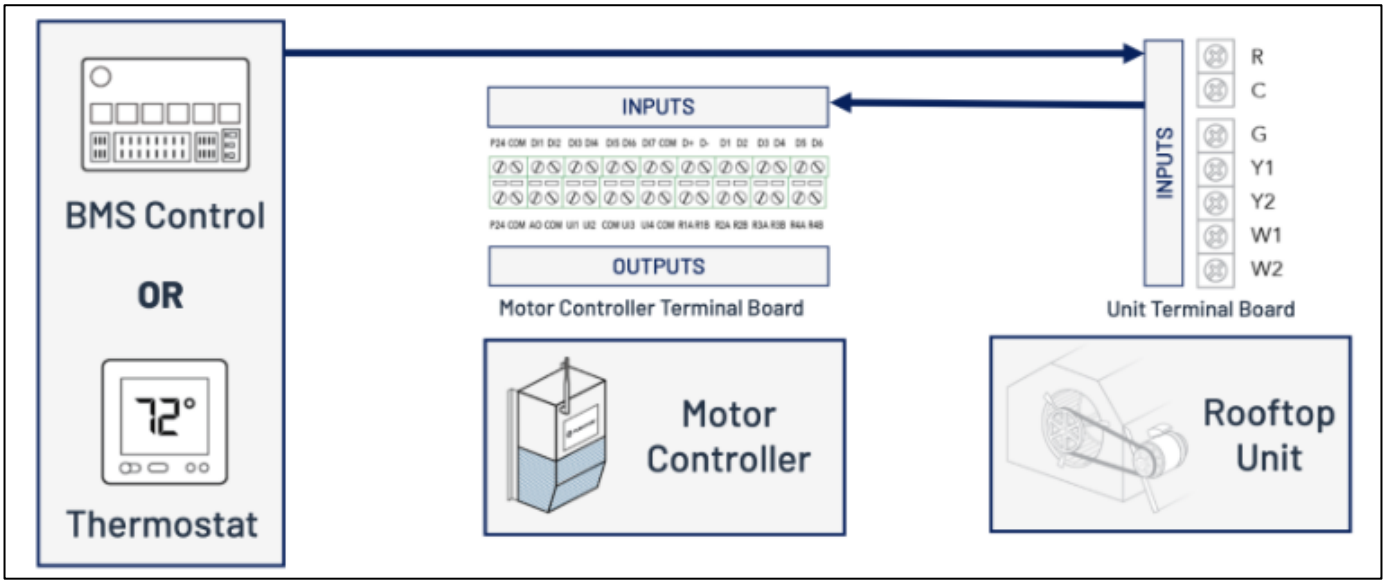
KIT-ISLN-FT-101 Motor Noise Isolation Feet Installation on V01 and V02 Motors, Frames are A, C, D **KIT-ISLN-FT-201** Motor Noise Isolation Feet Installation on V01 and V02 Motors, Frame F **KIT-ISLN-FT-301** Motor Noise Isolation Feet Installation on V03 Motors, Frame H Example of V01 motor with noise isolation feet KIT-ISLN-FT-101 installed.  **Right** **Left** For Noise Isolation Feet Installation instructions, see **Appendix.**	**1 Kit**

Control Wiring Method: Monitor Only

Defined by a Motor Controller wired in parallel with the 24V signals from the thermostat. Thermostat directly controls RTU heating and cooling stages.

- BMS or Thermostat has no direct physical connection to the Turntide motor controller's inputs
- Turntide motor controller inputs are wired to the RTU unit terminal board
- Turntide motor controller outputs are now available for other potential uses, such as run status or alarm/warning indication. NOTE: Supported only with a Monitor-Only specific cascade flow.
- The thermostat/BMS will send the 24 V signal to the motor controller and RTU unit terminal board simultaneously.

The SL121 and P06 motor controllers are prewired with a blue input cable.



Important: If you are replacing an existing Turntide Motor Controller (P04, P05, SL120) with an SL121 or P06, you will notice that the pre-wiring scheme has changed.

- **P06 and SL121 controllers are intended for Monitor Only integration**.
- If you do not wish to use the new Monitor Only control wiring method but want to maintain the Full Integration control wiring, you MUST use the existing wiring harness. See **Special Case: Replacing Old Turntide Motor Controller with a P06 or SL121 Motor Controller** in the **Appendix**.

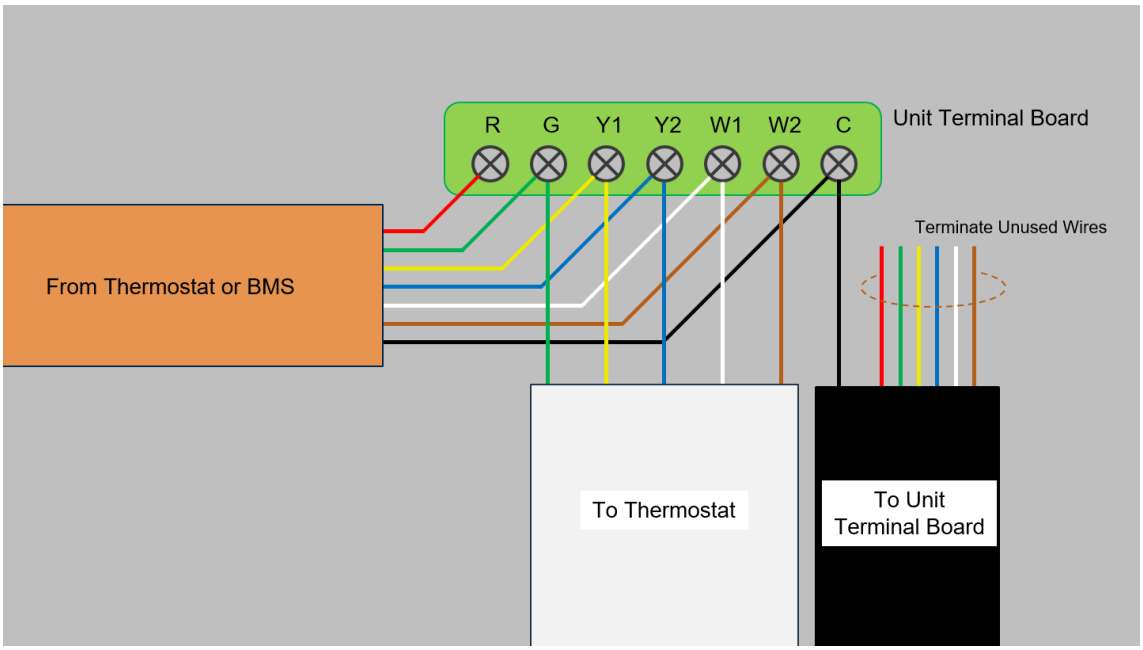


Figure 1 Monitor Only for P04, P05, and SL120 Motor Controllers (Information in the case of a warranty replacement unit)

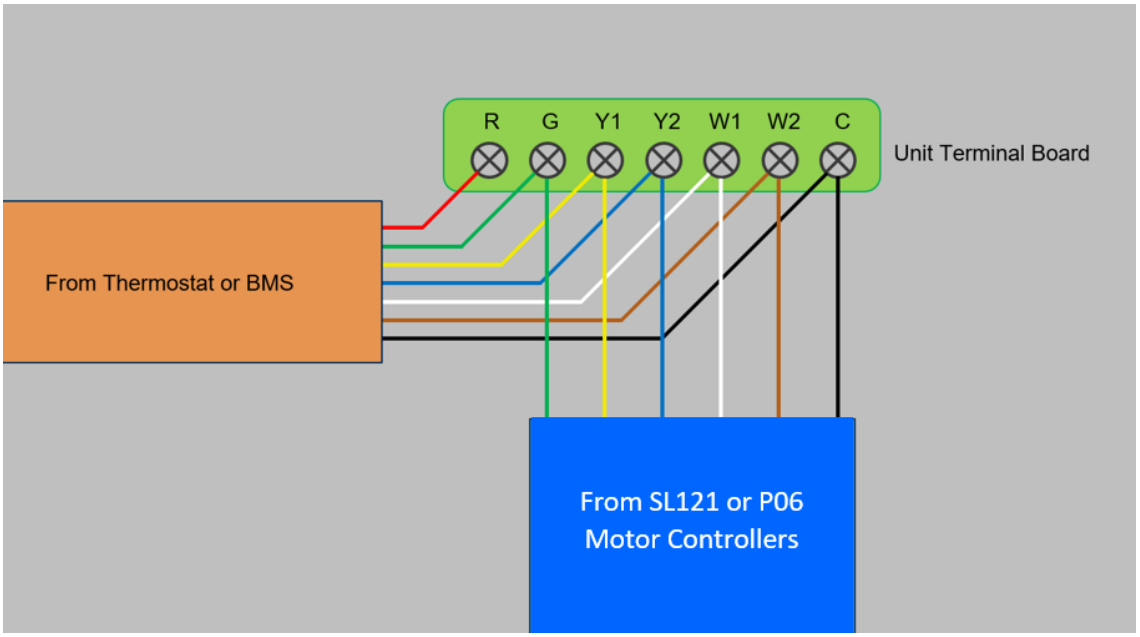
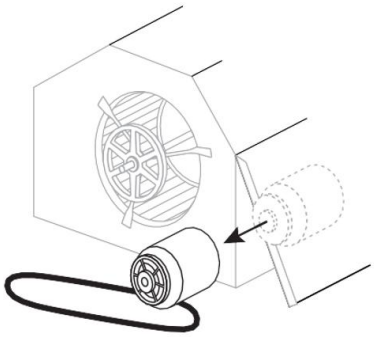


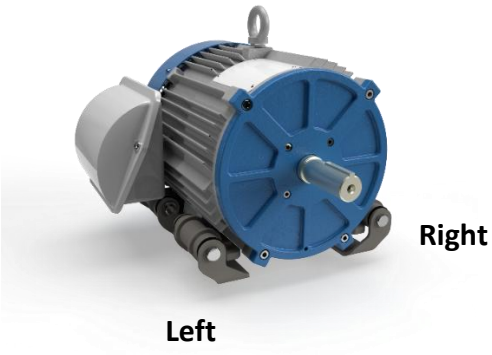
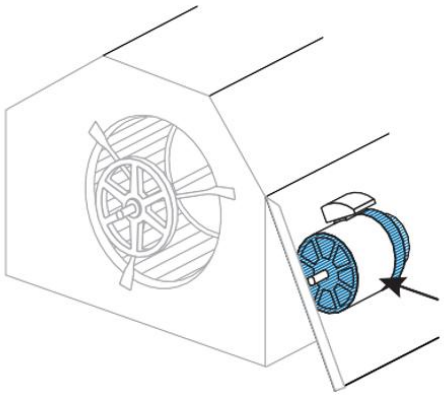
Figure 2 Monitor Only for SL121 or P06 Motor Controller

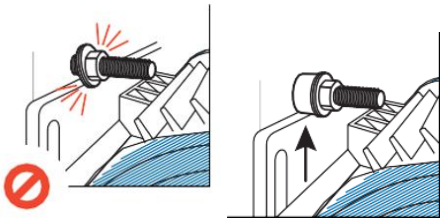
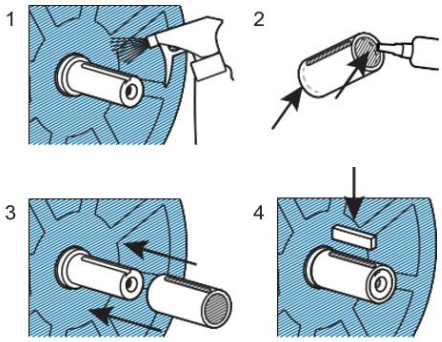
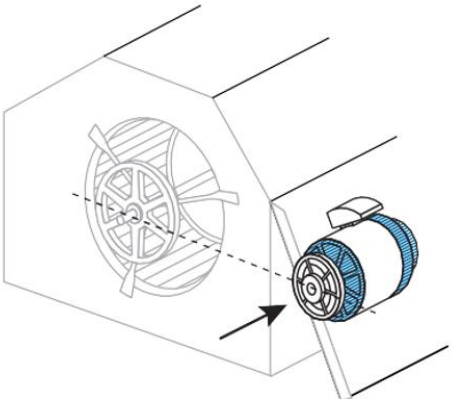
Follow these simple step-by-step instructions to replace the existing motor in a common Rooftop Unit (RTU) with a new Turntide Smart Motor System.

1. Uninstall the existing motor & **Install the Turntide Motor** → 2. Verify Jumper Pins/DIP Swtiches → 3. Install the **Turntide Motor Controller** → 4. Wire Components → 5. Start Up System

Task 1: Uninstall the existing motor and Install the Turntide Motor

Step	Instructions for Task 1: Uninstall the existing motor and Install the Turntide Motor	
1	Isolate all incoming power to RTU unit using normal **Lock Out/Tag Out** and local code requirements and verify that all power is turned off to the unit.	
2	1. Remove the existing belt. 2. **Remove the motor and mounting plate as one assembly.** In most cases, it's easier to remove the motor pulley before removing the motor.	

Step	Instructions for Task 1: Uninstall the existing motor and Install the Turntide Motor	
3	**Determine if you should install the Noise Isolation Feet to the base of the new motor.** Consider the following points: 1. Noise isolation feet increase the overall height of the Turntide motor as follows: • KIT-ISLN-FT-101 on a V01 motor raises the shaft height 0.5 inches (1.27 cm) • KIT-ISLN-FT-101 on a V02-D motor raises the shaft height 0.5 inches (1.27 cm) • KIT-ISLN-FT-201 on a V02-F motor raises the shaft height 0.125 inches (0.32 cm) • KIT-ISLN-FT-301 on a V03 motor raises the shaft height 0.62 inches (1.57 cm) 2. You may have to increase the size of the belt once the isolator feet are installed. 3. It takes more time to complete the installation when you add noise isolation feet. 4. Is the the location where you are installing the motor a noise-sensitive area and therefore requires noise isolation feet? **YES, to installing noise isolation feet?** Follow the instructions in the **Appendix** of this guide **at this point in your installation process.**	Example of V01 motor with noise isolation feet KIT-ISLN-FT-101 installed.  **Right** **Left** 1. **KIT-ISLN-FT-101** Motor Noise Isolation Feet Installation on V01 and V02 Motors, Frames are A, C, D 2. **KIT-ISLN-FT-201** Motor Noise Isolation Feet Installation on V01 and V02 Motors, Frame F 3. **KIT-ISLN-FT-301** Motor Noise Isolation Feet Installation on V03 Motors, Frame H
5	Install the Turntide Smart Motor to the existing motor mounting plate.	

Step	Instructions for Task 1: Uninstall the existing motor and Install the Turntide Motor	
6	In some cases, tightening the motor plate nut is not possible. The bolt sleeves provided allow for proper nut tightening.	
7	**For V01 Frame C motors ONLY**. The Turntide V01 Frame C motor has a 5/8in shaft, and the existing motor pulley is 7/8in ID. You must install the shaft adapter as follows: 1. Clean the shaft with a degreaser. 2. Apply a small amount of Loctite 620 retaining compound. 3. Install the shaft adapter with the set screw towards the shaft end. 4. Insert the extended height shaft key and tighten the set screw to lock the shaft adapter in place.	
8	Reinstall original motor pulley. If the existing pulley shows signs of excessive wear, it should be replaced. Replacing worn components will ensure that the system is running most efficiently. See also: **Fan Pulley and Motor Pulley** Alignment	
9	**Install the belt.** Use the recommended visual step-by-step process in **Best Practices for Installing Belt** in the **Appendix**.	

Task 2: Confirm Motor Controller Configuration

Turntide motor controllers are designed for several applications. The jumpers and switches are used to configure the motor controller for a specific application.

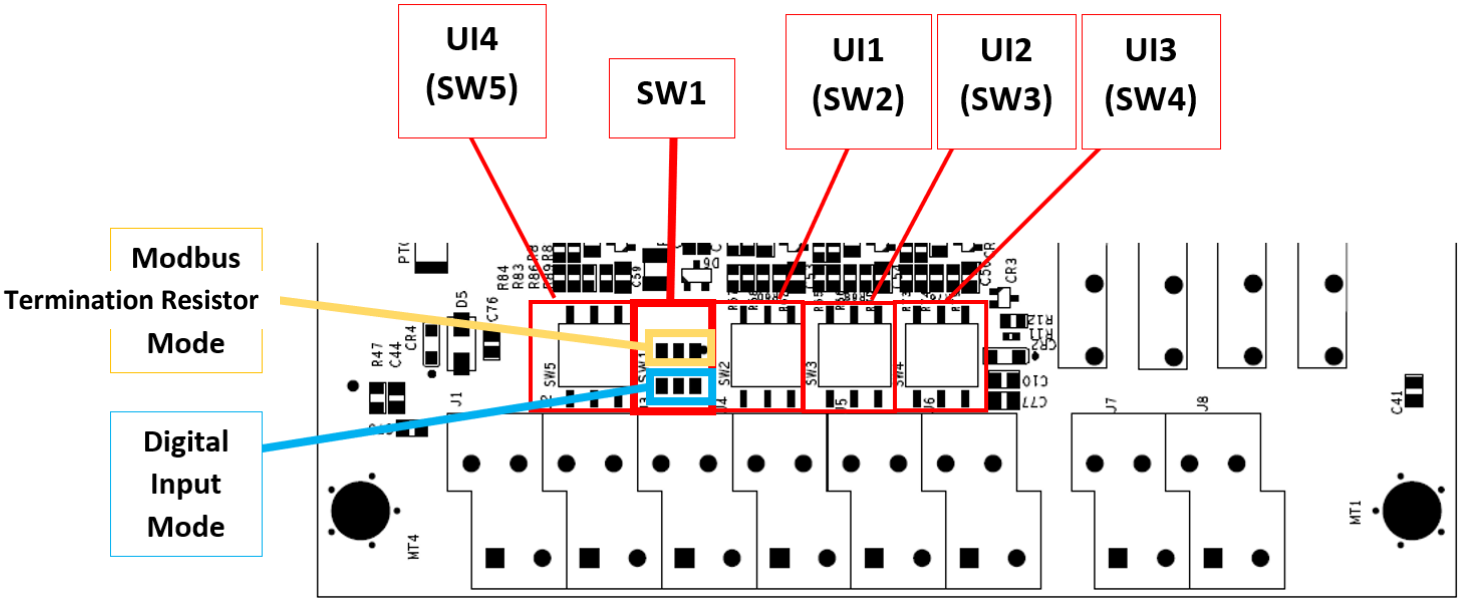
Before connecting the controller to the Turntide motor, verify the controller configuration.

SL121 Motor Controller Switches

P06 Motor Controller Switch Options

SL121 Motor Controller Switches

Figure 3 User-Selectable Switches SL121



SW1 for Modbus Termination Resistor and Digital Input Mode

SW1 is used for both the Modbus Termination Resistor and Digital Input Mode settings selection. Digital or Discrete Inputs initiate a programmed response of the motor controller based on parameter settings.

UI1 to UI4

Universal inputs define the connected device type. The Universal inputs may be configured in one of **three modes (I, V, R)** via DIP Switches.

- **Voltage (V):** 0-10V (may be used to control the inverter directly or used to monitor CO2 or other sensors in HVAC systems)
- **Current (I):** 0-20mA or 4-20mA (may be used for direct current loop control of the motor controller)
- **Resistive (R):** Thermistor temperature sensors (may be used to monitor ambient air, return air, and supply air temperatures in HVAC systems)

Notes:

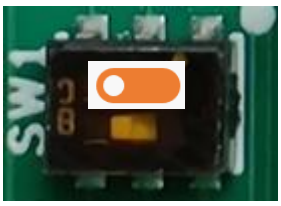
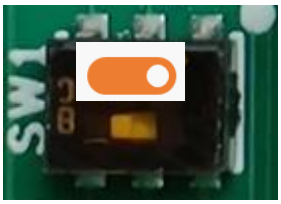
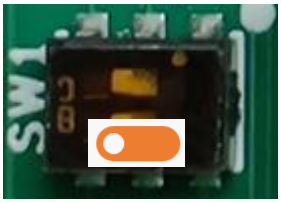
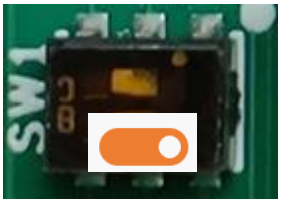
- Position 1 ON is the **resistive mode**
- Position 2 ON is the **voltage mode**
- Position 3 ON is the **current mode.**

ONLY one switch position should be ON at a time.

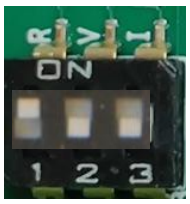
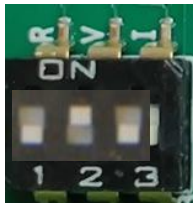
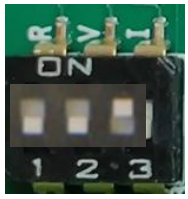
SL121 Motor Controller User-Selectable Switch Options Usage & Example

Table 2 Switch Options SL121

Motor Controller Model	Modbus Termination Resistor Switch	Digital Input Mode Switch	Universal Input Mode Switches			
			UI1	UI2	UI3	UI4
SL121	SW1	SW1	SW2	SW3	SW4	SW5

Modbus Termination Resistor Selection		
Switch Position	**Mode**	**Examples**
Top LEFT position 	Modbus termination resistor is **enabled**	Set if wiring to terminals D+/D is end of daisy chain.
Top RIGHT position 	Modbus termination resistor is **disabled**	
Digital Input Mode Selection		
Switch Position	**Mode**	**Examples**
Bottom LEFT position 	Enables digital inputs LOGIC or dry contact mode.	Set if **DI1** through **DI7** will be used to receive contact closures for control.
Bottom RIGHT position 	Enables digital inputs 24VAC signaling mode.	Set if **DI1** through **DI7** will be used to receive 24VAC input signal from existing BMS or thermostat.

Motor Controller Model	Modbus Termination Resistor Switch	Digital Input Mode Switch	Universal Input Mode Switches			
			UI1	UI2	UI3	UI4
SL121	SW1	SW1	SW2	SW3	SW4	SW5

Universal Input Mode Selection		
UI1 to UI4 DIP Switch ON	**Mode**	**Examples**
Caution: ONLY one switch position should be ON at a time; otherwise, may cause damage to the motor controller. **R** 	Resistive/LOGIC: Returns resistance of connected element or ON/OFF if declared as resistive or LOGIC mode respectively.	Resistive: 2 wire 10K Ω thermistor LOGIC: Dry contact closure = ON Dry contact open = OFF
Caution: ONLY one switch position should be ON at a time; otherwise, may cause damage to the motor controller. **V** 	Voltage: 0-10V signal ended voltage input.	3-wire device with external power source that provides 0-10V signal. (1 signal, 1 common, 1 power)
Caution: ONLY one switch position should be ON at a time; otherwise, may cause damage to the motor controller. **I** 	**Current:** 0-20mA current input.	3-wire device with external power source that provides a 0-20mA signal. (1 signal, 1 common, 1 power)

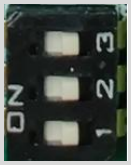
P06 Motor Controller Switch Options

Universal inputs define the connected device type. The Universal inputs may be configured in one of **three modes (I, V, R)** via DIP Switches.

- **Voltage (V):** 0-10V (may be used to control the inverter directly or used to monitor CO2 or other sensors in HVAC systems)
- **Current (I):** 0-20mA or 4-20mA (may be used for direct current loop control of the motor controller)
- **Resistive (R):** Thermistor temperature sensors (may be used to monitor ambient air, return air, and supply air temperatures in HVAC systems)

Notes:

- Position 1 ON is the **resistive mode**
- Position 2 ON is the **voltage mode**
- Position 3 ON is the **current mode.**

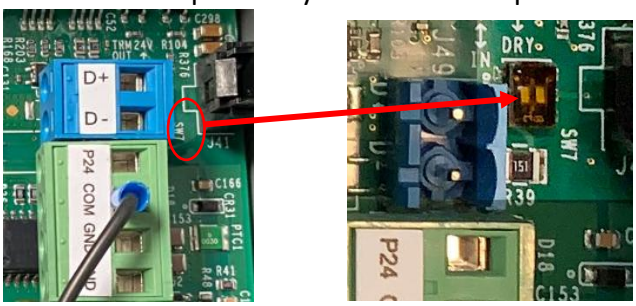


ONLY one switch position should be ON at a time.

SW7 for Modbus Termination Resistor and Digital Input Mode

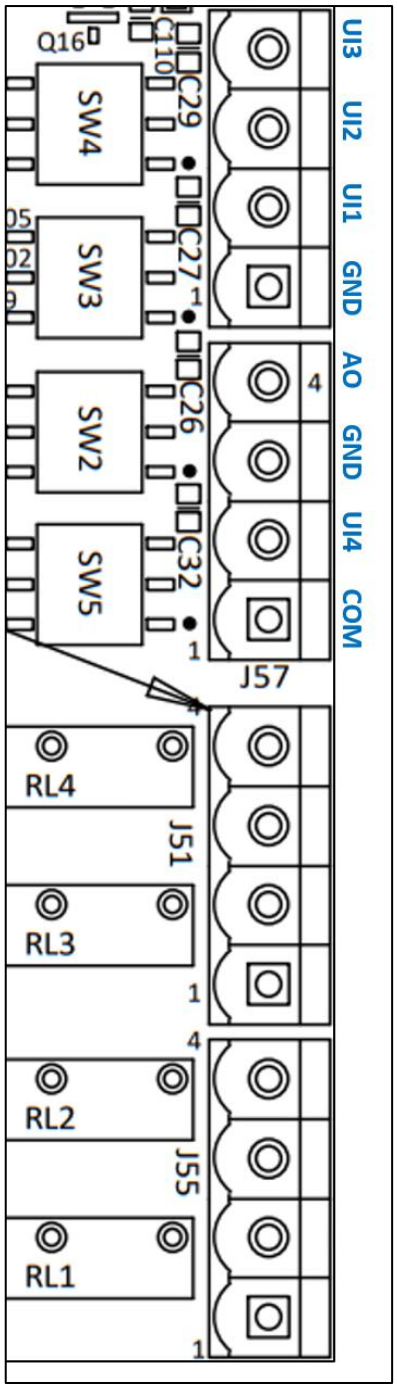
SW7 is used for both the Modbus Termination Resistor and Digital Input mode settings selection. Digital or Discrete Inputs initiate a programmed response of the motor controller based on parameter settings.

The blue D+ D- cap is easily removed to improve access to SW7.

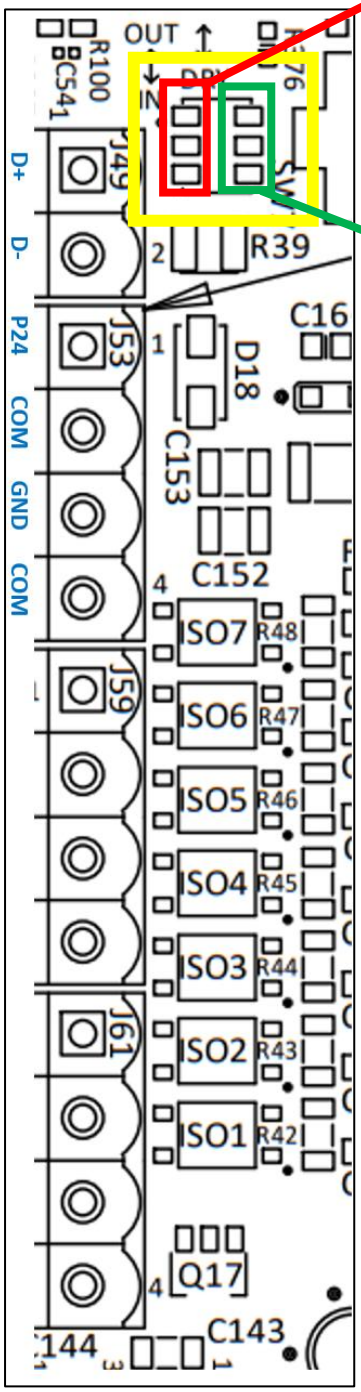


P06 Motor Controller User-Selectable Switch Options Diagram

Figure 4 User-Selectable Switches P06



UI3 (SW4)
UI2 (SW3)
UI1 (SW2)
UI4 (SW5)



SW7: Modbus Termination Resistor Mode

SW7: Digital Input Mode

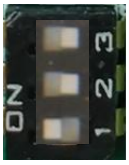
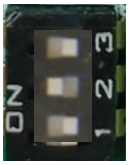
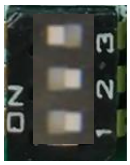
P06 Motor Controller User-Selectable Switch Options Usage & Examples

Table 3 P06 User-Selectable Switch Options

Motor Controller Model	Modbus Termination Resistor Switch	Digital Input Mode Switch	Universal Input Mode Switches			
			UI1	UI2	UI3	UI4
P06	SW7	SW7	SW2	SW3	SW4	SW5

Modbus Termination Resistor Selection		
Switch Position	**Mode**	**Examples**
Left DOWN position 	Modbus termination resistor is **enabled**	Set if wiring to terminals D+/D is end of daisy chain.
Left UP position 	Modbus termination resistor is **disabled**	
Digital Input Mode Selection		
Switch Position	**Mode**	**Examples**
Right DOWN position 	Enables digital inputs LOGIC or dry contact mode.	Set if **DI1** through **DI7** will be used to receive contact closures for control.
Right UP position 	Enables digital inputs 24VAC signaling mode.	Set if **DI1** through **DI7** will be used to receive 24VAC input signal from existing BMS or thermostat.

Motor Controller Model	Modbus Termination Resistor Switch	Digital Input Mode Switch	Universal Input Mode Switches			
			UI1	UI2	UI3	UI4
P06	SW7	SW7	SW2	SW3	SW4	SW5

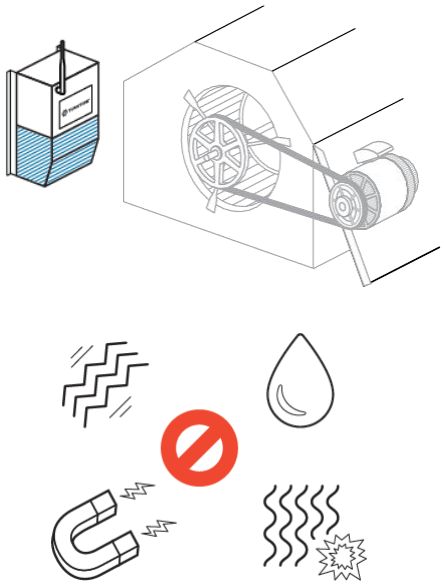
Universal Input Mode Selection		
UI1 to UI4 DIP Switch ON	**Mode**	**Examples**
Caution: ONLY one switch position should be ON at a time; otherwise, may cause damage to the motor controller. **R** 	Resistive/LOGIC: Returns resistance of connected element or ON/OFF if declared as resistive or LOGIC mode respectively.	Resistive: 2 wire 10K Ω thermistor LOGIC: Dry contact closure = ON Dry contact open = OFF
Caution: ONLY one switch position should be ON at a time; otherwise, may cause damage to the motor controller. **V** 	Voltage: 0-10V signal ended voltage input.	3-wire device with external power source that provides 0-10V signal. (1 signal, 1 common, 1 power)
Caution: ONLY one switch position should be ON at a time; otherwise, may cause damage to the motor controller. **I** 	**Current:** 0-20mA current input.	3-wire device with external power source that provides a 0-20mA signal. (1 signal, 1 common, 1 power)

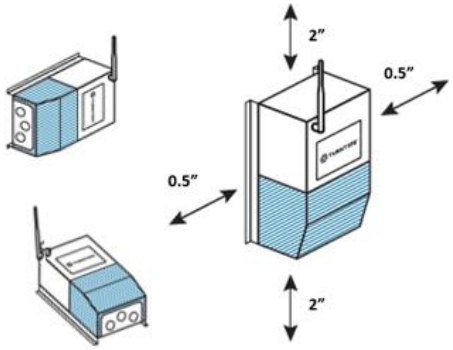
Task 3: Install the Turntide Motor Controller

Important: If you are replacing an existing Turntide Motor Controller (P04, P05, SL120) with an SL121 or P06, you will notice that the pre-wiring scheme has changed.

- **P06 and SL121 controllers are intended for Monitor Only integration**.
- If you do not wish to use the new Monitor Only control wiring method but want to maintain the Full Integration control wiring, you MUST use the existing wiring harness. See **Special Case: Replacing Old Turntide Motor Controller with a P06 or SL121 Motor Controller** in the **Appendix**.

Required: Ensure that motor controller wires are isolated by a minimum of 6mm or 0.25 in from power cables and never route them through a common conduit or cable tray.

Step	Instructions for Task 3: Install the Turntide Motor Controller	
1	Mount the Turntide Motor Controller inside the RTU—ideally in the blower cabinet-using caution not to penetrate the cabinet with the screws. Ensure the controller is far from excessive vibration, moisture, electromagnetic interference, and explosive/corrosive vapors. **Note**: If a suitable location is **NOT** available, please contact Turntide Technical Services. Do **NOT** install the controller on the floor in an area where pooled water or splashing water will affect it. You may have to install a channel slot (Unistrut or a similar riser) to elevate the controller so it is not in the lowest part of the cabinet where moisture can build up.	

Step	Instructions for Task 3: Install the Turntide Motor Controller	
2a	**SL121 Motor Controller** Turntide smart motor controllers ship with cable fittings (cord grips) to seal or to provide strain relief to the terminals in which the conductors are connected. **If your controller arrives with the cable fittings already installed, complete the controller installation as follows:** 1. Mount in an upright (vertical), sideways (horizontal), or flat position to/on a rigid surface. 2. Securely attach the motor controller to the surface with a 1/4in or M7 fastener using the four screw tabs on the base. 3. The SL121 motor controller has an integrated heatsink fan shroud. We strongly recommend a minimum of: • 2 inches clearance at the top and bottom of the controller to prevent impeding the airflow path • 0.5 inches around the sides of the controller to allow the inside ambient to vent. **If your controller does NOT have the cable fittings already installed, complete the controller installation as follows:** The **blue** cable in the pre-wired controllers is coiled inside the unit. You will route the cable through the fitting and secure the fastening washer to clamp to the conduit ingress plate or plane: • Install all strain relief accessories into the open holes with locknut on the inside. • Loosen the external portion of the strain relief (that you intend to pass the cable through) to allow for cable passage. • Uncoil the pre-wired cable and pass it through the strain relief from the inside of the enclosure to the outside of the enclosure.	

Step	Instructions for Task 3: Install the Turntide Motor Controller	
	4. Tighten the external portion of the strain relief until the internal strain relief-fitting seals and holds the cable secure. 5. Hand-tighten until it is secure and the cable no longer moves when pulled. Do NOT overtighten. 6. Mount in an upright (vertical), sideways (horizontal), or flat position to/on a rigid surface. 7. Securely install the motor controller to the surface with a 1/4in or M7 fastener using the four screw tabs on the base. 8. The SL121 motor controller has an integrated heatsink fan shroud. We strongly recommend a minimum of: ○ 2 inches clearance at the top and bottom of the controller to prevent impeding the airflow path ○ 0.5 inches around the sides of the controller to allow the inside ambient to vent. **Note**: If your business/organization requires that you manually disable Wi-Fi, please contact Turntide Technical Services for instructions.	

2b

P06 Motor Controller

Turntide smart motor controllers ship with cable fittings (cord grips) to seal or to provide strain relief to the terminals in which the conductors are connected.

If your controller arrives with the cable fittings already installed, complete the controller installation as follows:

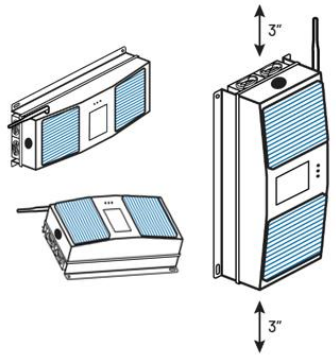
1. Mount the controller (ideally) in an upright (vertical), sideways (horizontal), or flat position to/on a rigid surface with a minimum clear space of 3 inches on top and bottom.
2. Note that there is no minimum clearance on the sides.

If your controller does NOT have the fittings already installed, complete the installation as follows:

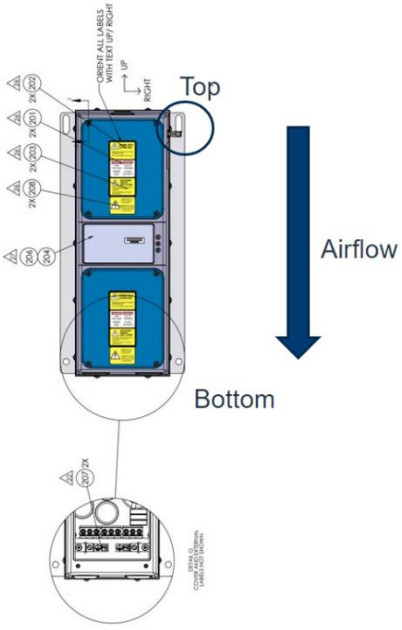
The **blue** cable in the pre-wired controllers is coiled inside the unit. You will route the cable through the fitting and secure the fastening washer to clamp to the conduit ingress plate or plane:

1. Install all strain relief accessories into the open holes with locknut on the inside.
2. Loosen the external portion of the strain relief (that you intend to pass the cable through) to allow for cable passage.
3. Uncoil the pre-wired cable and pass it through the strain relief from the inside of the enclosure to the outside of the enclosure.
4. Tighten the external portion of the strain relief until the internal strain relief-fitting seals and holds the cable secure.
5. Hand-tighten until it is secure and the cable no longer moves when pulled. Do NOT overtighten.
6. Mount the controller ideally in an upright (vertical), sideways (horizontal), or flat position to/on a rigid surface with a minimum clear space of 3 inches on top and bottom. Note that there is no minimum clearance on the sides.

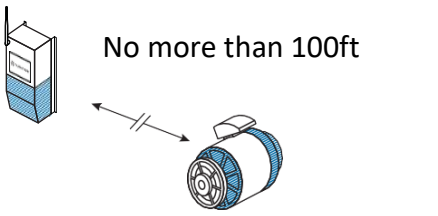
Important: For P06 controllers, the included fittings must be installed to maintain an IP65 rating. If you do not use the included cord grip kit, use fittings that meet a minimum of IP65 water ingress protection and install them according to that manufacturer's instructions.



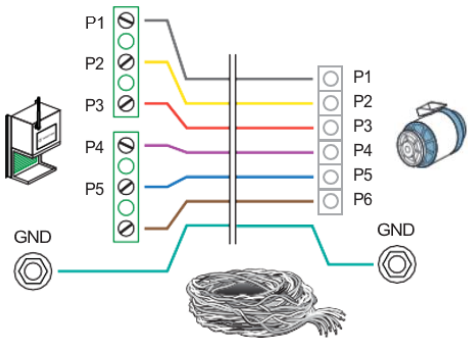
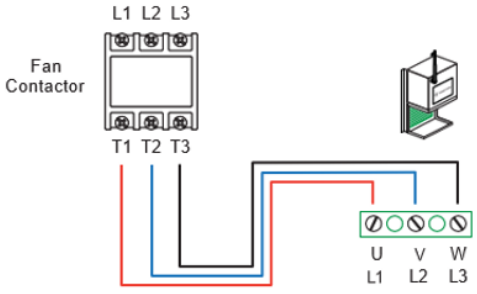
The antenna location indicates the top of the controller.

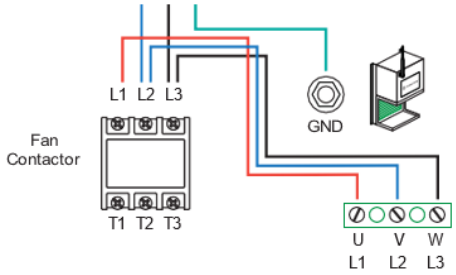
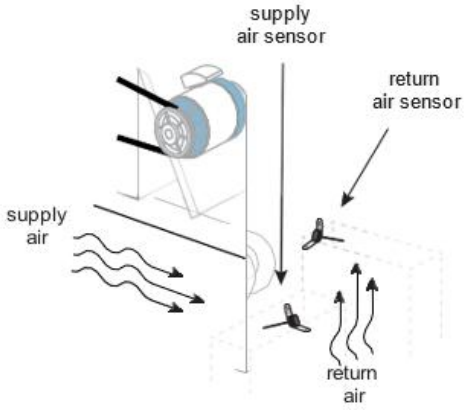


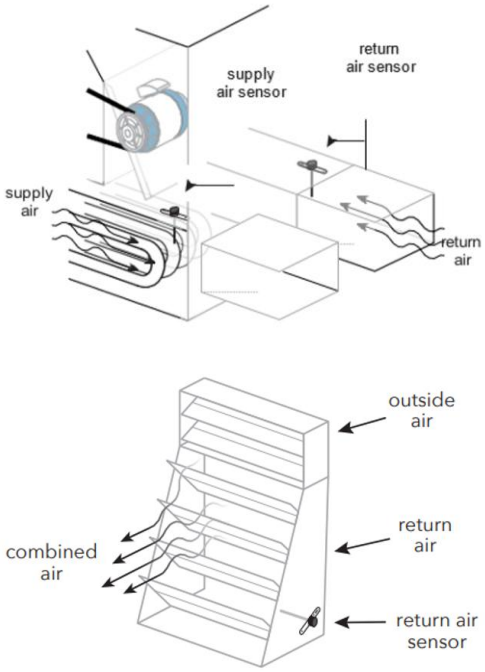
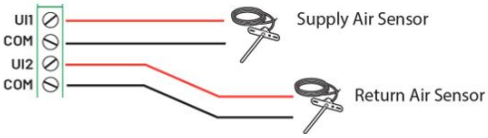
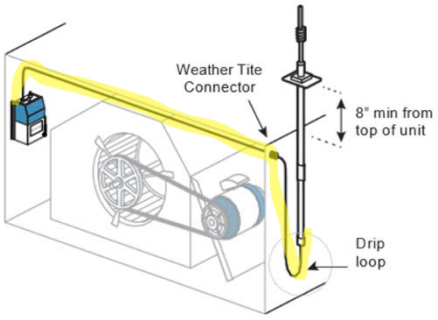
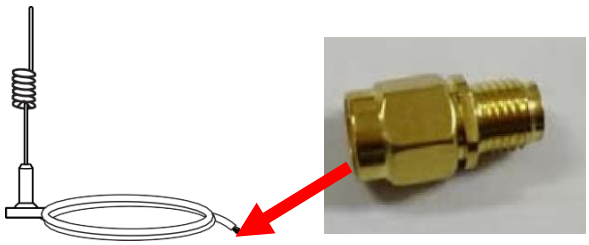
A note about Wi-Fi: If your business/organization requires that you manually disable Wi-Fi on the P06, please contact Turntide Technical Services for instructions.

Step	Instructions for Task 3: Install the Turntide Motor Controller	
3	If a longer motor power cable is needed, Turntide offers a 10m (~33ft) option. Contact **support@turntide.com** for lengths greater than 10m.	

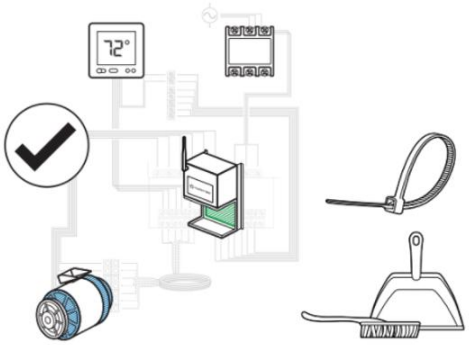
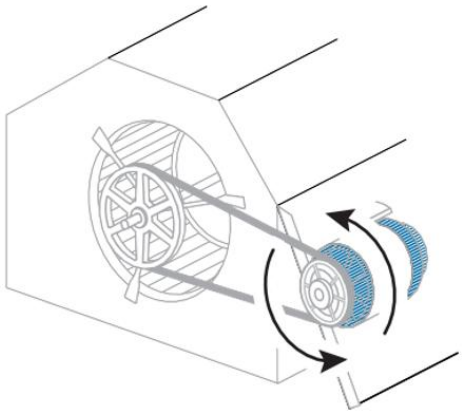
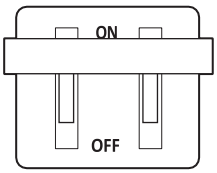
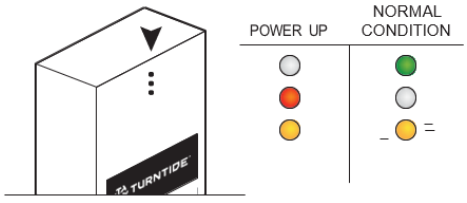
Task 4: Wire Components

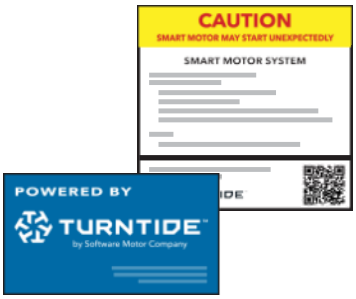
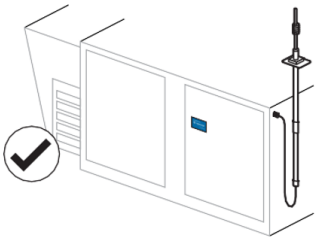
Step	Instructions for Task 4: Wire Components	
1	Refer to **Wiring Information** for physical layout of the wires.	• **Wiring Information SL121 Motor Controllers, Monitor Only** • **Wiring Information P06 Motor Controllers, Monitor Only**
2	1. Insert bushing into the motor electrical box. 2. Install the ferrules end of the motor power cable to the Turntide Motor Controller and unterminated leads to the Turntide Smart Motor. 3. Cut excess length from the raw end of the cable to required length, leaving ample slack for future servicing.	
3	Connect the induction motor power wires to the Turntide Motor Controller. If the original induction motor had separate overload wires, then they must be connected.	 SL120/SL121 motor controllers are labeled **L1**, **L3**, and **L3** P05/P06 motor controllers are labeled **U**, **V**, and **W**

Step	Instructions for Task 4: Wire Components	
4	Relocate induction motor power wires from the **Load** side of the fan contactor to the **Line** side, so that the Turntide Motor Controller has an unswitched power supply. **Warning: Ensure that input power ground is terminated on the controller. The ground wire from the motor to the controller does not provide sufficient grounding**. If not properly grounded, the motor controller may not function correctly and could pose a safety hazard. Ensure you have a dedicated ground wire.	
5a	**Air Sensor Installation** If you are **NOT** using air sensors, skip this task (5a) and task (5c). Air sensors are **NOT** intended for installations exposed to weather. Install the supply air sensor downstream of the coil and heat exchanger, and the return air sensor in the return duct inlet. (Sensors are identical and can be installed in either location.) For more information, see **Supply and Return Air Sensors** in the **Appendix**. All cables provided by Turntide are **NOT** rated for outdoor use.	

Step	Instructions for Task 4: Wire Components	
5b	For horizontally ducted units, install the supply air sensor through blower deck just beyond the heat exchanger, and the return air sensor where duct enters unit. For units equipped with an economizer, install the return air sensor upstream of the economizer such that it senses the indoor return air, not the outside air, taking care not to impede damper blade operation.	
5c	Wire sensors to the Turntide Motor Controller per configuration specific wiring diagrams. Sensors are **not** polarity sensitive.	
6	You are replacing an existing Turntide motor controller (for example, P04, P05, or SL120) with a newer motor controller (for example, P06 or SL121) AND you already have an RMK installed: **You will use the existing External Dual-Band Wi-Fi antenna with 3m wire** that is already wired through the RTU **and attach it to the P06 or SL121** using the coaxial connector adapter that is provided.  	

Task 5: Start Up the System

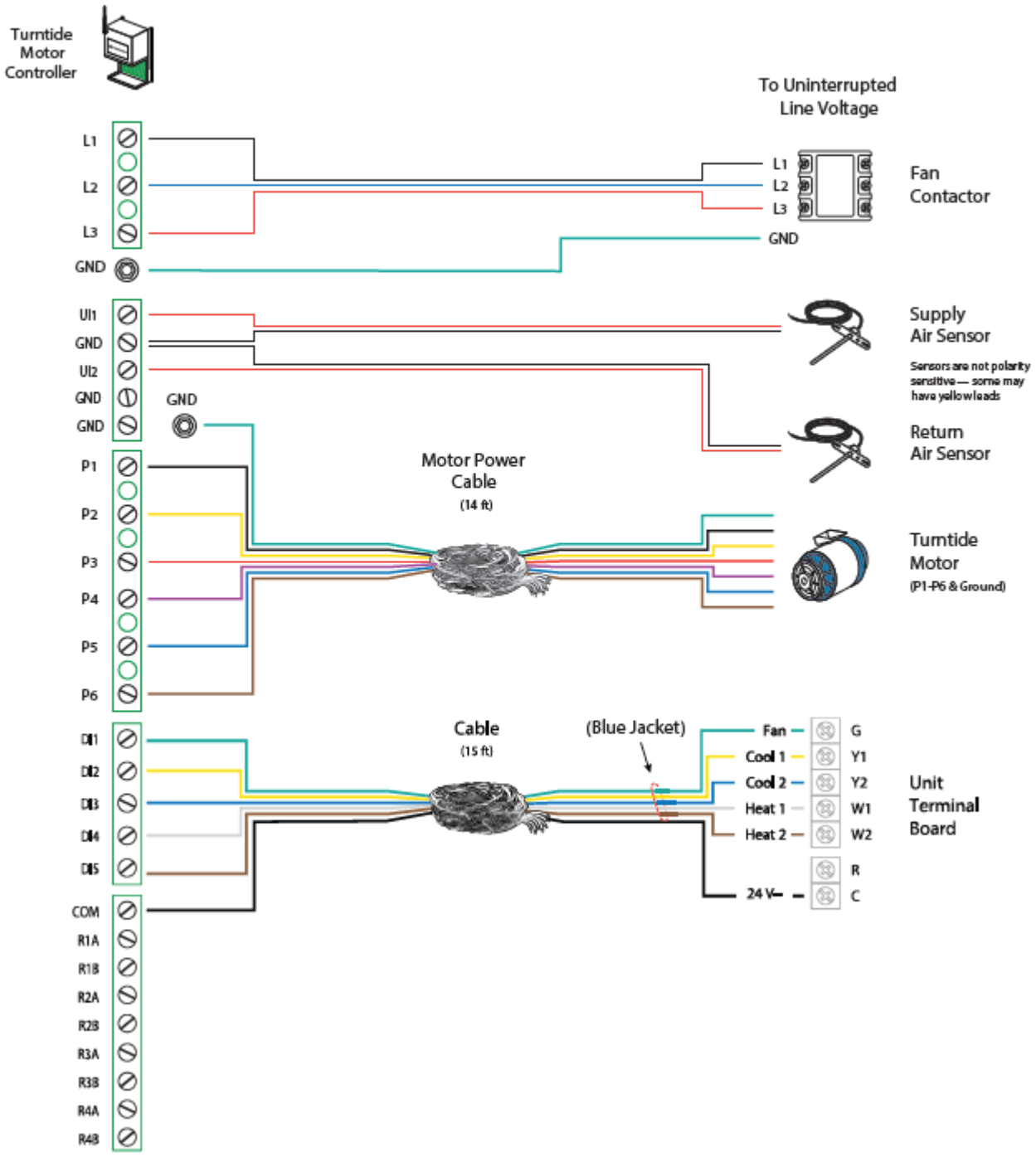
Step	Instructions for Task 5: Start Up the System	
1	1. Verify that all wiring is correct and wire terminations are tight and secure. 2. Install cable ties around any loose wires and clean blower cavity of any debris from installation.	
2	Turn the fan pulley by hand and verify that the motor pulley and fan rotate freely.	
3	Turn on power to the unit.	
4	Inspect the Turntide motor controller's LEDs for the correct run sequence. Upon power up: 1. The **red** and **yellow** LEDs will illuminate briefly. *2.* The **green** LED will illuminate solidly.	

Step	Instructions for Task 5: Start Up the System	
5	At this point, you must use the **Turntide Technician App** to commission the motor. A smart phone with the Turntide Technician mobile app is necessary for connecting to the motor controller. *You cannot complete the installation without using the app.* See the Turntide Technician App User Guide at	
6	Affix the Turntide label on the exterior of the blower access panel and the Caution label on the blower housing.	
7	Confirm all access panels are re-installed and secure on unit. Ensure all unit disconnects are in the ON position and remove all materials and tools from roof/location.	

Wiring Information SL121 Motor Controllers, Monitor Only

Wiring Information

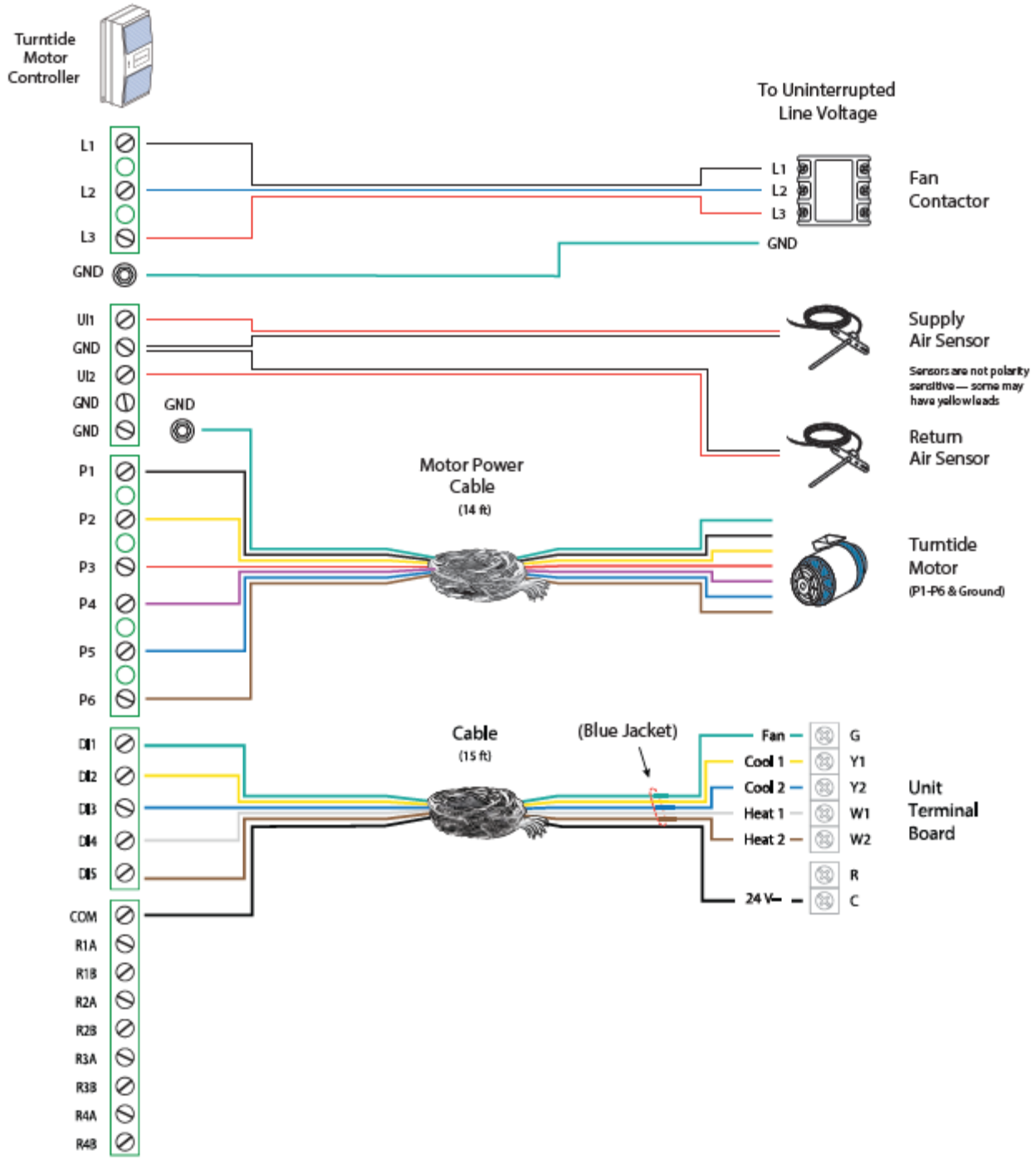
SL 121 Motor Controllers



Wiring Information P06 Motor Controllers, Monitor Only

Wiring Information

P06 Motor Controllers



Appendix

How to Install Noise Isolation Feet

Table 4 Noise isolation kits matched with motors

KIT	SKU (motor and frame)	Notes
KIT-ISLN-FT-101	V01-0300-2-A00 V01-0300-4-A00 V01-0300-2-C00 V01-0300-4-C00 V01-0300-6-C00 V01-0300-2-D00 V01-0300-4-D00 V01-0300-6-D00 V02-0500-2-D00 V02-0500-4-D00 V02-0500-6-D00	**Frames are A, C, D** V02 motors with a 143/145T frame size require KIT_ISLN-FT-101.
KIT-ISLN-FT-201	V01-0300-2-F00 V01-0300-4-F00 V01-0300-6-F00 V02-0500-2-F00 V02-0500-4-F00 V02-0500-6-F00	**Frame F** V01-F motors, which are less than 3hp motors with a 182/184T frame size require KIT-ISLN-FT-201.
KIT-ISLN-FT-301	V03-1500-4-H00 V03-1500-6-H00	**Frame H**

Table 5 Torque required for Nylon-Patch Thread-Locking Fasteners

Kit	Fastener	Torque Inch Pounds	Torque Foot Pounds	Torque Nm
KIT-ISLN-FT-**101**	Two **M6** x 1mm x 16mm Nylon-Patch Thread-Locking Fasteners	170.0 in-lbs ± 11.2 in-lbs	14 ft-lbs ± 1 ft-lbs	19.2 Nm ± 1.3 Nm
KIT-ISLN-FT-**201**	Four **M6** x 1mm x 16mm Nylon-Patch Thread-Locking Fasteners	170.0 in-lbs ± 11.2 in-lbs	14 ft-lbs ± 1 ft-lbs	19.2 Nm ± 1.3 Nm
KIT-ISLN-FT-**301**	Eight **M6** x 1mm x 16mm Nylon-Patch Thread-Locking Fasteners	170.0 in-lbs ± 11.2 in-lbs	14 ft-lbs ± 1 ft-lbs	19.2 Nm ± 1.3 Nm
	Eight **M8** x 1.25mm x 16mm Nylon-Patch Thread-Locking Fasteners	330.0 in-lbs ± 19.5 in-lbs	27.5 ft-lbs ± 1.6 ft-lbs	37.3 Nm ± 2.2 Nm

Installation Steps

1. Identify the Turntide motor and frame size using the codes found on the nameplate of the motor and match it to a Noise Isolation Kit in **Table 4 Noise isolation kits matched with motors.** Verify that your package contains the correct noise isolation feet for your motor and motor frame.

Figure 5 Example Motor V01 with Frame A

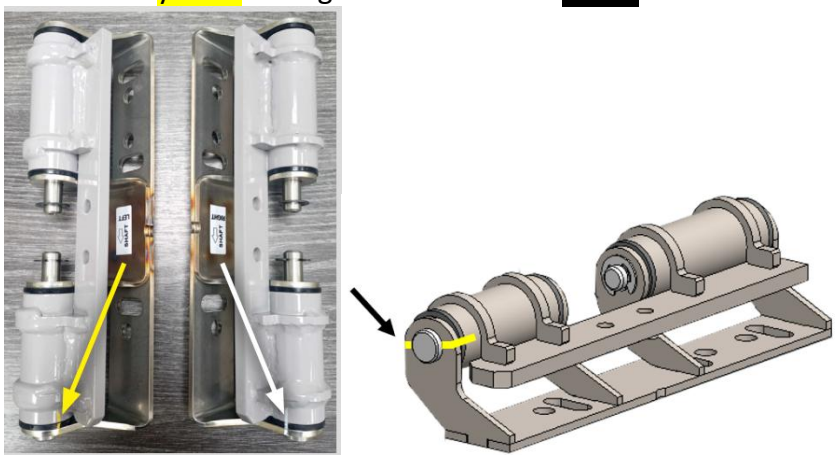
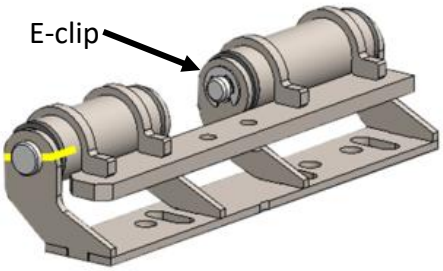
Go to instructions for your kit:

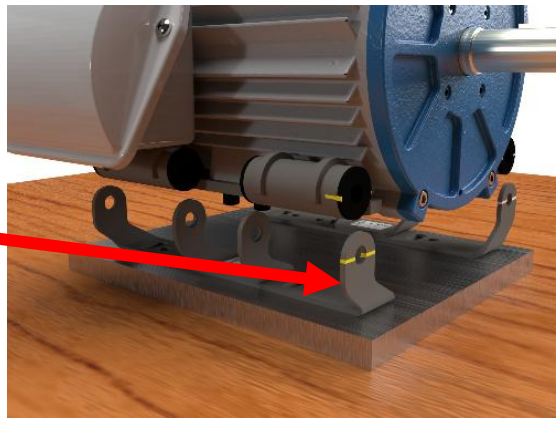
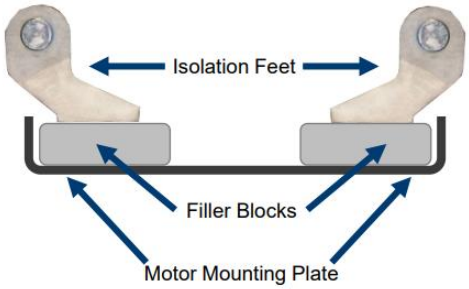
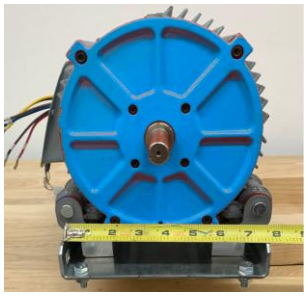
- **KIT-ISLN-FT-101 Motor Noise Isolation Feet Installation on V01 and V02 Motors, Frames A, C, and D**
- **KIT-ISLN-FT-201 Motor Noise Isolation Feet Installation on V01 and V02 Motors, Frame F**
- **KIT-ISLN-FT-301 Motor Noise Isolation Feet Installation on V03 Motors, Frame H**

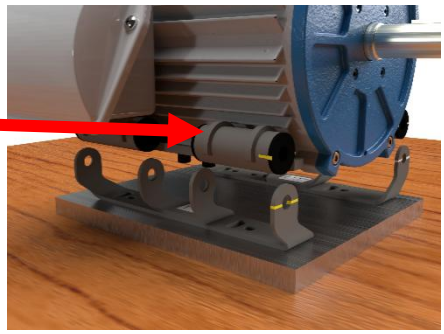
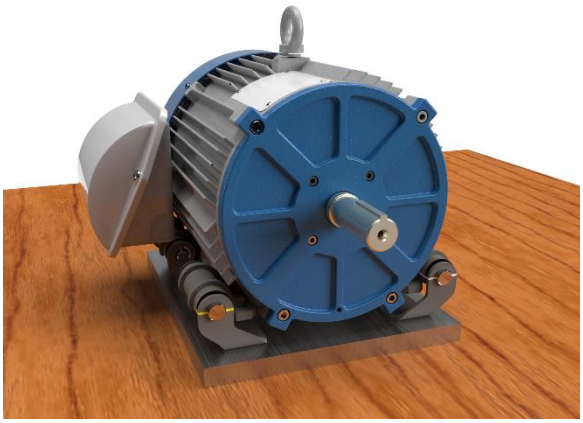
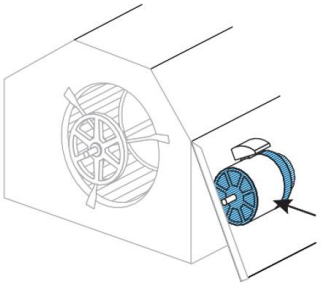
Important: Do **NOT** use feet spacers or bolt sleeves with noise isolation feet.

KIT-ISLN-FT-101 Motor Noise Isolation Feet Installation on V01 and V02 Motors, Frames A, C, and D

Important: Assumes you have removed the existing mounting plate. Do **NOT** use feet spacers or bolt sleeves with noise isolation feet.

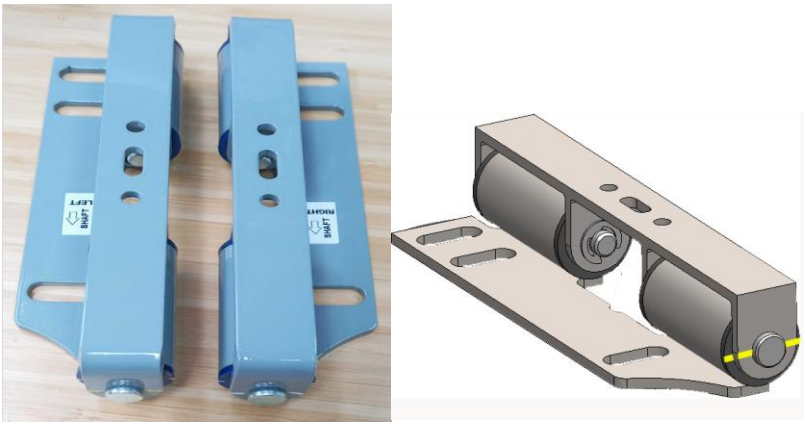
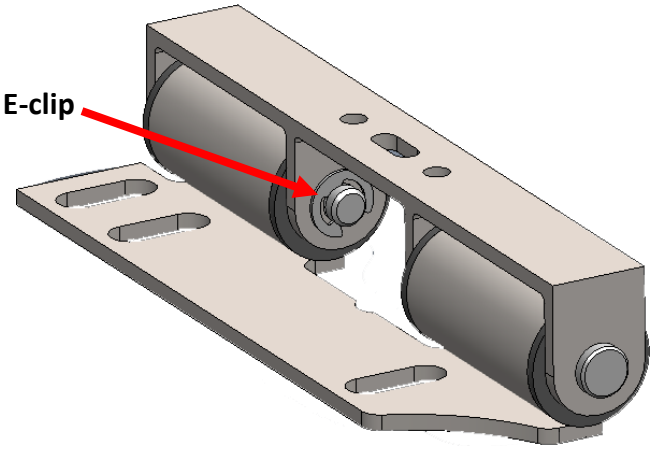
Instructions for KIT-ISLN-FT-101 Motor Noise Isolation Feet Installation on V01 and V02 Motors, Frames A, C, and D	
1	**Examine the new noise isolation feet:** • The feet in KIT-ISLN-FT-101 are **NOT** symmetrical. They are identified as *Left* and *Right*, when facing the shaft end of the motor. • The shorter barrel faces toward the motor shaft end. (A sticker indicates the direction.) • Color indicator lines on the isolation foot upper and lower sections indicate which pieces go together when reassembling the isolation foot. • The left foot is marked yellow the right foot is marked **white.** 
3	**Disassemble the noise isolation feet to allow for easier installation:** Remove the E-clips from the clevis pins, sliding clevis pins out, so as to separate the lower foot section from the upper foot section. 

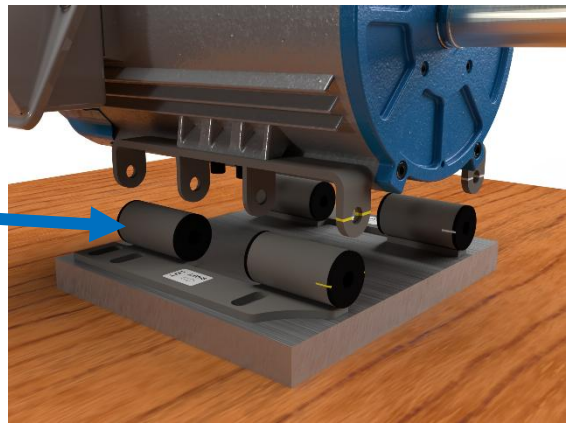
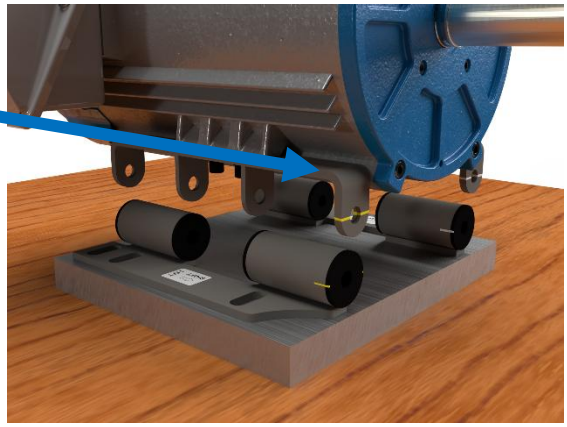
Instructions for KIT-ISLN-FT-101 Motor Noise Isolation Feet Installation on V01 and V02 Motors, Frames A, C, and D	
3	Install the **lower section** of the Left and Right noise isolation feet **to the mounting plate** BUT do **not** tighten the bolts yet! The Left foot is marked with yellow, and the Right foot is marked with **white.** *The position of the motor (and therefore noise isolation feet) relative to the mounting plate is determined based on where the pulley/belt is on the blower fan as well.* Lower section of foot installed on the mounting plate.  **Special Cases:** **Narrow Mounting Plate**: If you are using a narrow mounting plate with a V01 motor and KIT-ISLN-FT-101, you will need filler blocks to allow the feet to hang over the edge of the mounting plate.   **Vertical Mounting Plate:** If your mounting plate is positioned vertically, at this point, follow instructions in **Special Instructions for Installation on a Vertical Mounting Plate** before proceeding with Step 5.

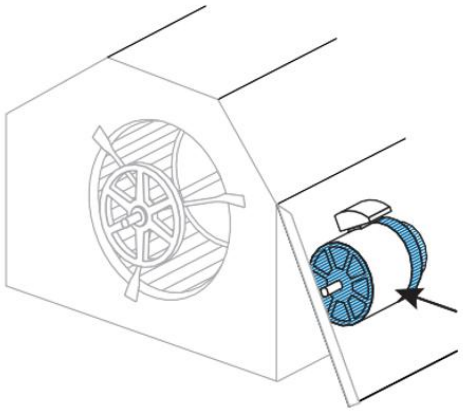
Instructions for KIT-ISLN-FT-101 Motor Noise Isolation Feet Installation on V01 and V02 Motors, Frames A, C, and D	
4	• Install the upper section of the Left and Right noise isolation feet **to the motor**. • Ensure that bolts connecting motor isolation feet to the motor body are torqued to specifications. **KIT-ISLN-FT-101** for motors V01 and V02 (A, C, and D frames) includes: Two M6 x 1mm x 16mm Nylon-Patch Thread-Locking Fasteners Torque: **14 ft-lbs ± 1 ft-lbs** (19.2 Nm ± 1.3 Nm) Upper section of foot installed on the motor. 
5	• Reconnect the upper and lower sections of the noise isolation feet using the clevis pins and E-clips. • Carefully align the motor on the mounting plate on a flat surface. • Fully tighten the lower noise isolation feet bolts. 
6	Reinstall the motor and mounting plate assembly in the RTU. 
Go back to **Task 1: Uninstall the existing motor and Install the Turntide Motor, Step 7.**	

KIT-ISLN-FT-201 Motor Noise Isolation Feet Installation on V01 and V02 Motors, Frame F

Important: Assumes you have removed the existing mounting plate. Do **not** use feet spacers or bolt sleeves with noise isolation feet.

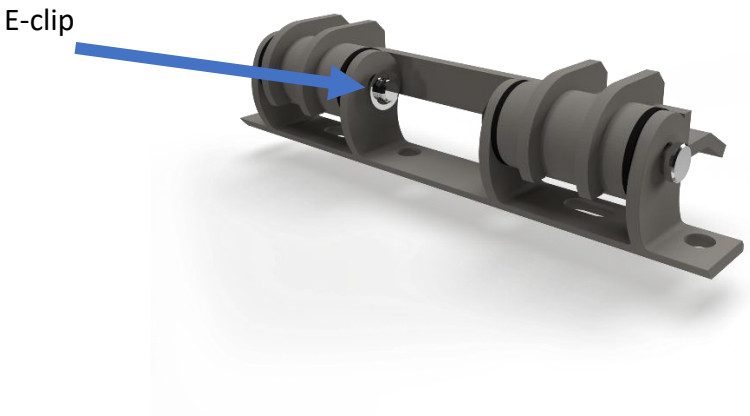
Instructions for KIT-ISLN-FT-201 Motor Noise Isolation Feet Installation on V01 and V02 Motors, Frame F	
1	**Examine the new noise isolation feet:** 1. The feet in KIT-ISLN-FT-201 are **NOT symmetrical**. They are identified as Left and Right, when facing the shaft end of the motor. 2. Color indicator lines on the isolation foot upper and lower sections indicate which pieces go together when reassembling the isolation foot. The left foot is marked yellow the right foot is marked **white**. 
2	**Disassemble the noise isolation feet:** Remove the E-clips from the clevis pins, sliding clevis pins out, so as to separate the lower foot section from the upper foot section. 

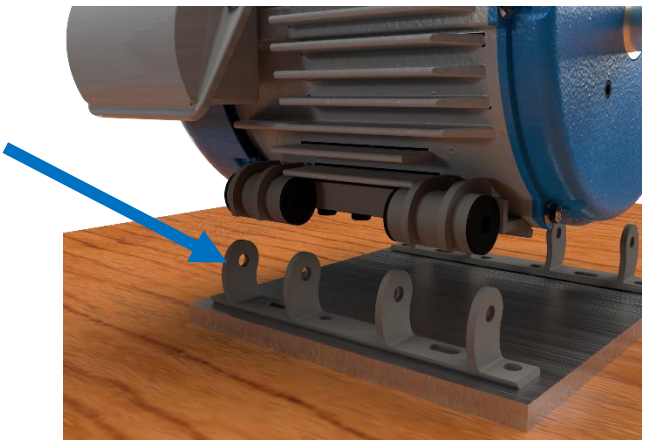
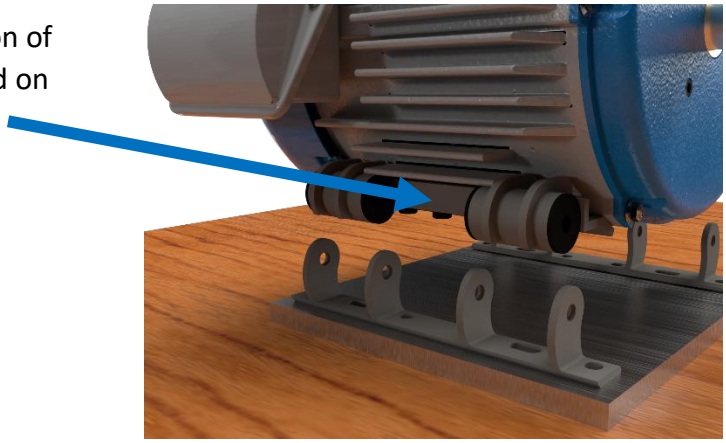
Instructions for KIT-ISLN-FT-201 Motor Noise Isolation Feet Installation on V01 and V02 Motors, Frame F	
3	Install the **lower section** of the Left and Right noise isolation feet **to the mounting plate** BUT do **NOT** tighten the bolts yet! The Left foot is marked yellow the Right foot is marked **white.** *The position of the motor (and therefore noise isolation feet) relative to the mounting plate is determined based on where the pulley/belt is on the blower fan as well.* Lower section of foot installed on the mounting plate 
4	1. Install **the upper section** of the Left and Right noise isolation feet **to the motor**. **2.** Ensure that bolts connecting motor isolation feet to the motor body are torqued to specifications. **KIT-ISLN-FT-201** Motor Noise Isolation Feet Installation on V01 and V02 Motors, Frame F includes: Four M6 x 1mm x 16mm Nylon-Patch Thread-Locking Fastener Torque: **14 ft-lbs ± 1 ft-lbs** (19.2 Nm ± 1.3 N) Upper section of foot installed on the motor. 

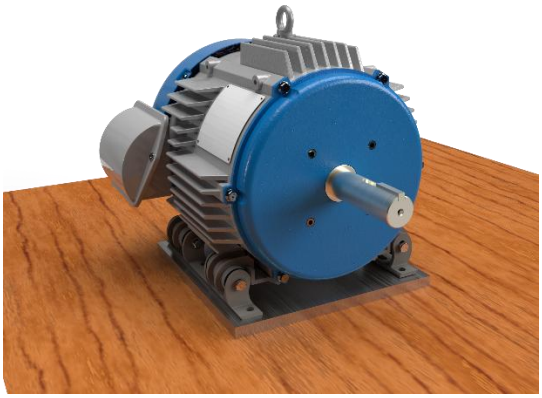
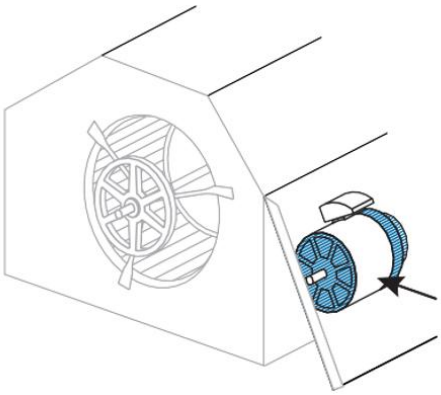
Instructions for KIT-ISLN-FT-201 Motor Noise Isolation Feet Installation on V01 and V02 Motors, Frame F	
5	• Reconnect the upper and lower sections of the noise isolation feet using the clevis pins and E-clips. • Carefully align the motor on the mounting plate on a flat surface. • Fully tighten the lower noise isolation feet bolts to the mounting plate. 
6	Reinstall the motor and mounting plate assembly in the RTU. 
Go back to **Task 1: Uninstall the existing motor and Install the Turntide Motor, Step 7.**	

KIT-ISLN-FT-301 Motor Noise Isolation Feet Installation on V03 Motors, Frame H

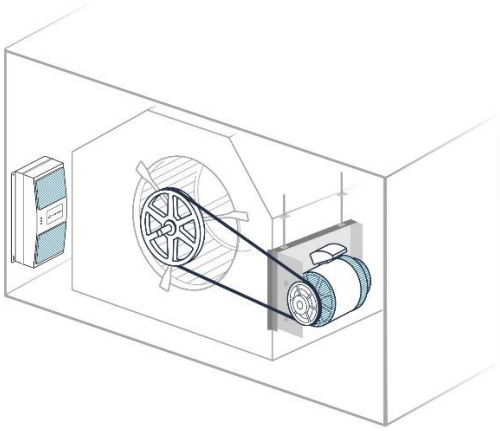
Important: Assumes you have removed the existing mounting plate. Do **not** use feet spacers or bolt sleeves with noise isolation feet.

Instructions for KIT-ISLN-FT-301 Motor Noise Isolation Feet Installation on V03 Motors, Frame H	
1	**Examine the new noise isolation feet:** The feet in KIT-ISLN-FT-301 are **symmetrical**. 
2	**Disassemble the noise isolation feet:** Remove the E-clips from the clevis pins, sliding clevis pins out, so as to separate the lower foot section from the upper foot section. 

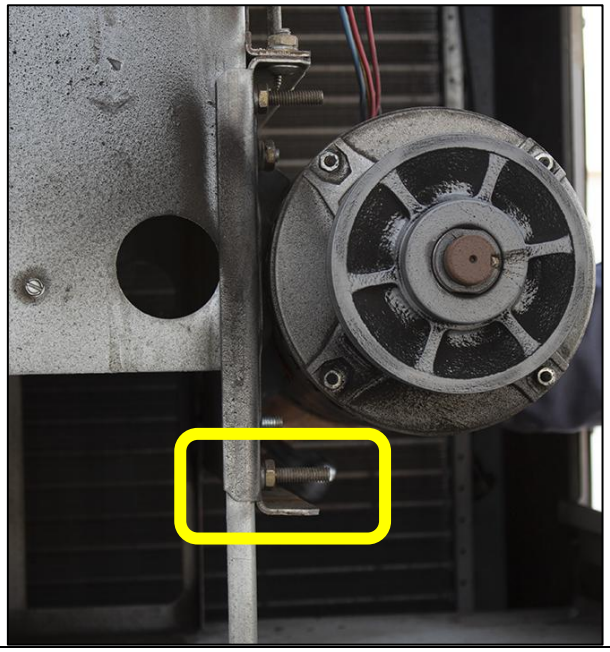
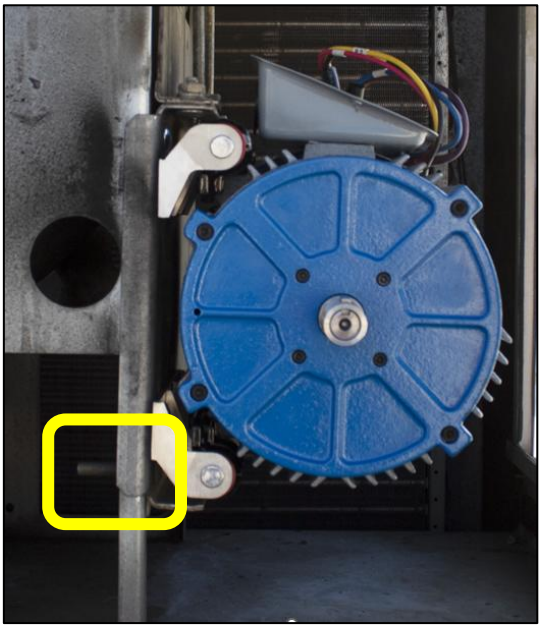
Instructions for KIT-ISLN-FT-301 Motor Noise Isolation Feet Installation on V03 Motors, Frame H	
3	Install the **lower section** of the Left and Right noise isolation feet **to the mounting plate** BUT do **NOT** tighten the bolts yet! *The position of the motor (and therefore noise isolation feet) relative to the mounting plate is determined based on where the pulley/belt is on the blower fan as well.* Lower section of foot installed on the mounting plate 
4	1. Install the upper section of the noise isolation feet **to the motor**. 2. Ensure that bolts connecting motor isolation feet to the motor body are torqued to specifications. Depending on the housing of your V03 motor, you will use the M6 or M8 fasteners. **KIT-ISLN-FT-301** Motor Noise Isolation Feet Installation on V03 Motors, Frame H includes: Eight M6 x 1mm x 16mm Nylon-Patch Thread-Locking Fasteners Torque: **14 ft-lbs ± 1 ft-lbs** (19.2 Nm ± 1.3) Eight M8 x 1.25mm x 16mm Nylon-Patch Thread-Locking Fasteners Torque: **27.5 ft-lbs ± 1.6 ft-lbs** (37.3 Nm ± 2.2 Nm) Upper section of foot installed on the motor. 

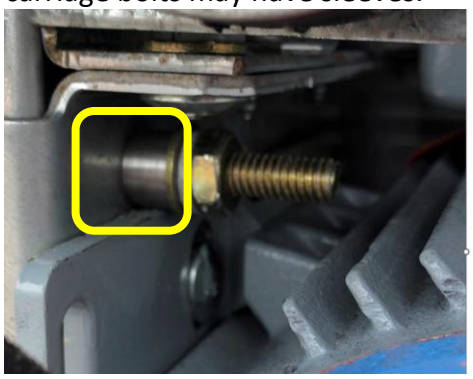
Instructions for KIT-ISLN-FT-301 Motor Noise Isolation Feet Installation on V03 Motors, Frame H	
5	1. Reconnect the upper and lower sections of the noise isolation feet using the clevis pins and E-clips. 2. Carefully align the motor on the mounting plate on a flat surface. 3. Fully tighten the lower noise isolation feet bolts. 
6	Reinstall the motor and mounting plate assembly in the RTU. 
Go back to **Task 1: Uninstall the existing motor and Install the Turntide Motor, Step 7.**	

Special Instructions for Installation on a Vertical Mounting Plate



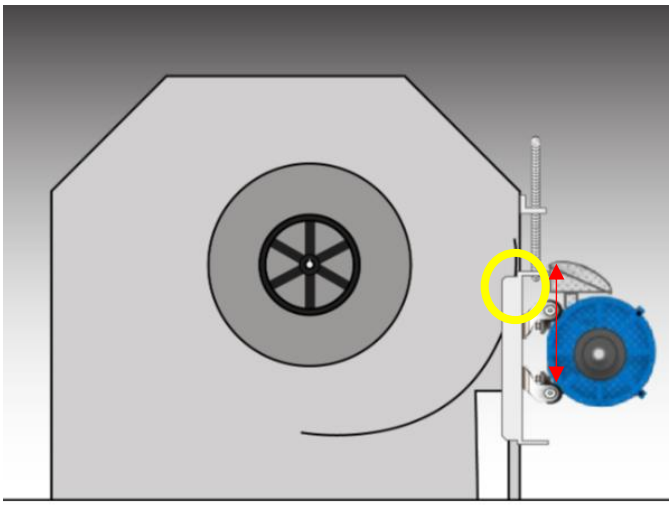
Key Concepts

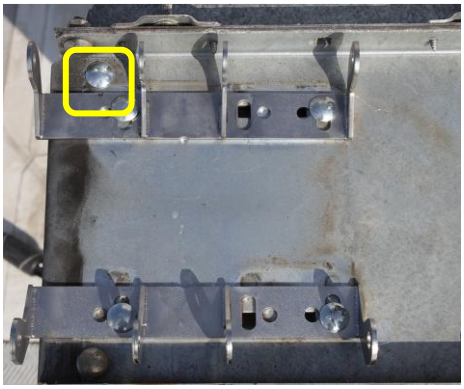
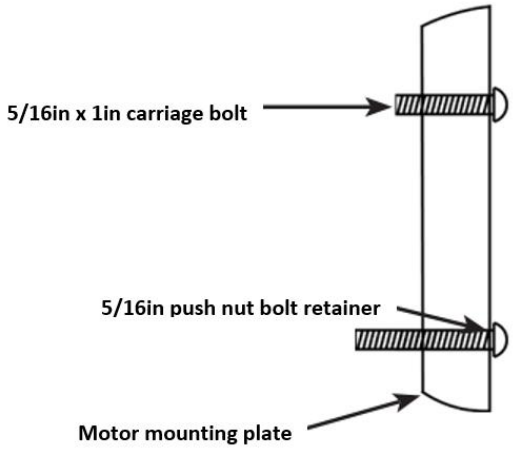
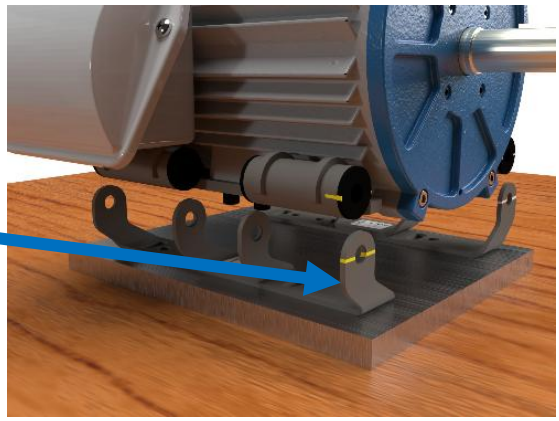
BEFORE: In an existing vertical mounting plate installation, the bolts are positioned with the thread facing the motor. As you can see in the example image, the bolt extends towards the motor.	**AFTER**: You will be reversing the mounting bolts (180 degrees) with the noise isolation feet installation. As you can see in the example image, the bolt thread now extends **towards** the RTU. This allows you to access the nut when belt tension adjustment is necessary.
	

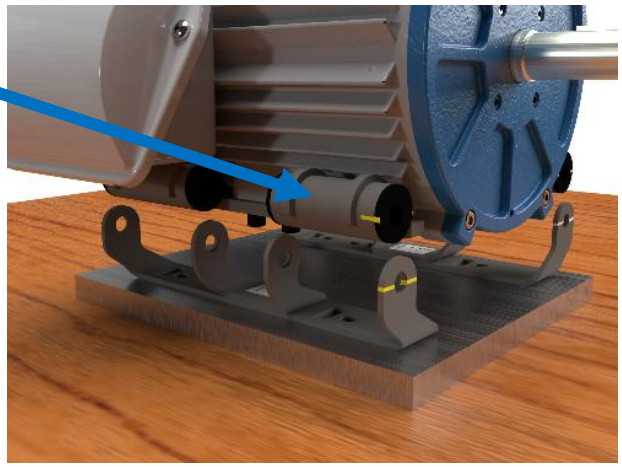
In your *existing* Turntide motor installation, the carriage bolts may have sleeves. 	You will **not** use sleeves with the installation of the noise isolation feet. 

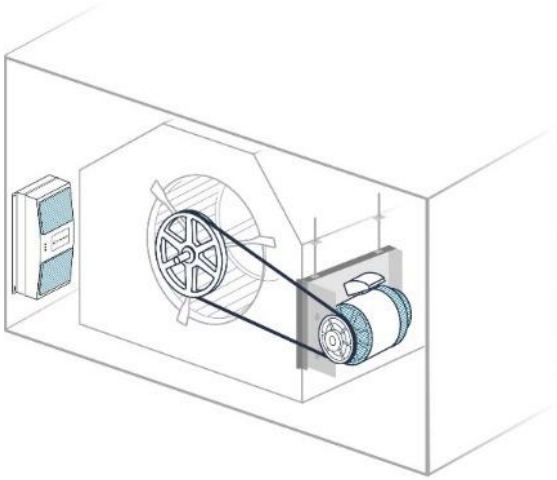
Before you begin, note the following:

1. Assumes you have removed the existing mounting plate.
2. **Important**: Feet spacers, bolt sleeves, and filler blocks are **not** applicable to this configuration.
3. You will reuse all the existing mounting bolts but turn all the bolts 180 degrees.
4. In the upper left corner of the mounting plate, use a **5/16in x 1in** carriage bolt. Using a shorter bolt ensures that it will **NOT** protrude into the blower housing.
5. You might have to shift the entire assembly down to get a good fit. This is necessary if the blower housing is preventing ample space for nut installation on the bolt in the upper right corner and proper bolt seating.



1	1. Install the **5/16in x 1in** carriage bolt in the upper left corner of the **top** of mounting plate. 2. Install the remaining bolts and add push nut bolt retainer to the bolts nearest the shaft/belt.  
2	Install the **lower section** of the Left and Right noise isolation feet **to the mounting plate** BUT do **not** tighten the bolts yet! The Left foot is marked yellow, and the Right foot is marked **white.** *The position of the motor (and therefore noise isolation feet) relative to the mounting plate is determined based on where the pulley/belt is on the blower fan as well.* Lower section of foot installed on the mounting plate. 

3	1. Install the upper section of the Left and Right noise isolation feet **to the motor**. 2. Ensure that bolts connecting motor isolation feet to the motor body are torqued to specifications. **KIT-ISLN-FT-101** for motors V01 and V02 (A, C, and D frames) includes: Two M6 x 1mm x 16mm Nylon-Patch Thread-Locking Fasteners Torque: **14 ft-lbs ± 1 ft-lbs** (19.2 Nm ± 1.3 Nm) Upper section of foot installed on the motor. 
4	1. Reconnect the upper and lower sections of the noise isolation feet using the clevis pins and E-clips. 2. Carefully align the motor on the mounting plate on a flat surface. 3. Fully tighten the lower noise isolation feet bolts. 

5	Reinstall the motor and mounting plate assembly in the RTU. 
Go back to **Task 1: Uninstall the existing motor and Install the Turntide Motor, Step 7.**	

Special Case: Replacing Old Turntide Motor Controller with a P06 or SL121 Motor Controller

How to Replace a P04/P05/SL120 with SL121/P06 Control Wiring

Note: The P04, P05, and SL120 motor controllers are prewired with a **white** input and a **black** output cable, each with a 300 V rating.

- The **white** input wired in parallel with the thermostat 24V signals to the RTU.
- The **black** cable wired for 24V Common.

1. When removing the existing controller, retain the existing **BLACK** and **WHITE** wire harnesses.
2. Remove and retain the orange jumper wires that are connected to terminals **R1B, R2B, R3B**, and **R4B**.
3. Remove the blue wire harness from the new Turntide motor controller. *It is not used in this application.*
4. Install the orange jumper wires in the new motor controller terminals **R1B, R2B, R3B,** and *R4B*.
5. Connect the wires of the **BLACK** harness as follows:
    a. Red to R1B (this is already connected to the orange jumper)
    b. Black to COM
    c. Yellow to R1A
    d. Blue to R2A
    e. White to R3A
    f. Brown to R4A
    g. Green to DI1 (this already connected to the green wire of the **WHITE** harness)
6. Connect the wires of the **WHITE** harness as follows:
    a. Green to DI1 (this is already connected to the green wire of the **BLACK** harness)
    b. Yellow to DI2
    c. Blue to DI3
    d. White to DI4
    e. Brown to DI5

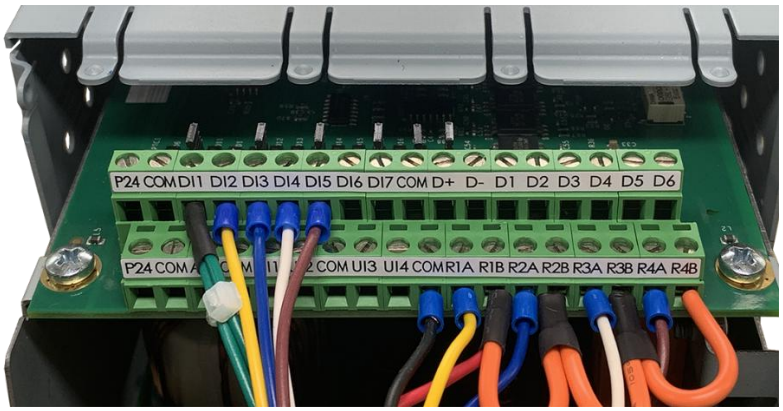


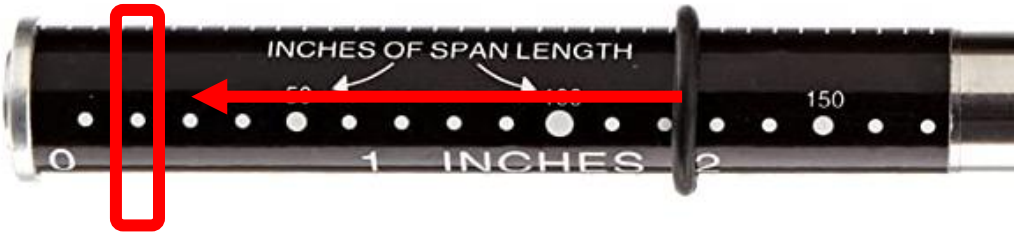
Figure 6 Older SL120 Motor Controller Showing Existing Control Wiring

Best Practices for Installing Belt

Measure the belt tension with a belt tension gauge.
Do NOT attempt to tension the belt without proper testing tools.
If the existing belt shows signs of excessive wear, it should be replaced.

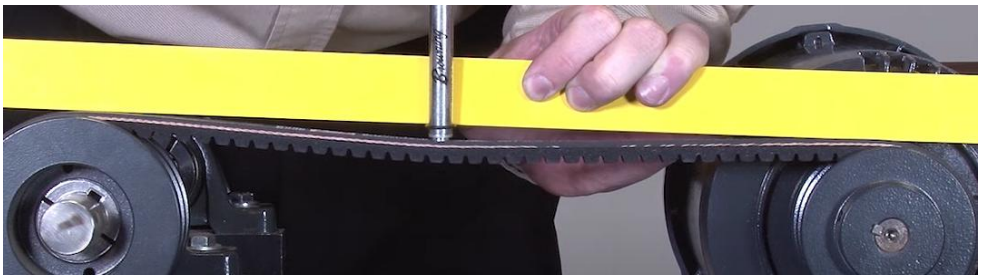
1. Measure the distance (inches) from the center shaft of the motor to the center shaft of the blower wheel.

2. Round the distance to the closest value. If evenly divided, round down. *For example, 20 1/2 inches is rounded down to 20 inches*.
3. Set the bottom O-ring of the belt tension gauge to that value. *For example, slide the O-ring down to the 20-inch mark or notch on your gauge.*

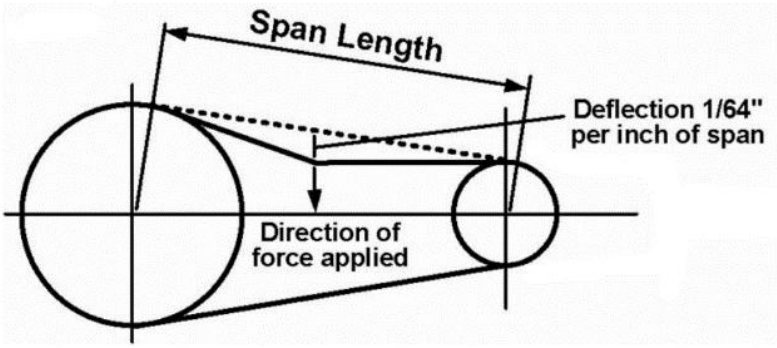


4. Set the top O-ring at zero (0). (Slide the O-ring to the base.)

5. Set a straight edge across the top of the belt. Deflect the belt until the bottom **O-ring** is in the same plane as the straight edge.



HVAC industry standard



6. The top O-ring will have moved up the gauge and show the amount of force used. For example, say 7 pounds.
7. Measure the diameter of the smaller pulley. *The diameter of the smaller pulley determines pressure to the belt that should be applied to the belt.*

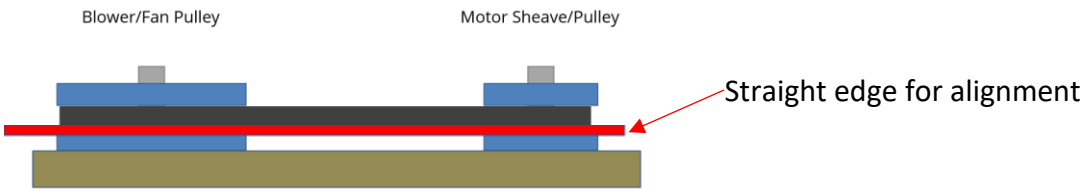
8. Using a deflective force chart, find the value your tension gauge registered and compare it with the diameter of the smaller pulley**.** *For example, if you are using a BX type belt, your tension gauge registered 10 pounds of force, and the smaller pulley is 5 inches in diameter, then the belt tension is in the acceptable range.*

	Smallest Pulley Diameter Range	RPM Range	Belt Deflection Setting			
			uncogged belts		cogged belts	
			used belt	new belt	used belt	new belt
4L, A, AX	2.0 - 2.9	1000 - 2500	1.8	2.6	2.0	3.0
		2501 - 4000	1.4	2.0	1.6	2.4
	3.0 - 3.6	1000 - 2500	3.6	5.4	4.0	6.0
		2501 - 4000	2.8	4.1	3.3	4.9
	3.8 - 4.8	1000 - 2500	4.4	6.6	4.9	7.3
		2501 - 4000	3.7	5.7	4.3	6.4
	5.0 - 7.0	1000 - 2500	5.3	7.8	5.7	9.2
		2501 - 4000	4.6	6.8	5.1	7.6
	3.4 - 4.2	860 - 2500			4.8	7.2
		2501 - 4000			4.1	6.2
5L, B, BX	4.4 - 5.6	860 - 2500	5.2	7.9	7.1	10.5
		2501 - 4000	4.5	6.6	7.1	9.1
	5.8 - 8.6	860 - 2500	6.2	9.4	8.4	12.4
		2501 - 4000	6.0	6.8	7.3	10.7

If the belt cannot be properly tensioned, install a longer or shorter belt, as necessary.

Fan Pulley and Motor Pulley Alignment

1. For proper belt seating, ensure the centerline of the pulleys are aligned.
2. Use a straight edge to verify pulley alignment.
3. Verify that all pulley setscrews are secure.



Troubleshooting a Stalled Motor

If motor stalling:

1. Remove the belt and test if the motor still stalls. (Manual mode in the Turntide Technician App.)
2. If motor runs *properly* without the belt:
    - **Slightly reduce the belt tension and test motor operation in small increments or upsize the belt if necessary**.
    - If you installed isolator feet, you may need to increase the belt by 2 sizes.
    - Note however, if the belt is too loose, it will slip and cause reduced airflow, excessive wear, and early failure.
3. If the motor is *still stalling* without a belt:
    - With the motor off, spin the motor by hand to feel bearings or if anything within the motor is clunking around.
    - Verify that power wiring is correctly wired. For example, are P2 & P3 correct or flipped?
    - Using the Turntide Technician App (**General** screen), verify that you have the correct motor model and voltage selected and that it matches the motor nameplate.
    - Confirm there aren't any rub-outs or exposed copper along the motor power wiring (Applicable check only if the motor has been in operation for some time).
    - If the motor continues to stall, contact Turntide Technical support.

Supply and Return Air Sensors

When you install a supply air temperature sensor, it changes the sequence of operations of the motor system in all flows.

1. If the unit is in heating mode and the supply air temperature is greater than 140degF, the Turntide motor will increase speed to increase airflow.
2. If the unit is in cooling mode and the supply air temperature is less than 50degF, the Turntide motor will increase speed to increase airflow.
3. If the sensors are not installed, the motor system maintains its typical control method dictated by the installed flow.
4. Supply and return temperatures are viewable in BOS for connected motors and on the Technician App for all motors.
5. As a failsafe measure, if the supply and return airs sensors malfunction, then the motor system maintains the Turntide control method (40/75/90) or any custom setpoints that were installed. A malfunction includes if the Turntide motor controller cannot read any values from the sensor or if the values are invalid.