COONEY
ENGINEERED SOLUTIONS
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SMART COIL UNIT VENTILATORS

Installation and Operation Guide

This document details the installation and operation of the Cooney Smart Coil System.

The scope of this document is to provide sufficient details for successful installation of the unit in new installation and to offer operational understanding of the main systems and features of the unit.

Version 1

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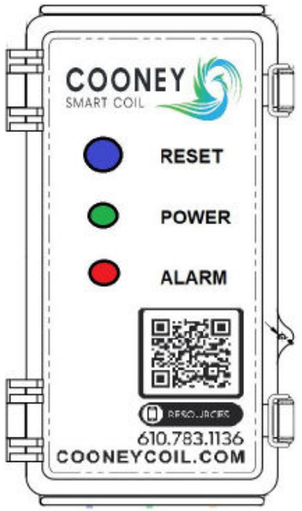
INTRODUCTION

The Cooney Smart Coil System features a reliable sensing system which works hand in hand with the Cooney Coil Freeze Block™ System valves.

The role of the Cooney Smart Coil System is to monitor up to 30 Freeze Block™ Valves 24/7 and to take Alarm Actions on one or more Protection Events.

In the standard configuration, Alarm Actions are the following:
1. Illuminate the internal LED light specific to zone activated.
2. Illuminate the Front Panel Red Alarm Lamp.
3. Trigger a relay to Building Management systems that indicates an Alarm State.

The front panel of the Cooney Smart Coil System is pictured here.



Smart Coil Unit Vent Control Box

QUICK START GUIDE

(a)
Clips
(One Per Valve)

(b)
Sensor Leads
(One Per Valve)

(c)
Sensor Labels

(d)
Control Box

(e)
Panel Sticker

1 Locate all Freeze Block™ Valves on coils

Use the included sticker to indicate location of Coil Access Panels.

2 Install Clips (a) on to the valves

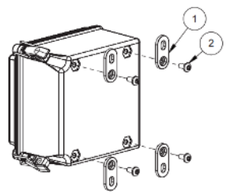
Freeze Block Valve™ must have Groove for install. If Coil was purchase before 2019, contact Cooney Coil.

3 Install Sensors Leads (b) into the clips

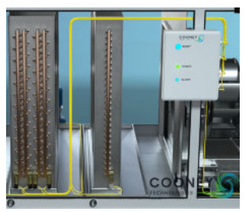
Label each sensor with included sensor labels (c) at valve and control box

4 Mount Control Box (d) in desired location

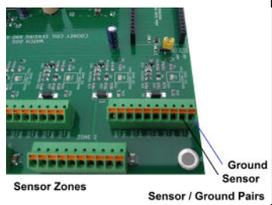
Can be mounted inside or outside of AHU using the provided mounting hardware



5 Run Sensor leads (b) from the valve(s) to the Control Box (d)



6 Input Sensor leads (b) to Control Box terminal strips



7 Supply appropriate power to the control box (d)

8 Test each sensor for functionality and register Smart Coil for warranty coverage

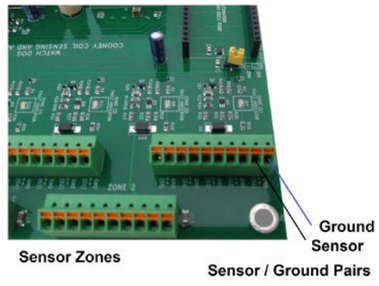
Scan QR code to register Online, or fill out included warranty form and email to info@cooneycoil.com

Sensor Block

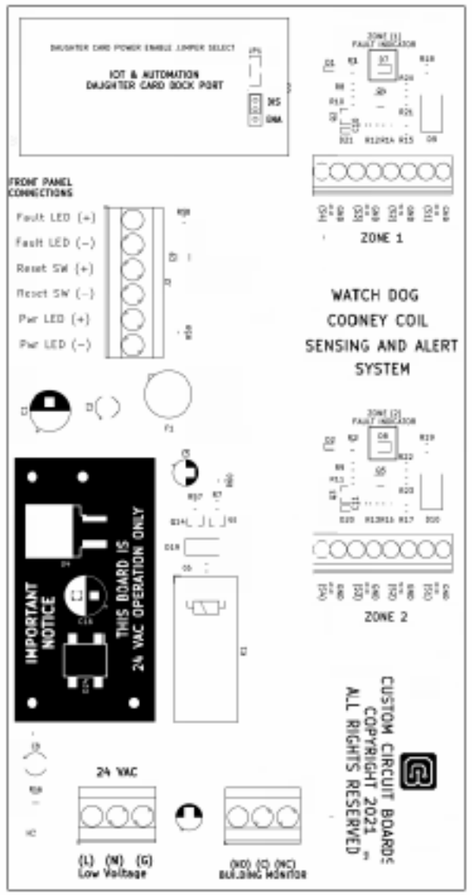
The sensor block is comprised of two fault detection zones and two associated Terminal Connectors labeled for Zone 1, Zone 2 respectively.

Each Terminal Connector has 8 spring tensioned wire lead inputs that are identified with Signal / Ground Pairs to accommodate up to 4 Sensor Input cable pairs per connector.

You can see from the Illustration to the right that markings on the board at each Connector indicate GND >> S(n), to identify the Signal / Ground Pairings.



In a Standard, Non Shielded Sensor Cable, there are no polarity requirements for the White and Black Sensor Cable pair.



The GND / S(n) is provided in support of an optional Ground Shielded Sensor Cable Pair, where there are two conductors and a shield conductor for better noise immunity.

Power Block

24 VAC Terminal has a three conductor screw terminal block and align to the (L) (N) and (G) markings, shown in the bottom left corner of the PCB.

First insure that no power is applied to the supply input lines prior to working with these conductors. Connection should be made in all cases with Single Phase AC voltage using three conductor lines of Line, Neutral and Ground. These should be installed to the associated screw terminal marked (L), (N) and (G) respectively.

Installation of the 24 VAC supply wiring should enter the enclosure via the ½" VAC Input Grommet and be connected appropriately to the terminal.

Building Management Block

A 3 conductor Screw Terminal Block is provided for external monitoring. The terminal block is connected to a double pole single throw (DPST) dry contact relay which is actuated by the Alarm State of the WatchDog system.

Note: This Alarm State indicator is a passive switch and meant for low voltage applications of 48 Volts or less and 4 amps max applied. It is not fused.

Building Management Block (cont.)

As labeled, pins 1 & 2 are Normally Open (NO) and pins 2 & 3 are Normally Closed (NC) during Non Alarm conditions (no valve deployment).

During an Alarm State, pins 1 & 2 are closed and pins 2 & 3 are open, indicating that one or more valve(s) have deployed. The output will remain in the Alarm State until the fault condition has abated and the reset button is manually pressed.

Installation of BM wiring should enter the enclosure via the 3/8" BM Grommet and be connected appropriately to the terminal. Loosen the vertical screw of each terminal to allow for conductor placement, and then tighten the screw to compress and secure the wire conductor lead at each port. Do not over tighten the screw terminal. Snug torque is suggested.

OPERATION

For a successful and smooth installation, first make a quick verification of proper connections to the Power Block, Sensor Block, BM Block and insure that the Unit is securely mounted. Following this review, complete the following steps to determine success of the installation.

Application of Power

At this time, power can be applied from the supply breaker panel.

Power Up Indicators

Once power is supplied, you should observe the following state:

1. Front Panel Green Power lamp lit.
2. Front Panel Red Alarm lamp lit.
3. Building Management Relay set to Alarm State.
4. Six LED Zone indicators on the PCB are lit.

If this is not the condition, remove power and reassess the connections on the Front Panel Connector, Sensors and VAC.

System Reset

If the Alarm Lamp is lit, press and release the Front Panel Reset Button once. This should cycle the system to Ready state which is summarized as:

1. Red Front Panel Alarm lamp is no longer lit.
2. Building Management Relay resets to Ready State.
3. Six LED Zone indicators on the PCB are no longer lit.

The system is now in Ready State, or Operational State.

Sensor Operation

Sensor operation has three tiers of action with Zone Fault indicators, General Fault Indicator and BM Alarm State actuation. All of which should be verified.

Zone Fault Indicators

On the circuit board, you will note six zone fault indicators which are identified as Zone (1) Fault Indicator to Zone (6) Fault Indicator. These respectively match the six Sensor Blocks and are used to help narrow which zone(s) are at fault. Following system reset, these six indicators should not be illuminated. If one or more is illuminated there is a sensor fault being actively detected on the offending Zone.

General Fault Indicator

As earlier mentioned, this is the Front Panel Red Lamp, which illuminates to indicate that one or more of the Zone Fault indicators has been triggered and that the system is in an Alarm State. A System Reset should clear this condition, also assuming that no Zones are in fault.

BM Alarm State Actuation

Finally, the Building Management output indicates the System state by toggling the relay condition which is connected to the BM Terminal Block.

As mentioned, in Ready State, continuity from (NO) to (C) is open circuit and (NC) to (O) is closed circuit.

During Alarm State, this continuity condition flips to indicate to the BM system that an Alarm

Condition exists; hence continuity from (NO) to (C) is now closed and (NC) to (O) is now open.

Following a System Reset, Ready and Alarm states can be induced for testing purposes with the following technique.

At one or more sensor inputs, dip the sensor end into a cup of water or squeeze the two leads simultaneously between a wet finger and thumb. This will simulate a Freeze Event / Valve Deployment and latch a fault in the associated Zone.

A latched fault will light the PCB Zone (n) Fault Indicator LED associated with the trip, Light the Red Front Panel Alarm lamp and toggle the Building Management Relay to Alarm State.

A Reset should clear this state and your installation is ready for Operation.

It is suggested to conduct this test cycle on each Sensor line.

TROUBLESHOOTING

Photo Consultation

After verifying the connection steps above, if standard operation is not achieved, take a photo of both the Front Panel and inside the enclosure. For the inside shot, be sure and get the back side of the front panel which includes the Front Panel Wire bundle.

With those two photos, make a call to our engineering support at (610) 783-1136 and email the photos to info@cooneycoil.com.

Fuse

If is appears there is no power to the Circuit Board, as in the case that power is applied and all seven fault indicators did not light, then it may be valid to check the 12 v dc 2A fuse. If there is a blown fuse, it is best to make a visual inspection to determine cause. When this condition is cured, a new fuse may be reinstalled.

Replacement fuses can be commonly purchased from sources such as Digikey.

Replacement part number:

1	**Fuse**	**2 Amp Fuse**	**WK4957BK-ND**	**Littlefuse**

CONTACT US

For additional questions and engineering support contact us:

(610) 783-1136
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SCAN TO REGISTER SMART COIL WARRANTY

NOTES:

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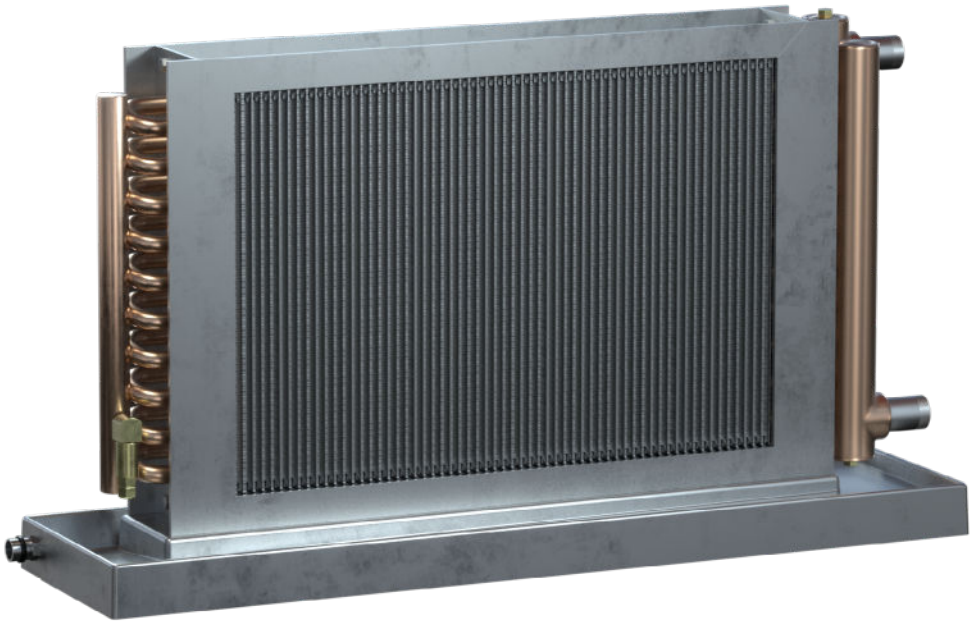
COONEY FREEZE BLOCK™

Installation and Operation Guide



This document details the installation and operation of Cooney Freeze Block™ Coils.

The scope of this document is to provide sufficient details for successful installation of the unit in new installation and to offer operational understanding of the main systems and features of the unit.

Version 1.4

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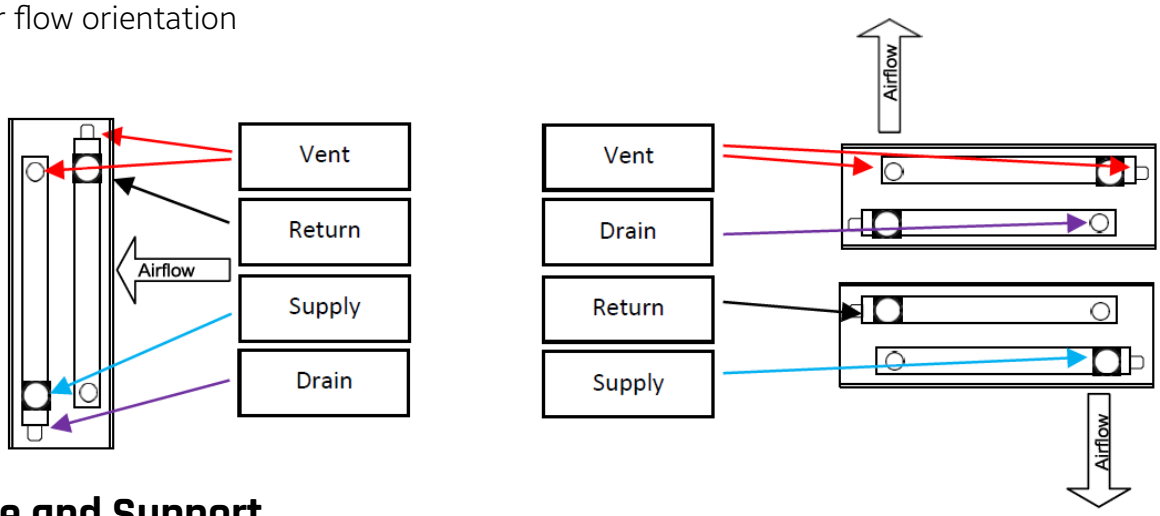
RECEIVING A SHIPMENT

All coils, unless otherwise pre-arranged with CES, are shipped FOB factory requiring all received crates and coils be inspected for any signs of possible freight damage prior to offloading from truck and while the carrier is still present. CES makes every effort to protect the coils from shipping damage but if suspect upon arrival, check the coil while the carrier is still present. If there is damage file a claim with the carrier.

INSTALLATION

Coil Mounting Orientation

A Freeze Block™ coil is designed to be mounted in one particular orientation. Proper coil orientation ensures proper valve deployment given a freeze event, maximum heat transfer, automatic purging of air in the tubes and ability to properly drain coil by gravity. If the coil is improperly installed or has not been built to fit the orientation required at the job site, coil performance may be diminished. The sketch below shows the proper fluid connections and horizontal air flow direction of a coil built for a "Right" or for a "Left" hand installation. Also shown are the proper fluid connections to a coil built for a vertical air flow orientation



Coil Pipe and Support

Fluid coil tubes must be horizontal and level with the ground for maximum draining, and the sheet metal coil casing firmly attached to the supporting structure or duct work. Any movement or vibration in the coil and / or connected piping during operation must be minimized as this could put excessive bending force on the headers. Piping at the coil should be supported so the weight of the piping and fluid in the piping are not supported by the coil headers. Also see the "Precautions" section.

Piping Connection

The coil connections are usually copper or brass. They are softer than steel connections and can easily be cross-threaded and damaged by over tightening. Coils connections and headers can be twisted out of shape, especially if a long handled wrench is used.

It is recommended that a second, (hold back) wrench be used and held firmly to prevent the twisting of the coil connection as force is applied by the tightening wrench.

Freeze Block™ Valve Drainage

All Freeze Block™ relief valves should flow to an open drain. Attaching a hose to direct drain flow is optional. Any hose attachment to direct drainage should flow downward ensuring proper flush. Lifting fluid after valve must be avoided. Any coil installed or operated with a drainage restriction or lift in drain line will not be covered under the Freeze Block™ Warranty.

Access Panels

All coils equipped with the Cooney Freeze Block™ technology to be installed inside of any air handling unit must be equipped with access doors at all relief valve connections. These access doors must be large enough to perform any and all necessary maintenance to the relief valve sections of the coil.

Tube / Fin Damage

When cutting or drilling near the coil, observe and check the location of the nearest tubes and header to avoid puncturing them. If the coil fins get bent they can be combed out by utilizing and fin comb, (this needs to match the coil's fins per inch) and can be procured from a local HVAC supply house.

Insulation

All Fluid Cooney Freeze Block™ Coils come with pre-insulated return bends and expansion relief headers on the front and back of the coil. This insulation must be left in place for the life of the coil. The supply and return piping and fittings to and from the coil connections must be fully insulated and or heat traced to be protected against freezing in the event that the piping is exposed to freezing conditions. Any coil installed or operated without this insulation will not be covered under the Freeze Block™ Warranty.

INITIAL OPERATION

Startup

All Fluid Cooney Freeze Block™ Coils come with pre-insulated return bends and expansion relief headers on the front and back of the coil. This insulation must be left in place for the life of the coil. The supply and return piping and fittings to and from the coil connections must be fully insulated and or heat traced to be protected against freezing in the event that the piping is exposed to freezing conditions. Any coil installed or operated without this insulation will not be covered under the Freeze Block™ Warranty.

Leak Check

It is suggested that the coil be checked for leaks several days after initial startup when the system is operating at full fluid flow and temperature levels.

Note: Rain water, cleaning, loose connections and condensation dripping off piping, coil surfaces or headers may look like a coil leak. Investigate these thoroughly to avoid downtime and expense prior to leak testing the coil.

PERFORMANCE

Thermal

Optimum heat transfer of a coil can be maintained if the fin surface and inside of the tubes are kept clean, along with a tight bond between the fins and tubes. Should a coil not meet thermal expectations the problem may reside elsewhere in the system.

The coil is the final component in a series with other heating and cooling components. It relies on these prior components working properly to supply the correct fluid flow rates at designated temperatures.

The coil is the easiest component to measure how well the entire heating / cooling system is operating and usually the first to be suspect when the root cause may lie elsewhere.

Durability

Similarly the durability of a coil can be affected by distant issues in the system. Water hammer, pressure and / or temperature spikes, vibration, water treatment incompatibility and other factors may first show up at the coil as a leak. This may be a result of an issue somewhere else in the system. These factors need to be investigated if there is a deficiency in the coil's thermal performance or durability. Once eliminated, a more thorough evaluation can be done. Refer to the "Initial Operation" and "Precautions" sections.

CLEANING

Valves

It is extremely rare that a Freeze Block™ Valve would clog but it can occur if a system experiences repeat freeze and thaw cycles along with an excessive amount of sludge or deposits moving through the valves. It is recommended that strainers and / or filters be installed according to industry standards throughout the chilled water and hot water systems to prevent such situations.

In the event that multiple freeze and thaw conditions occur all valves should be inspected and cleaned if necessary to prevent clogging.

Fins

The fin surface can be cleaned in several ways. For light dust or dirt that does not aggressively adhere to the fins, blowing low pressure, (oil free) compressed air across the fins or use of a mild soapy detergent that is "free" rinsing, (leaving no residue behind) should be sufficient. Any such cleaning solution needs to be compatible with the coil material and must not be applied to a hot coil so as to allow time for the cleaning solution to work and not burn solvents into the airstream and / or coil materials. Be sure to rinse the seams and crevices thoroughly, especially brazed and welded joints along with where the coil tubes come through the coil casing. After rinsing, the coil needs to be dried as quickly as possible.

Ideally use low pressure, (oil free) compressed air to minimize any corrosion. For more aggressive contaminates a stronger solution or solvent and / or cleaning procedure may be required. Contact CES for more in-depth details.

Steam Cleaning

The coil can be steam cleaned but the steam pressure needs to be low and the steam parallel to the fins, otherwise the force of the steam could bend the fins over. Also if the fins are severely corroded at the point of contact with the tube, steam cleaning could further deteriorate this critical fin-to-tube bond.

Cleaning Position

The ideal cleaning position for a coil is with it flat because contaminates travel the shortest distance before being forced out. Cleaning the finned surface in the upright position allows contaminates to collect at the bottom of the coil making it difficult to get debris out.

SEASONAL SHUTDOWN

Short Term

Short term shutdowns do not require draining the coil if the temperature surrounding the coil is above the freeze point and below the boiling point of the fluid and the fluid is relatively free of oxidizing dissolved air.

Winterization

For winterization of chilled water Freeze Block™ coils, draining is required for all coils designed to be exposed to freezing conditions. Constant exposure to freezing and thawing may cause tube damage and premature failure.

If chilled water Freeze Block™ coils are installed downstream of preheat coils where freezing conditions happen only with system failure, chilled water Freeze Block™ coils may be left undrained if equipped with a Smart Coil System tied into the Building Maintenance System, (BMS). The following actions are the minimum requirements:

1. Notification, (via alarm) to maintenance / operations team of valve deployment
2. Fan to be shut down automatically immediately upon notification of a valve activation
3. Air intake louvers to be shut automatically after fan has stopped rotating
4. Circulation pump to be turned on automatically where available.

If a Smart Coil System is not installed on Chilled Water Coil, Coil must be drained.

All Cooney Freeze Block™ coils are manufactured with threaded drain connections at the bottom of the supply header along with each of the expansion relief headers. A threaded vent connection is located at the high point of the outlet header. Each of these connections require a ball valve, (not included) to be installed prior to the coil installation and operational for use during draining and winterization. When draining, the coil should be isolated from the fluid system. Open the vent ball valve at the top of the coil along with all ball valves at the bottom. If the coil has been installed properly, (see “Installation”) the fluid will drain out by gravity. All vent and drain ball valves should be left open throughout the entire heating season to properly winterize the coil. Coil failures related to lack of proper winterization by customer shall not be covered under the Freeze Block™ warranty.

Precautions

System issues, or a coil not designed for the rigors of the particular application, as mentioned in the “Performance” sections could cause premature coil failure. The possibility of replacing the coil should be considered in the initial site design or at the time of installation especially if it is a crucial component in the process. Another consideration should be what affect any leaking fluid would have on the surroundings.

Repairs

Do not attempt to repair a Freeze Block™ coil without Cooney Engineered Solutions factory authorization. Doing so voids the warranty and destroys any evidence of what caused the leak so it is not possible to be evaluated. If the coil is damaged beyond repair it must be replaced. Also refer to the “Performance” and the “Precautions” sections.

CONTACT US

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