



A CSW Industrials Company

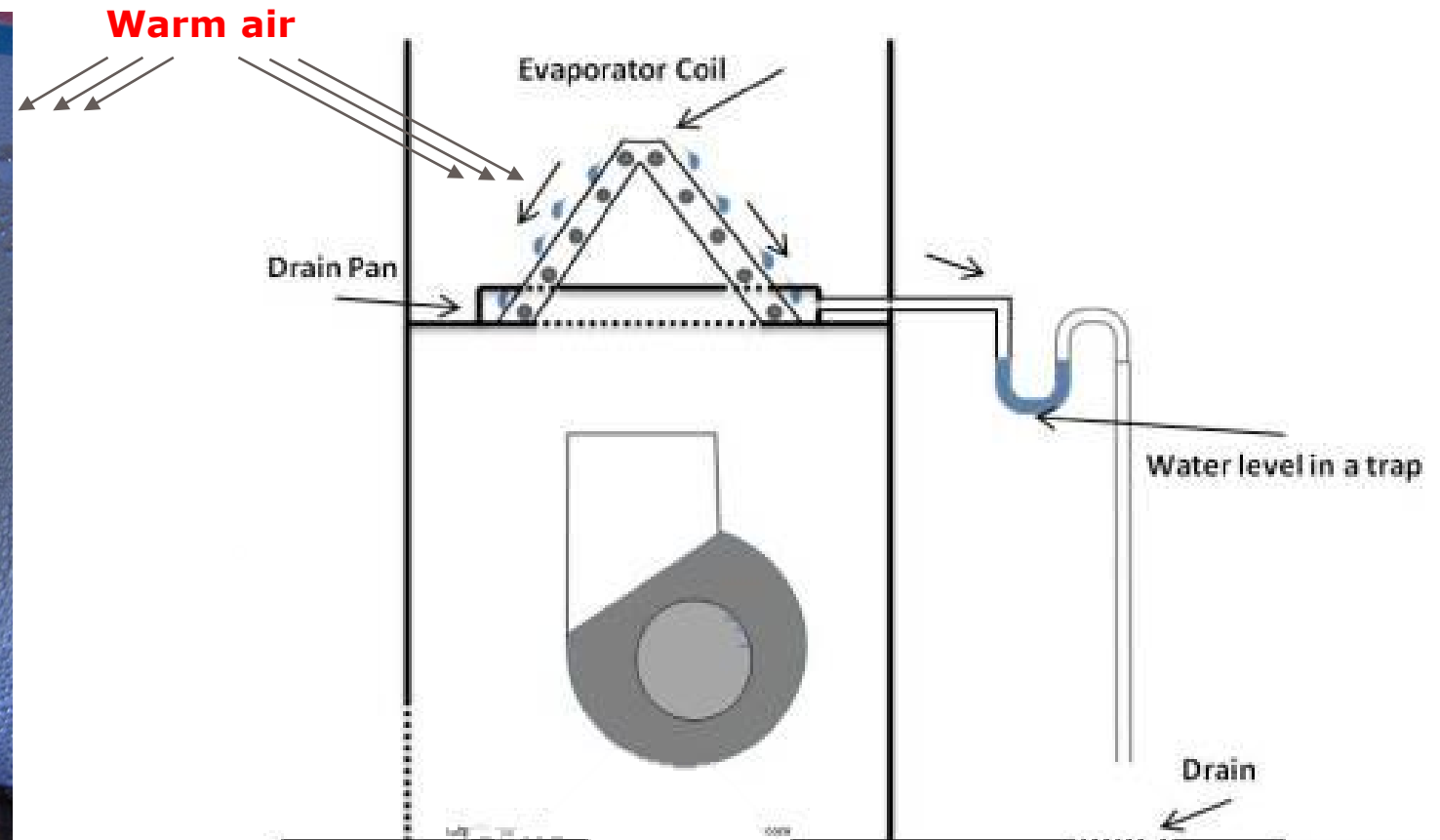
# Condensate Overflow Shut-off Switches/Sensors - Safe-T-Switch® and All Access™

by Jerry Myren

# Applications



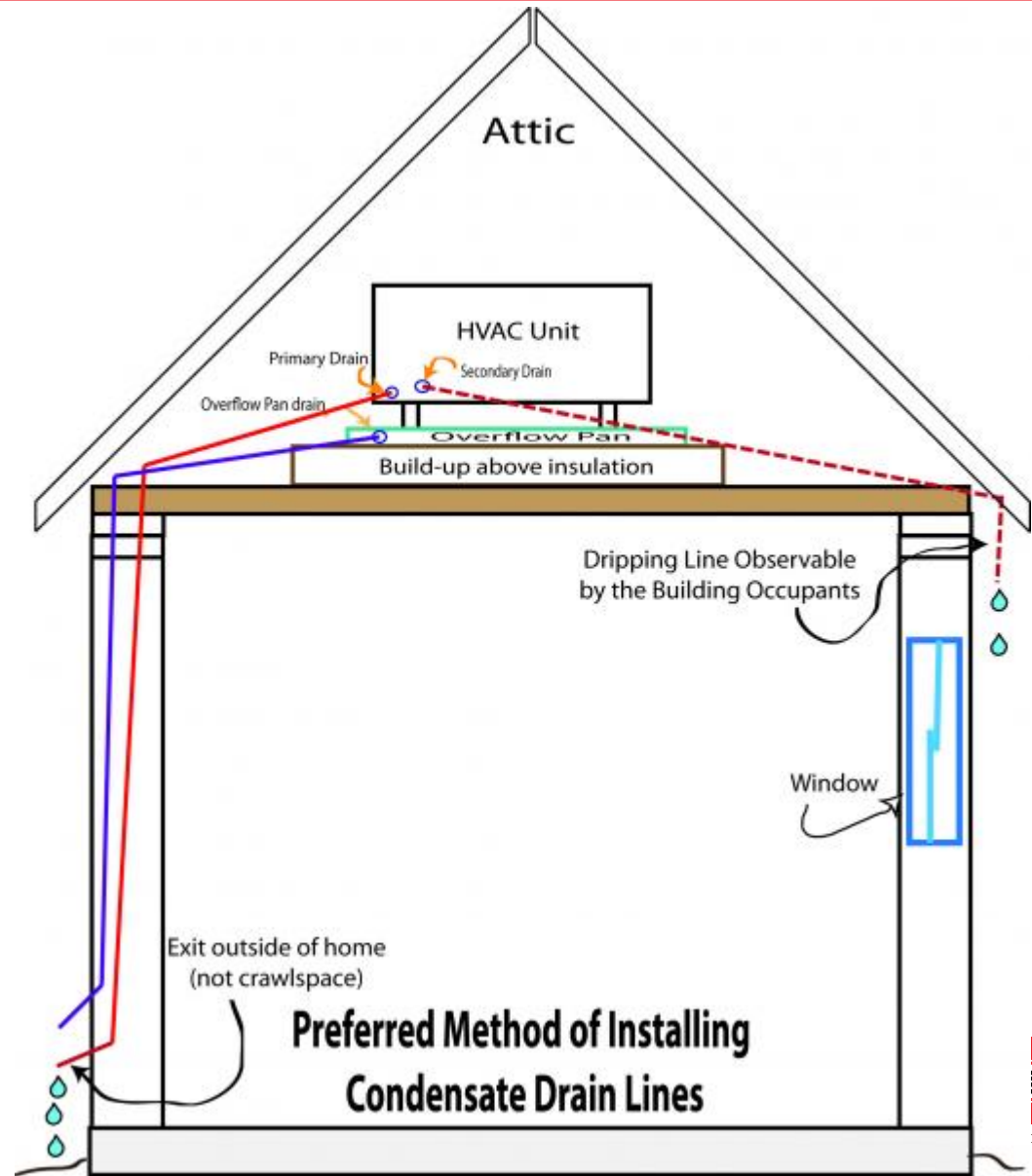
# Condensate and HVAC/R Systems



# The Condensation Removal System

## Condensate Management Components:

- Primary Drain Pan (A/C Coil)
  - Primary/Overflow Drain Line ———
  - Secondary Drain Line - - - - -
- Auxiliary (Secondary/Overflow) Drain Pan
  - Auxiliary Drain Line ———



# A **condensate switch** is another essential component to a properly functioning HVAC system

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Required by the  
**International Mechanical Code**

## **IMC 307.2.3 Auxiliary and secondary drain systems**

In addition to the requirements of Section 307.2.1, where damage to any building components could occur as a result of overflow from the equipment primary condensate removal system, one of the following **auxiliary protection methods** shall be provided for each cooling coil, or fuel-fired, appliance that produces condensate:

1. An **Auxiliary Drain Pan** (Secondary/Overflow) with a separate Drain Line shall be provided under the coils on which condensation will occur....
2. A separate Overflow Drain Line shall be connected to the drain pan provided with the equipment (**Primary Drain Pan**)
3. An **Auxiliary Drain Pan** without a separate drain line shall be provided under the coils on which condensate will occur. Such pan shall be equipped with a water level detection device (added '06) conforming to UL508 that will shut off the equipment served prior to overflow of the pan.

# A condensate switch is an essential component to a properly functioning HVAC system

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Required by the  
**International Mechanical Code**

## IMC 307.2.3 Auxiliary and secondary drain systems

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1. An **Auxiliary Drain Pan** (Secondary) with a *separate Drain Line* shall be provided under the coils on which condensation will occur.... The auxiliary pan drain shall “discharge to a conspicuous point” of disposal to alert occupants in the event of a stoppage of the primary drain.



# A condensate switch is an essential component to a properly functioning HVAC system

Required by the  
**International Mechanical Code**



## IMC 307.2.3 Auxiliary and secondary drain systems

In addition to the requirements of Section 307.2.1, where damage to any building components could occur as a result of overflow from the equipment primary condensate removal system, one of the following **auxiliary protection methods** shall be provided for each cooling coil, or fuel-fired, appliance that produces condensate:

1. An **Auxiliary Drain Pan** (Secondary) with a *separate Drain Line* shall be provided under the coils on which condensation will occur....
2. A separate Overflow Drain Line shall be connected to the drain pan provided with the equipment (**Primary Drain Pan**). Such over flow drain shall discharge to a conspicuous point of disposal to alert occupants in the event of a stoppage of the primary drain. The overflow drain line shall connect to the drain pan at a higher level than the primary drain connection.

# A condensate switch is an essential component to a properly functioning HVAC system

Required by the  
**International Mechanical Code**

## IMC 307.2.3 Auxiliary and secondary drain systems

In addition to the requirements of Section 307.2.1, where damage to any building components could occur as a result of overflow from the equipment primary condensate removal system, one of the following **auxiliary protection methods** shall be provided for each cooling coil, or fuel-fired, appliance that produces condensate:

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# Find the right Safe-T-Switch



← *Float Switches* →

## SS1

Primary drains,  
or  
Auxiliary drain  
outlets

*Dual-sensor switch  
option available  
(SS103E)*

## SS2

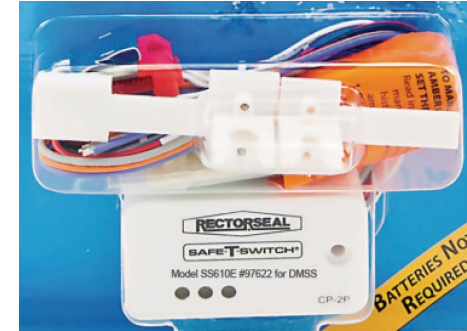
Primary drain pan's  
Auxiliary outlet

*Plenum-rated model  
also available (SS2AP)*

## SS3

Primary  
and  
Auxiliary drain pans

*Plenum-rated model for  
Commercial Rooftop  
primary drain pans  
(SS500EP)*



← *Electronic Probes* →

## SS610E

Mini-Split  
Systems Switch

*For installation directly  
on  
primary drain pan,  
or clipped to coils  
above primary  
drain pan*

## SS700E

Auxiliary drain pan  
only!

# SS1 Float Switch: For primary drains or auxiliary drain outlets

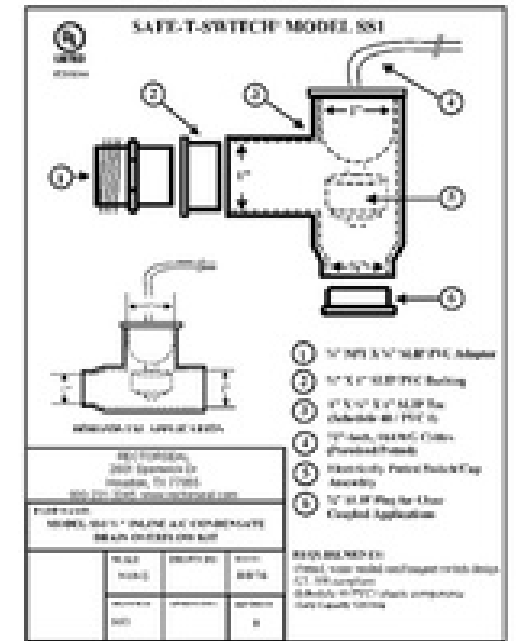
- Detects clogged A/C condensate drains and shuts off the system to prevent water damage to floors, walls, and ceilings
- Magnetic reed switch
- Connect to either red or yellow wire
- Can be installed horizontally or vertically, inline or on the primary pan's auxiliary drain out by using the included ¾" adapter, bushing and cap
- Includes directional cleanout tool to provide cleanout access
- Dual-sensor switch option available (SS103E)



Code	Description	Qty
97632	Model SS1	24
	SS103E	

# SS-1 Installation

- Glue 3/4" long end of supplied threaded male X male stub into female drain pan outlet.
- **Horizontal install:** Press switch/cap assembly firmly into top 1" opening in Tee until the rim is flush against the Tee opening.
- **Vertical install:** Remove switch/cap assembly from top 1" Tee inlet and insert into remaining 1" Tee inlet so that the rim is flush against the Tee opening.



If more sensitivity is desired, switch may be threaded out of cap. **Do not glue into tee!**

# SS2 Float Switch: For primary drain pan auxiliary outlet

- Magnetic reed switch
- Connect to either red or yellow wire
- Using the ¾" adapter the SS2 can be installed on the auxiliary outlet of the primary drain pan
- Easy access to the switch and the primary drain line for service
- Plenum-rated model available (**SS2AP**)
  - Schedule 40 CPVC. Listed to UL-2043

Code	Description	Qty
97637	Model SS2	24
97640	SS2AP Plenum-rated	50



# SS3 Float Switch: For primary and auxiliary drain pans

- Magnetic reed switch
- Connect to either red or yellow wire
- Steel mounting bracket clips firmly over the edge of most drain pans
- Slim profile can be installed on primary or auxiliary drain pans.
- Plenum rating available for Commercial Rooftop primary drain pans (SS500EP)

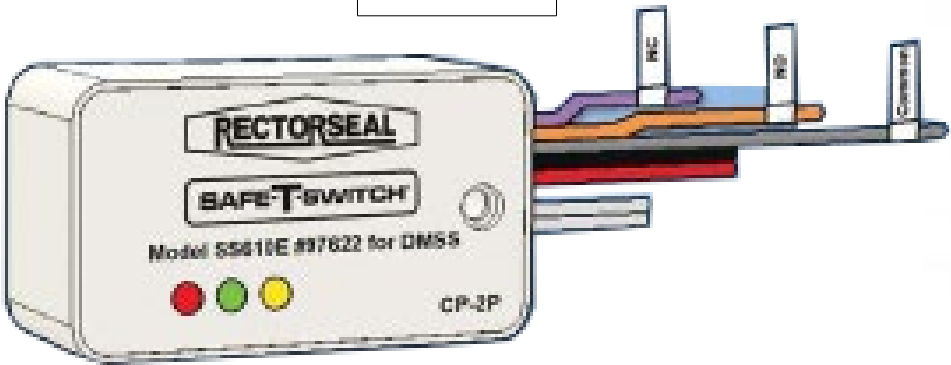
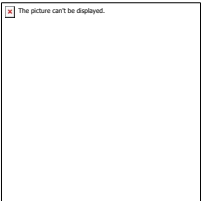
Code	Description	Quantity
97647	Model SS3	24



\* Being discontinued



# Electronic Safe-T-Switches



# New in the 2006 IMC....

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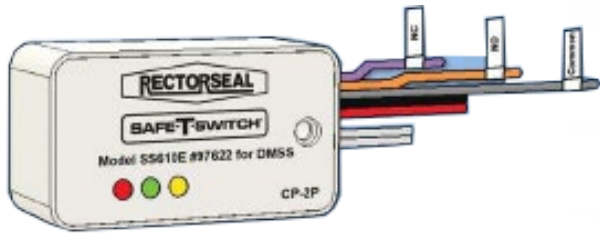
**307.2.3.1 Water-level monitoring devices.** On down-flow units and all other coils that do not have a secondary drain and do not have a means to install an auxiliary drain pan, a water-level monitoring device shall be installed INSIDE THE **PRIMARY DRAIN PAN**.

This device shall shut off the equipment served in the event that the primary drain becomes restricted. **Externally installed devices and devices installed in the drain line shall not be permitted.**

# SS610E Mini-Split Systems Switch: For installation directly on primary drain pan or clipped to coils above primary drain pan

- Sensor connects to indoor units
- LED indicator can be mounted to side of unit
- Can be wired in both “Normally Open” and “Normally Closed” systems
- Univolt input 15-250, Vac 15-100 Vdc
- No batteries required

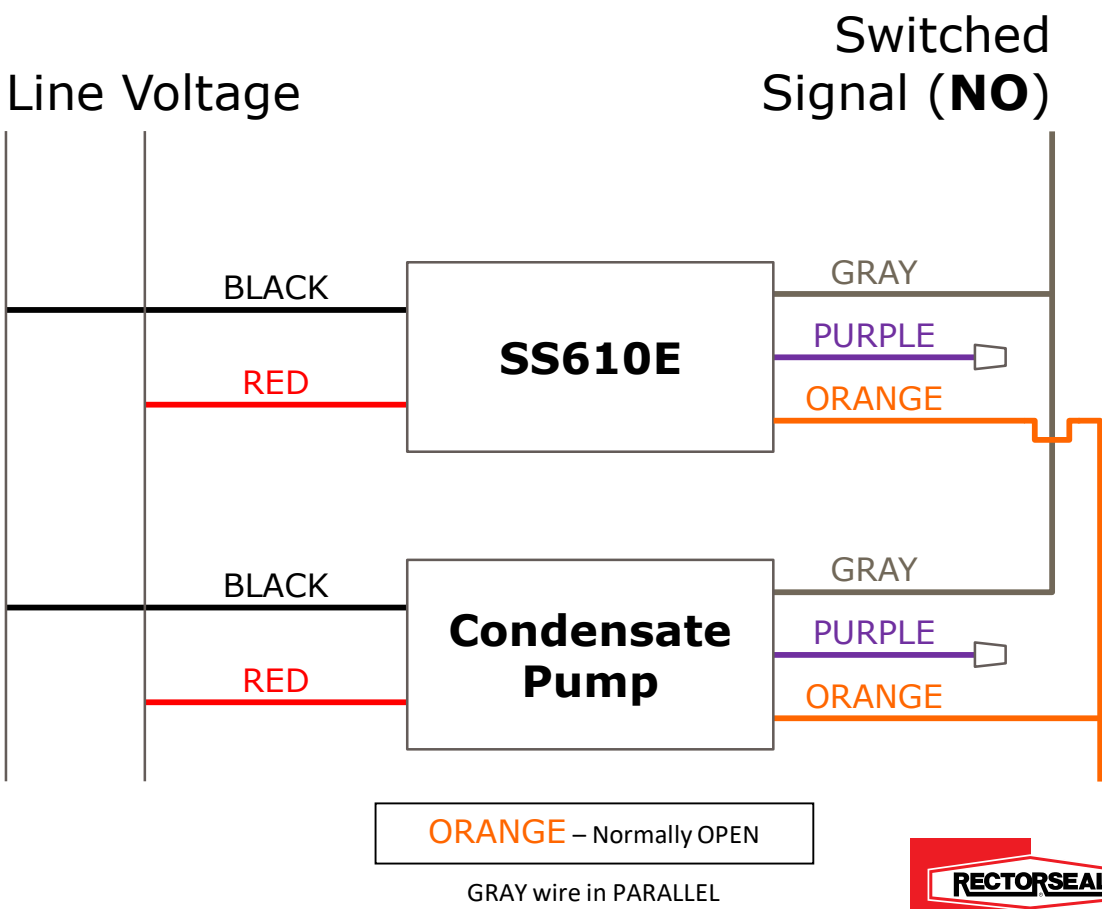
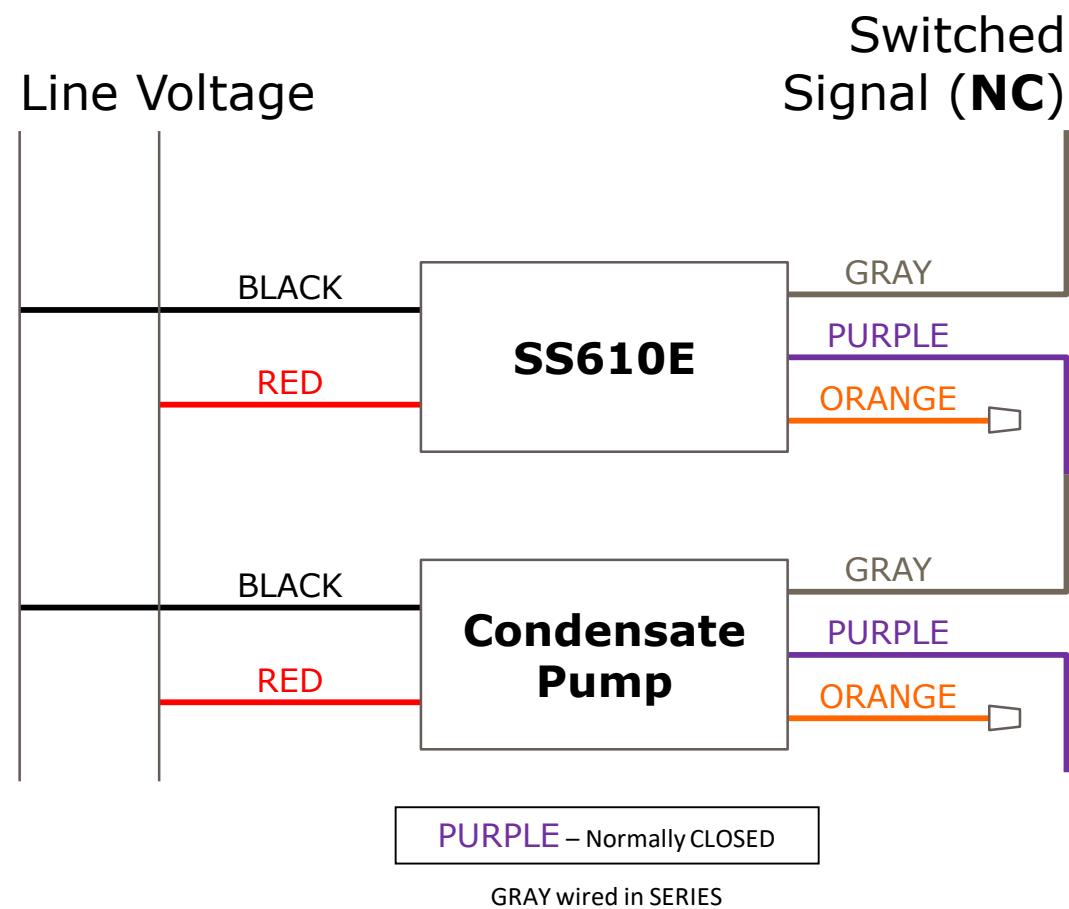
Code	Description	Qty
97622	SS610E for DMSS	12
97623	Daikin DACA-CFS1 (SS610E)	12



# SS610E - Wiring Diagram

For **Normally Closed (NC)** circuit, SS610E and condensate pump shall be “*wired in series*”

For **Normally Open (NO)** circuit, SS610E and condensate pump shall be “*wired in parallel*”



# SS610E – Submittal Data Sheet



## Submittal Data Sheet

### Safe-T-Switch SS610E Electronic Condensate Overflow Switch Designed for Ductless Minisplits

Project Information:

Job Name:

Location:

Engineer:

Submitted to:

For: ☐ Reference ☐ Approval ☐ Construction

Submitted by:

Reference:

Submittal Information:

Approval:

Date:

Construction:

Unit #:

Drawing #:

(Sec. I) Ordering Information:

Product Code - 97622  
Model - SS610 E  
Carton Qty - 12  
Carton Weight - 4 lbs.

(Sec. II) Product Specifications:

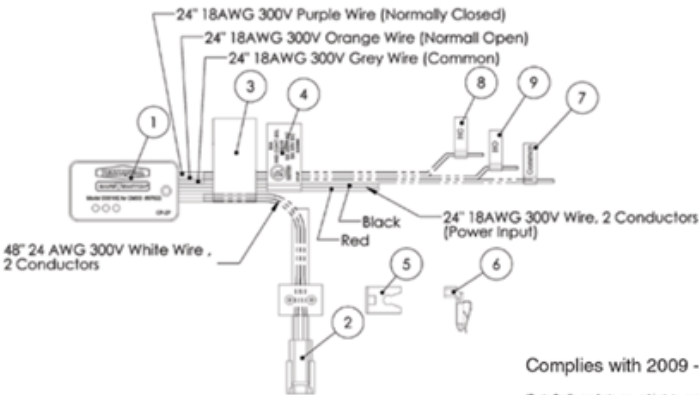
CPU Length – 2.5"  
CPU Width – 1.4"  
CPU Height – 1"  
Power Supply – 15 to 250 Volts AC, 15-100 volts DC  
Switching Capacity – 0 to 250 Volts AC, 5A, 1250VA; 0 to 30 Volts DC, 5A, 150W  
Contact – NC/NO  
Probe Cable Length – 4'  
Lead Cable Length – 2'  
Power Consumption – 0.5 Watt

(Sec. III) Carton Contents:

(Fig. I) Product Image:



(Fig. II) Part List:



- 1.) CP-2P
- 2.) SE-4 Probe with DK-6P bracket
- 3.) Reset instruction tag
- 4.) UL tag, CP-2P
- 5.) Part 1 for 5mm tube BK-6P
- 6.) BK-5P Bracket
- 7.) Tag, Common
- 8.) Tag, Normally Closed
- 9.) Tag, Normally Open

Complies with 2009 - 2012 IMC & IRC

(RectorSeal's products are subject to continuous improvements; RectorSeal reserves the right to modify product design, specifications & information in this data sheet without notice and without incurring any obligations)



# SS500EP Commercial Rooftop Downflow Units

- Electronic probe sensor
- 5-wire design
- Onboard LED indicator
- Plenum-rated wire
- 5-amp carrying capacity
- Either “Normally Open” or “Normally Closed”



Code	Description	Qty
97693	SS500EP Rooftop Downflow Units	24

## SS700E: For Secondary (Auxiliary) Drain Pan ONLY

- Electronic probe sensor, 5-wire design
- Works in any position, for all secondary drain pans
- Onboard LED indicator
- Stainless steel bracket
- Either “Normally Open” or “Normally Closed” wiring
- Adjustable height
- Great for “plastic” drain pans with **round** edges
- Automatically resets when water drains, or is removed from secondary pan



Code	Description	Qty
97695	SS700E	24



**RECTORSEAL**

A CSW Industrials Company

# Current Safe-T-Switch and All Access Product Line

In-Line sensor	Secondary Port	Clip-in Pan sensor	Clean-out for Primary Drain Line
Safe-T-Switch			
SS1	SS2	SS3	Easy Klear
			
All Access			
AA1-FS	AA2-FS	AA3-FS	Clean Out
			

# All Access Product Line

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## Condensate Switches

- #83411 – AA1-FS
- #83412 – AA2-FS
- #83413 – AA3
- #83416 – AA4P (plenum rated)
- #83417 – AA2P (plenum rated)

## Clean Out Accessories

- #83410 – AA1 Cleanout
- #83415 – Flush Tool
- #83414 – AA1 Insulation

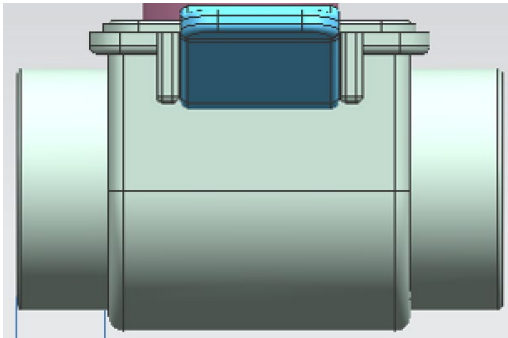
## Pump

- #83418 All Access Mighty Pump

# Third Generation **Coming Soon!!**

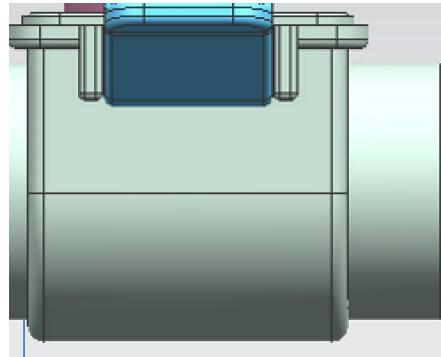
## SS1

\*Plenum and Non-plenum



## SS2

\*Plenum and Non-plenum



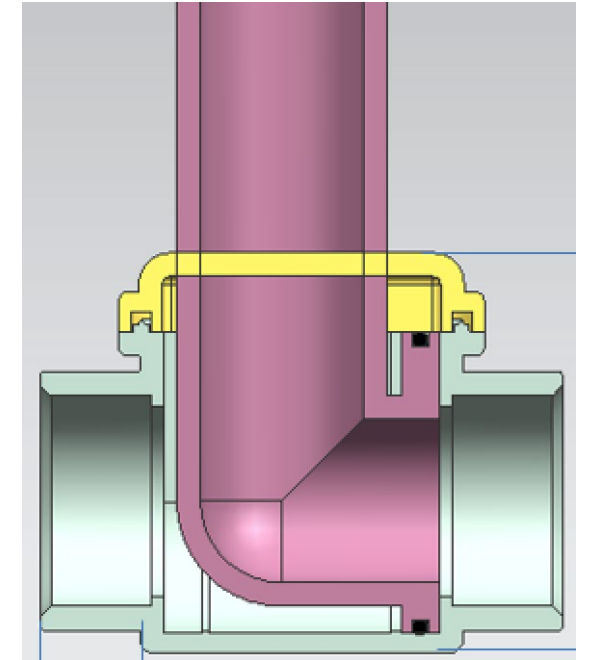
## SS3

\*Plenum and Non-plenum



## Clean Out

\*Plenum



- Keep better best Safe-T-Switch and All Access brands
- Next generation smaller, integrated **clean-out** AND **switch**
- Lid integrated with a switch
- SS1 and SS2 body types
- Direct-fitting cleanout tool
- Plenum and non-plenum rated

# Maintenance addressed in the IMC

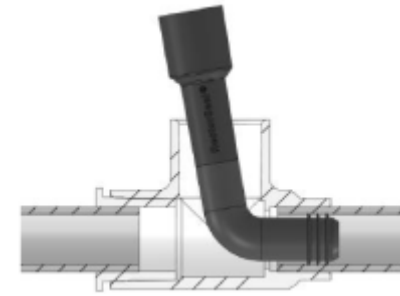
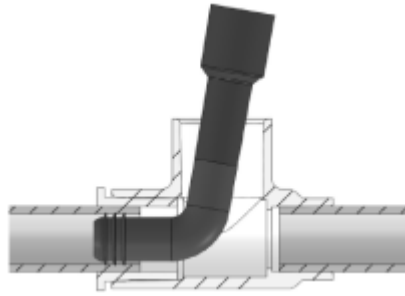
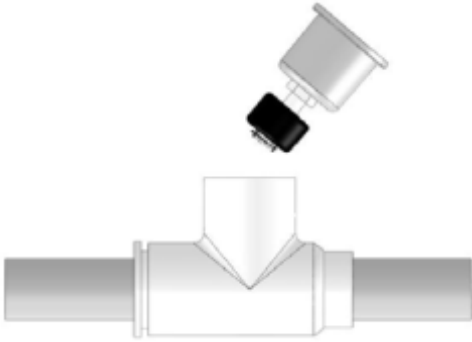
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**307.2.5 Drain line maintenance.** Condensate drain lines shall be configured to permit the *clearing of blockages* and performance of maintenance **WITHOUT REQUIRING THE DRAIN LINE TO BE CUT.**



# Condensate Clean-out

Significant push with codes requiring **access** to clean out condensate lines (Primary Drain Line)



# All Access Pump

## All Access Mighty Pump



The All Access Mighty Pump is a foot pump used to dislodge build up in the condensate drain line.



## Mighty Pump



The Mighty Pump is lightweight, reversible, hand-operated pump generates enough pressure or suction to clear blocked lines from inside or outside a home or building.

# Directional Clean-out Tool using Mighty Pump



- Attach a pressurizing, or vacuuming, device (e.g., **Mighty™ Pump**) to **Cleanout Tool**. Pump, or vacuum, until the blockage is cleared.
- Disconnect the pressurizing, or vacuuming, device from **Cleanout Tool**.
- Remove **Cleanout Tool** and hang it outside of the SS1 body.
- Insert SS1 Cup/Float subassembly into SS1 body. Test SS1 function.

## Why RectorSeal Safe-T-Switch?



# SAFE-T-SWITCH®

**Top Quality:** Every Switch is tested to ensure quality

**Durable:** Thicker stem

**Secure:** Embedded magnets won't fall out

**Stronger:** Extended magnet surface area. Smoother operation

**Fully adjustable Float Height:** Taller body and longer float allows greater float adjustment, reduces nuisance shutdowns

**Simple Installation:** Switch need not be perfectly level. Fits standard pipe sizes (adaptors included)

**Innovative Solutions:** Electronic switches offer a patented bracket and switch system for use in mini-split systems

**Proven Reliability:** 15+ years of proven condensate overflow protection against water damage.

\* Millions in service worldwide

In 2013, the average home insurance claim was \$8,787, with roughly 20% water-damage related claims.



# EVERY Switch/Sensor by RectorSeal is run-tested to ensure quality

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# Why RectorSeal Condensate Shut-off Switches?

## Beautifully designed Safe-T-Switch Product Catalog



# Why RectorSeal Safe-T-Switch?

## GENERAL REGULATIONS

detection device conforming to UL 508 that will shut off the equipment served prior to overflow of the pan. The auxiliary drain pan shall be constructed in accordance with Item 1 of this section.

4. A water-level detection device conforming to UL 508 shall be provided that will shut off the equipment served in the event that the primary drain is blocked. The device shall be installed in the primary drain line, the overflow drain line, or in the equipment-supplied drain pan, located at a point higher than the primary drain line connection and below the overflow rim of such pan.

**Exception:** Fuel-fired appliances that automatically shut down operation in the event of a stoppage in the condensate drainage system.

❖ An auxiliary (redundant) drain pan or a secondary drain is required for equipment locations where condensate overflow would cause damage to a building or its contents. The purpose of the auxiliary drain pan and secondary drain is to catch condensate spilling from the primary condensate removal system in the equipment. This "back-up" protects the building from structural and finish damage.

Condensate drains are notorious for clogging because of debris (lint, dust) from air-handling systems and the natural affinity to produce slime growths in drain pans and pipes. It is relatively common for condensate overflows to cause damage to buildings. This section lists four options for preventing damage where the equipment is located in spaces, such as attics, above suspended ceilings and furred spaces and locations on upper stories. One of the four methods

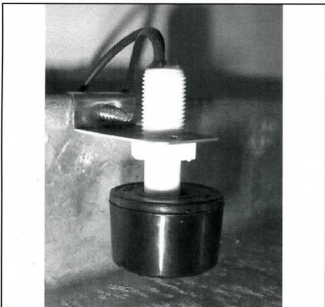


Figure 307.2.3(1)  
PRIMARY AND AUXILIARY DRAIN PAN FLOAT SWITCH  
(Courtesy of SMD Research, Inc.)

3-30

must be used.

Method 1 uses an auxiliary drain pan below the coils on which condensation will occur with an independent drain line that discharges to a location that is easily observable to notify the building occupants that a problem with the primary pan exists. The code prescribes the depth of the pan and specific material thicknesses to ensure that the pan will be corrosion resistant and will have sufficient holding capacity and capture ability. For the 2009 edition of the code, the thickness of metallic material was changed to reflect the low end tolerance for No. 24 gage galvanized sheet metal.

Method 2 uses an independent overflow drain line connected to the primary drain pan at a point higher than the primary drain line. Most evaporator coil pans are factory provided with an overflow drain tap that can be used for this purpose. As in Method 1, the point of discharge must be easily observable.

Method 3 uses a water-level detection device, usually a float switch or electronic sensor that must conform to the requirements of UL 508, located in the auxiliary drain pan. These detection devices will shut down the equipment before the pan overflows. There is no requirement for a separate drain line in this method. Figure 307.2.3(1) shows a typical float switch for a drain pan.

Method 4 also uses a water-level detection device located in the drain line from the primary drain pan or the overflow line from the primary drain pan rather than the secondary drain pan in Method 3. Figures 307.2.3(2) and 307.2.3(3) show typical in-line switches.

Both Methods 3 and 4 will notify the building occu-

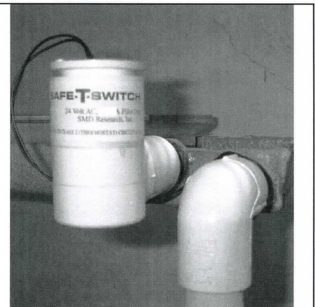


Figure 307.2.3(2)  
CONDENSATE OVERFLOW SWITCH  
(Courtesy of SMD Research, Inc.)

2009 INTERNATIONAL MECHANICAL CODE® COMMENTARY

## GENERAL REGULATIONS

pants that a blockage has occurred because the cooling system will cease to function.

The exception recognizes that some fuel-fired appliances that produce condensate have a built-in method of shutting down when a blockage occurs.

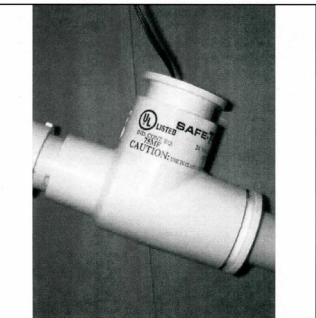


Figure 307.2.3(3)  
IN-LINE CONDENSATE OVERFLOW SWITCH  
(Courtesy of SMD Research, Inc.)

**307.2.3.1 Water-level monitoring devices.** On downflow units and all other coils that do not have a secondary drain or provisions to install a secondary or auxiliary drain pan, a water-level monitoring device shall be installed inside the primary drain pan. This device shall shut off the equipment served in the event that the primary drain becomes restricted. Devices installed in the drain line shall not be permitted.

❖ The intent of this section is to provide adequate overflow protection on all coils that do not have a secondary drain and have no provisions for a secondary or auxiliary drain pan. A water-level monitoring device,

like the one shown in Commentary Figure 307.2.3(1), is required to be installed in the primary drain pan. An in-line detection device is not allowed by this section because a blockage inside the pan at the drain hole would not be detected by the in-line device because the water would overflow from the pan and never reach the in-line detector. When the water overflows from the pan, it typically runs into the duct, causing mold and mildew problems. It will eventually leak out through the joints or seams and cause damage to the building structure or its contents.

**307.2.3.2 Appliance, equipment and insulation in pans.**

Where appliances, equipment or insulation are subject to water damage when auxiliary drain pans fill, that portion of the appliance, equipment and insulation shall be installed above the rim of the pan. Supports located inside of the pan to support the appliance or equipment shall be water resistant and approved.

❖ Where appliances, such as upflow furnaces and air handlers are installed such that supports are resting in the bottom of the auxiliary drain pan, all portions that are subject to water damage must be installed above the flood level rim of the pan (see Commentary Figure 307.2.3.2). Electrical components, metal items subject to rust and insulation within the appliance are examples of items that are subject to damage when submerged in water.

**307.2.4 Traps.** Condensate drains shall be trapped as required by the equipment or appliance manufacturer.

❖ The appliance or equipment manufacturer determines the need for a trap and often specifies the depth and configuration of the trap. The traps addressed in this section are unrelated to plumbing traps and serve a different purpose. Condensate drain traps do not directly connect in any way to the plumbing drain or the waste and vent system of a building. Condensate drain traps are installed to prevent air from being pushed or pulled through the drain piping. Airflow can impede condensate flow, causing overflow or abnormal water depth in drain pans. Some drain pans, such as those under pull-through cooling coils, may not drain at all without a trap to block airflow in the drain piping. Airflow in a condensate drain also wastes energy.

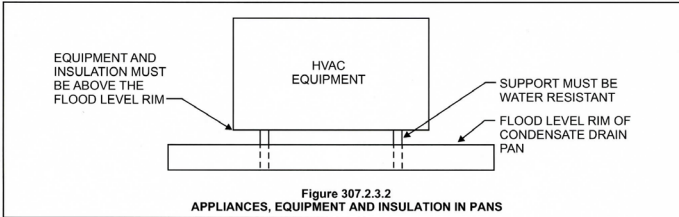


Figure 307.2.3.2  
APPLIANCES, EQUIPMENT AND INSULATION IN PANS

2009 INTERNATIONAL MECHANICAL CODE® COMMENTARY

3-31

# QUESTIONS??

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