# Flushometer Care & Service 101

## Part 5: ESS Exposed Sensor Flushometers


SLOAN®

# Presenters

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# Agenda

## This presentation will cover:

- Overview of Sloan ESS Exposed sensor flushometers
- Most common field service issues and solutions
- Maintenance recommendations
- Summary
- Q&A

## We will not be covering:

- ESS TMO or ESS Concealed Service and Maintenance

Understand how to extend the service life of Sloan products

Elmhurst Hospital Case Study, Elmhurst, IL  USA

# Acronyms in this Presentation

- **ESS** – Electronic Solenoid Sensor
- **TMO** – True Mechanical Override
- **OR** – Override Button
- **HW** – Hard-wired
- **WB** – Wall Box
- **SWB** – Small Wall Box
- **SBX** – Wall Plate with Integrated TMO
  aka “LaGuardia style”

# ESS Exposed vs. ESS Concealed


Royal ESS Exposed


Sloan/Regal ESS Exposed

Royal ESS 142 Concealed

ESS Concealed

# Why Specify A Sloan ESS Exposed Sensor Flushometer?

**New Installations**

- Touch-free
- Simple to operate and maintain
- Shares many components with manual flushometers
- 24 VAC hardwired sensor operation (no batteries)
- Normally closed solenoid design (“mono-static”)
- Appearance

**Existing installations**

- Utilizes existing 24 VAC power supplies
- Matches existing installed units
- Seamless replacement (since 1978)

# ESS Exposed Sensor Flushometer Applications

Water Closets

Urinals

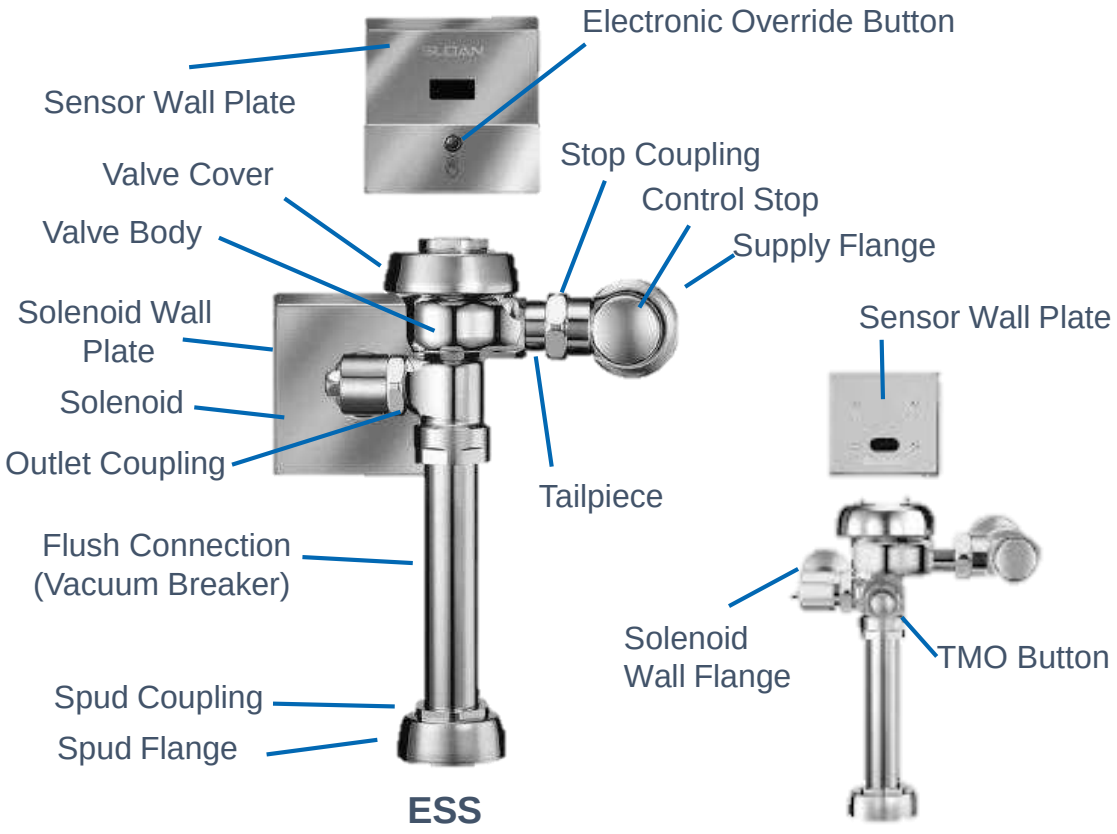
Utility (Service) Sinks

Bedpan Washers

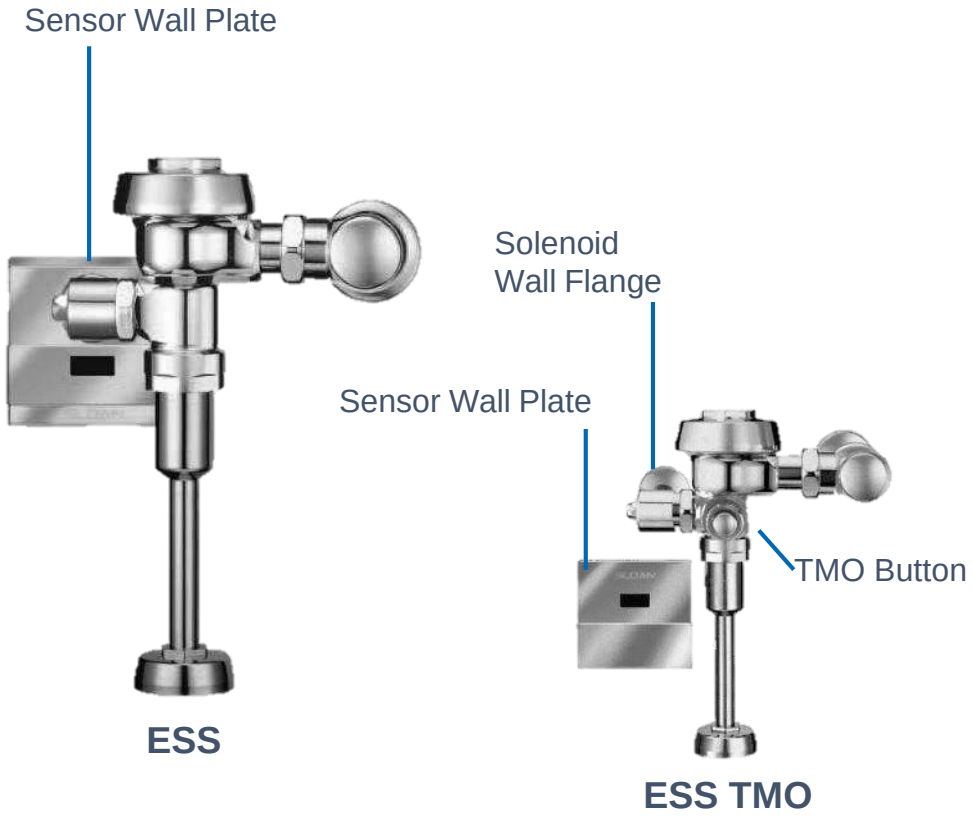
Squat Toilets

# ESS Exposed Sensor Flushometer Components

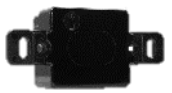
## CLOSET




## URINAL




All models use the EL-1500 Sensor Assembly



# What’s the Difference?

## Regal / Sloan Sensor Plate


## Royal Sensor Plate


All ESS Wall Plates are designed to be screwed into electrical boxes. See the rough-in guide HERE

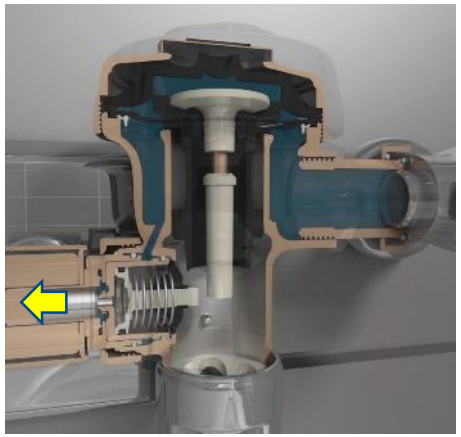
# ESS Exposed Sensor Flushometer Variations


| Model | Type | Closet Wall Plate<br>Sensor and Solenoid Plates | Urinal Wall Plate<br>Combination Sensor and Solenoid Plate | Wall Plate Style | TMO<br>True Mechanical Override Button | TMO Retrofit Kit | Power Supply |
|---|---|---|---|---|---|---|---|
| Royal | Diaphragm | Dual Plate | Single Plate | **Royal** | Optional | EL-1026A | 24 VAC |
| Sloan | Diaphragm | Dual Plate | Single Plate | Regal/Sloan | Optional | EL-1026A | 24 VAC |
| Regal | Diaphragm | Dual Plate | Single Plate | Regal/Sloan | Optional | EL-1026A | 24 VAC |
| Crown | **Piston** | Dual Plate | Single Plate | Regal/Sloan | **NA** | **NA** | 24 VAC |

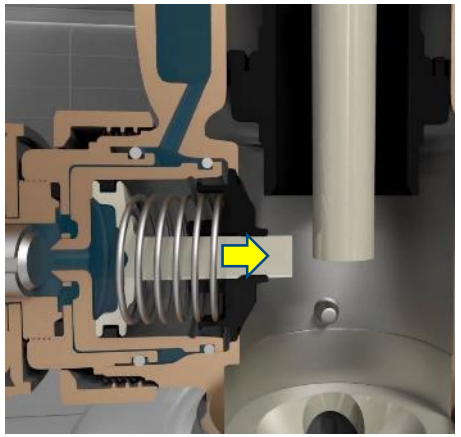
# How ESS Exposed Sensor Flushometers Function

[Link to ESS Exposed Sensor Flushometer Video]

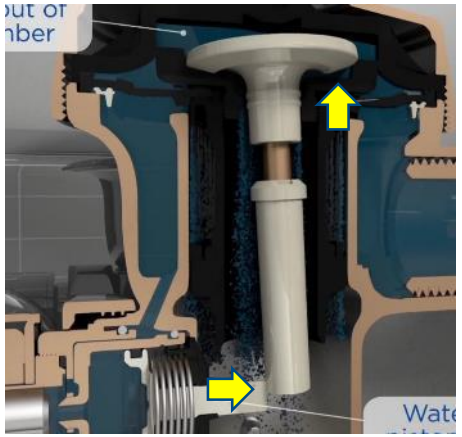
Sensor scans for valid target



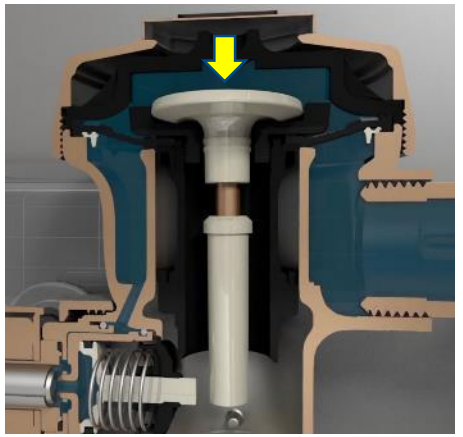
After valid target leaves, solenoid is energized



Solenoid movement permits water to flow into actuator cartridge and pushes plunger forward



Plunger tilts the relief valve, causing diaphragm to unseat and flush begins



Upper chamber re-pressurizes through the bypass, causing diaphragm to re-seat and ending flush

# How Do IR (Infrared) Sensors Work?


**The EL-1500 uses “Adaptive Sensing”**

- Sensor activated flushometers use infrared (IR) technology
- Detects user and flushes when they leave
- Flushes as programmed
- Touch not required

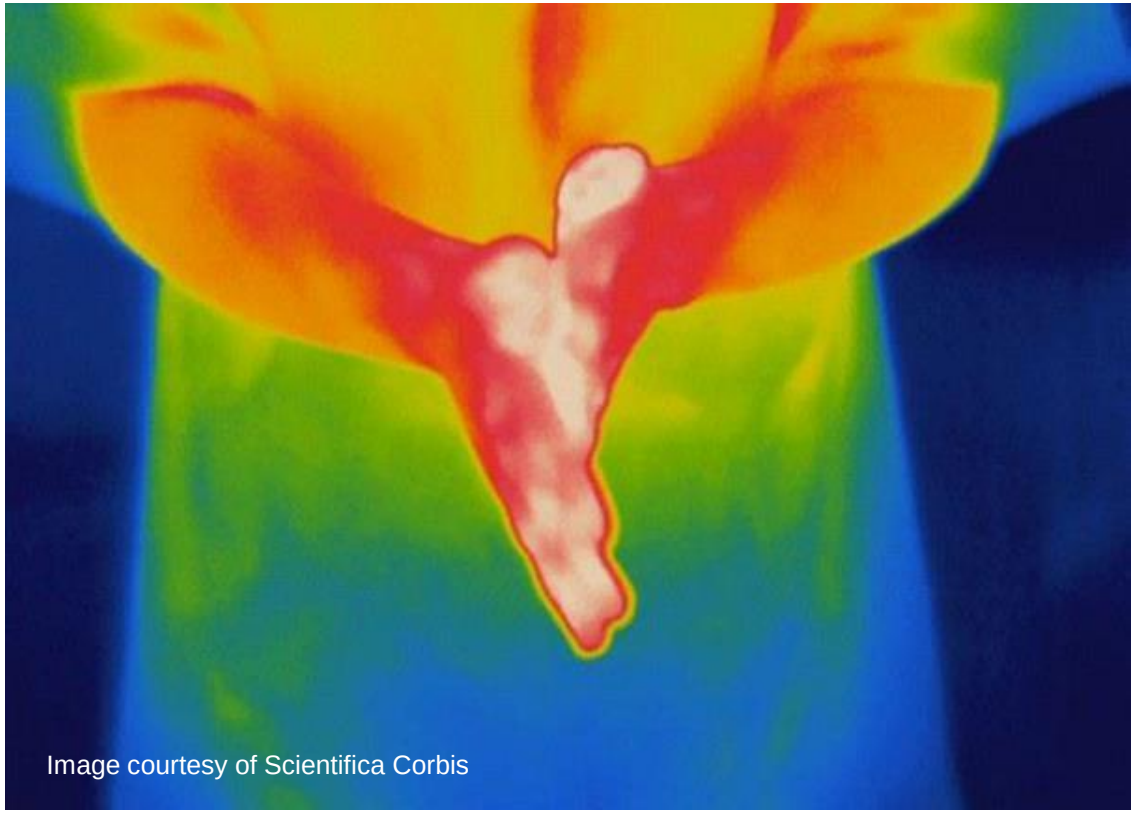


Image courtesy of Scientifica Corbis

# EL-1500 and EL-1500L Series Sensor

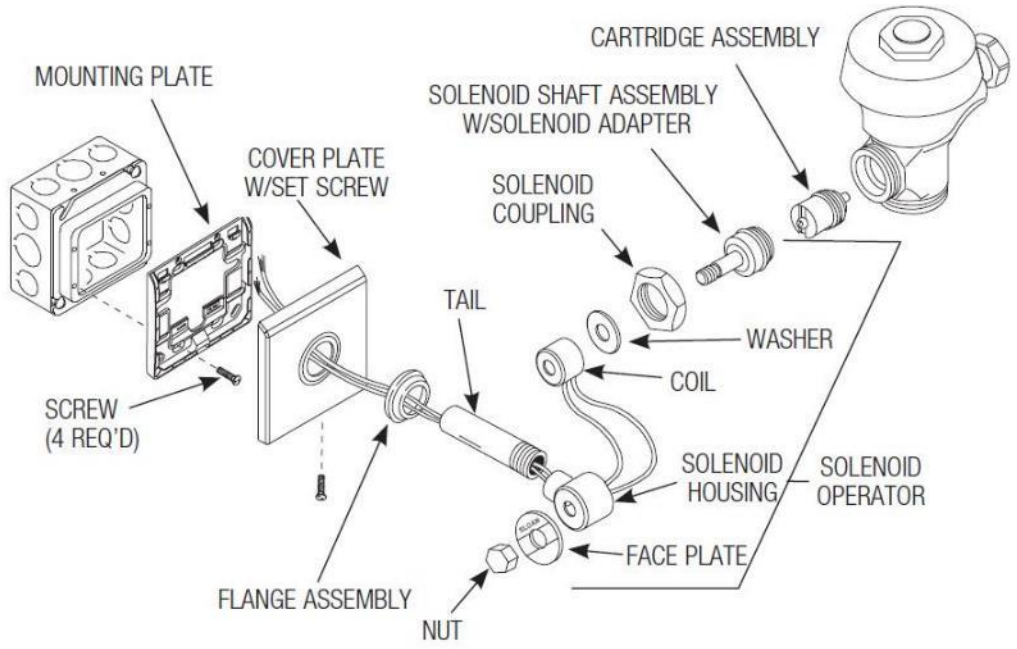

| | ESS |
|---|---|
| **LED Color** | Red |
| **Start-up Time** | 1 minute |
| **Start-up Indicator** | Solid Red LED during start up |
| **User is Detected** | Slow flashing red LED, then rapid flashing red LED when unit is armed (ready to flush – 16s for closet and 8s for a urinal) |
| **Flush Delay** | Closet – 3s / Urinal – 1s |
| **Low Battery Indicator** | NA (Hardwired 24 Volt) |
| **Link to Installation Instructions** | ROYAL_ESS |

# EL-1500 Sensor Tips

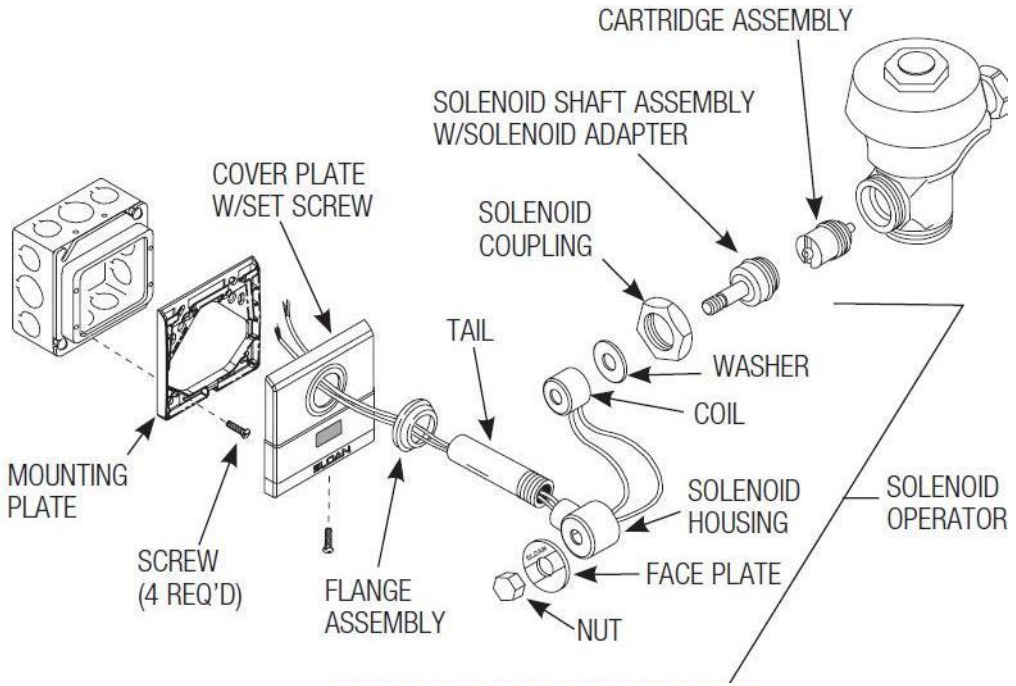
| Indicator | Issue | Resolution |
|---|---|---|
| Continuous slow flashing red LED | Improper start-up | Disconnect power for 60 seconds and repeat installation procedure |
| Continuous fast flashing red LED | Sensor is detecting a target | Remove obstruction or clean sensor window |
| Red LED flashes an “SOS” pattern (three short, three long, three short) | Wiring connections are incorrect or there is an electrical short | Re-wire the sensor correctly and repeat installation procedure |
| LED lights do not function | No power to unit | Check power supply and repeat installation procedure |


# Royal ESS Exposed Components Diagram

## Royal ESS Exposed Closet Flushometer



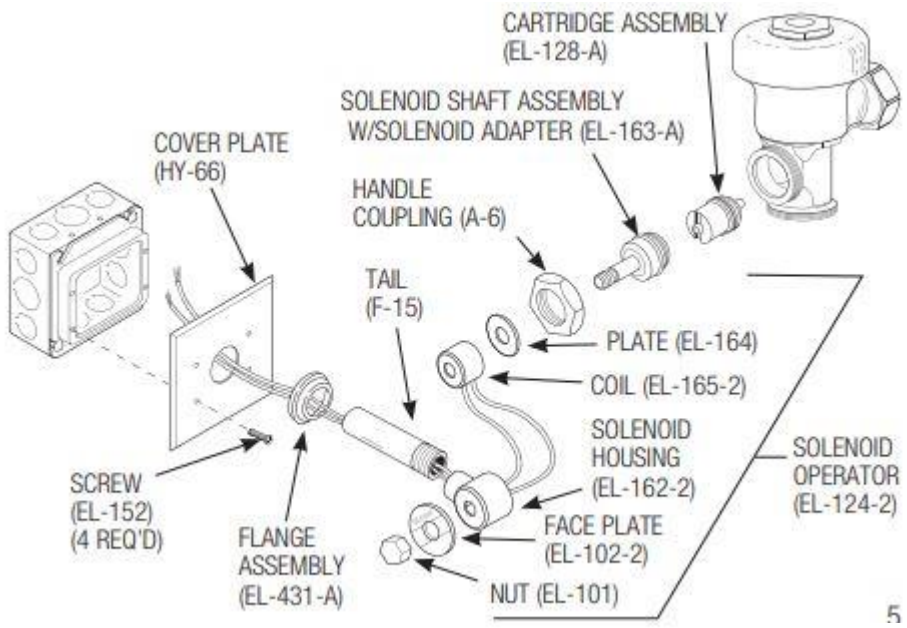

## Royal ESS Exposed Urinal Flushometer



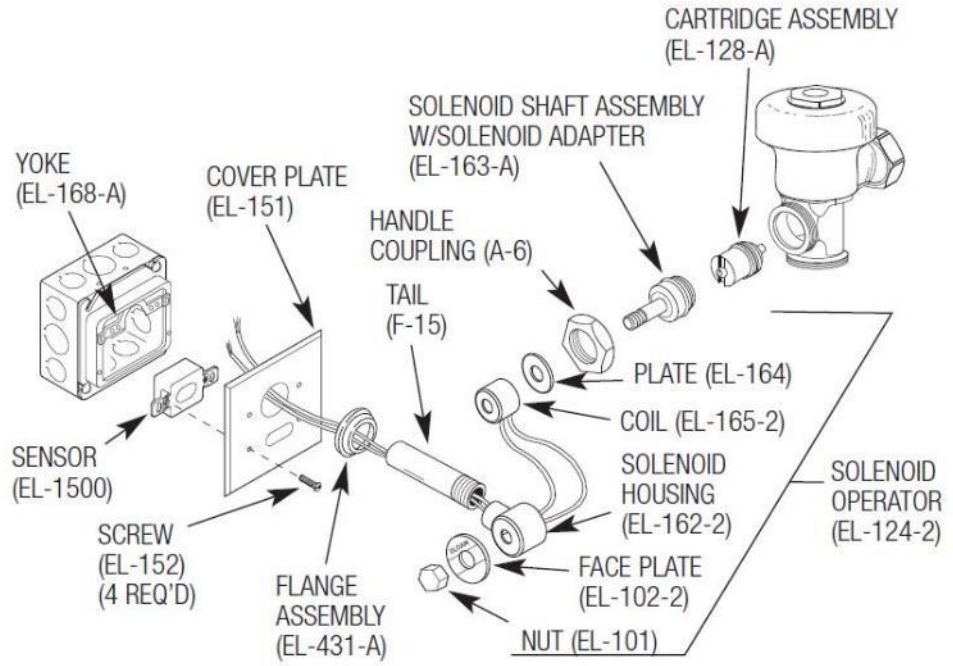

[Royal ESS Exposed Install Guide]
[Optima ESS Flushometer Repair & Maintenance]

# Regal/Sloan/Crown ESS Exposed Components Diagram

## Regal/Sloan/Crown ESS Exposed Closet Flushometer



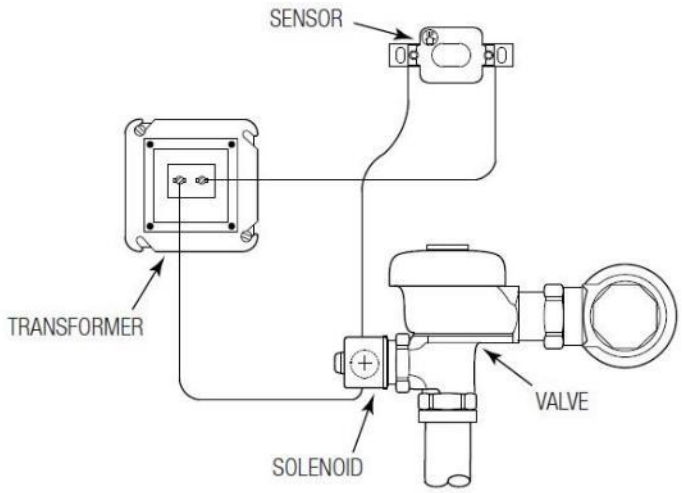

## Regal/Sloan/Crown ESS Exposed Urinal Flushometer



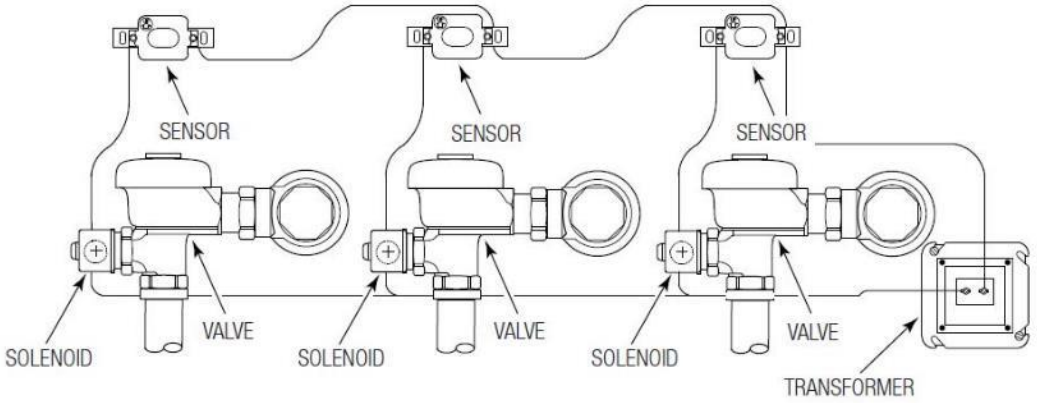

[Regal/Sloan ESS Exposed Install Guide]
[Crown ESS Exposed Install Guide]
[Optima ESS Flushometer Repair & Maintenance]

# ESS Exposed Sensor Flushometer Wiring Diagram

## Single Unit




## Multiple Units



# Field Issues & Solutions

from most common to least common

Images of uncommon “self-inflicted” issues

# Dominick's General Troubleshooting Approach for ESS Exposed Sensor Units


Sensor Assembly (and Override Button)


Solenoid


Actuator Cartridge


Diaphragm

# No Flush

Sensor

Solenoid

Actuator cartridge

| Symptom | Cause | Solution |
|---|---|---|
| Sensor LED blinks but does not flush, Override Button works | Sensor not calibrated | Power off for 60 seconds, power on again for sensor to auto adjust for 60 seconds, do not block sensor |
| Sensor LED does not blink or activate flush, Override Button works | Sensor damaged | Replace EL-1500 Sensor Assembly |
| | Sensor wired incorrectly | Rewire Sensor Assembly properly |
| Sensor LED blinks, but does not activate flush, solenoid makes buzzing noise, Override Button works (or buzzes with no flush) | High static pressure above 80 psi (552 kPA) | Reduce Static Pressure |
| | Undersized wiring, insufficient voltage | Reinstall with 18 gauge wiring (minimum), replace transformer |
| Sensor and Override Button work, Solenoid buzzes (or may trickle water to bowl) but does not activate flush | Solenoid corroded, oxidized or stuck | Replace EL-124-2 Solenoid or rebuild with EL-163-A Solenoid Shaft Assembly Repair Kit |
| | Damaged Solenoid Shaft Assembly | Replace with EL-163-A Solenoid Shaft Repair Kit |
| Sensor and Override button work, solenoid clicks, no flush | Actuator cartridge plugged with debris, damaged, or improperly re-assembled | Clean and re-assemble EL-128-A Actuator Cartridge Assembly, or replace |

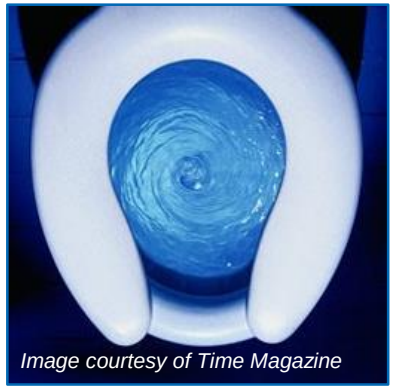
Valve off indicates diaphragm is working properly

# Field Issues & Solutions Not Related to the ESS Exposed Sensor

from most common to least common

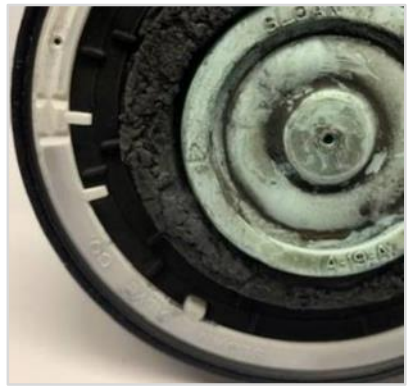
Images of uncommon “self-inflicted” issues

# Diaphragm Run-ons




Debris blocking diaphragm bypass

Debris under diaphragm



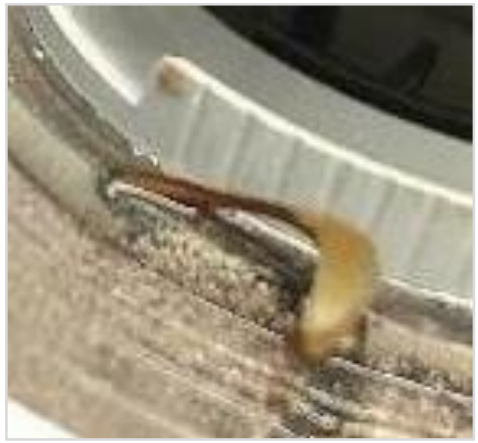
Degraded diaphragm assembly

Low pressure drop

| Symptom | Cause | Solution |
|---|---|---|
| Continuous flush with no shut-off | Debris blocking diaphragm bypass | Clean or replace diaphragm (replace inner cover too) |
| | Debris under diaphragm | Remove debris |
| | Low pressure drop | Check facility or municipal line pressure |
| | Diaphragm assembly compromised, cracked plastic guide (due to age) | Replace diaphragm assembly with proper gpf kit |

# Piston Run-ons


Debris blocking bypass



Debris under piston

Degraded relief valve seat

Low pressure drop

| Symptom | Cause | Solution |
|---|---|---|
| Continuous flush with no shut-off | Debris blocking bypass | Clean or replace piston |
| | Debris under piston | Remove debris |
| | Degraded relief valve seat | Replace the piston assembly |
| | Low pressure drop | Check facility or municipal line pressure |

In all cases, it's good to flush debris from the line

# No Evacuation - Diaphragm

Low pressure

Improper, low consumption, or urinal diaphragm

Perforated diaphragm

Cover not properly tightened

| Symptom | Cause | Solution |
|---|---|---|
| No evacuation when flushed (either sensor or override button) | Low pressure (<25 psi / <1.7 bar) | Address plumbing system deficiencies |
| | Low consumption (LC) or urinal diaphragm installed in older closet | Install correct gpf diaphragm |
| | Short flushing (perforated diaphragm) | Replace diaphragm |
| | Cover not properly tightened (DFB - dual filter bypass diaphragm) | Tighten cover |

# No Evacuation - Piston

Low pressure

Incorrect piston

Piston lip seal degradation

| Symptom | Cause | Solution |
|---|---|---|
| No evacuation when handle is depressed | Low pressure (<25 psi/<1.7 bar) | Adjust control stop to increase flow pressure<br>Address plumbing system deficiencies |
| | Incorrect piston installed | Match piston gpf (Lpf) to fixture gpf (Lpf) |
| | Piston lip seal degraded | Replace piston assembly |

Contact Tech Service for a list of piston kits

# Noise at Shut-off - Piston


High flow pressure

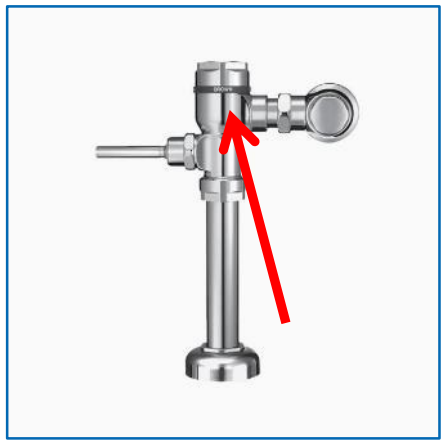
Piston lip seal degradation

Loose plumbing

| Symptom | Cause | Solution |
|---|---|---|
| “Thump” or “Bang” upon valve shut-off | High flow pressure | Adjust control stop to decrease flow pressure<br>Decrease plumbing system flow pressure |
| | Piston lip seal degraded | Replace piston assembly |
| | Loose plumbing | Secure piping properly<br>Check hammer arrestors |

# Cover Leak - Piston

Always use a fixed smooth jaw wrench….



Cover not tight enough

Worn cover gasket (Gem)

Worn inside cover (Crown/Naval)

Worn cover gasket (Naval)

| Symptom | Cause | Solution |
|---|---|---|
| Water leaking from threads beneath flushometer cover | Cover not tight enough | Turn off water and tighten cover |
| | Worn cover gasket (Gem) | Replace cover gasket (G106) |
| | Cracked inside cover (Crown) | Replace inside cover (CR124A) |
| | Worn cover gasket (Naval) | Replace cover gasket (CN76/CN105) |

# Inconsistent Flush


*Image courtesy of Time Magazine*

| Symptom | Cause | Solution |
|---|---|---|
| Flush duration is randomly normal, long, or short | Pressure fluctuation within the facility | Check plumbing system pressure and flow capacity |
| | Actuator Cartridge worn | Replace EL-128-A  Actuator Cartridge |

# Tailpiece Leak

Tailpiece with O-ring

Sloan H553 O-ring

| Symptom | Cause | Solution |
|---|---|---|
| Leaking at tailpiece next to control stop | Worn or degraded O-ring | Replace H553 O-ring |

Clean the tailpiece O-ring groove and the control stop bore before replacing the O-ring. Use 100% silicone grease (not petroleum-based).

# Vacuum Breaker Leak


Worn vacuum breaker sack

Sloan V651A repair kit

Sloan V551A repair kit

| Symptom | Cause | Solution |
|---|---|---|
| Dripping from **above** the vacuum breaker coupling during or after flush | Vacuum breaker sack damaged by over-tightening the vacuum breaker coupling | Clean vacuum breaker tube and replace vacuum breaker sack with V551A or V651A high backpressure VB repair kit |
| Dripping from **below** the vacuum breaker coupling during or after flush | Worn or degraded vacuum breaker sack | |

Wet the gasket prior to installation and hand tighten then “snug” with wrench

# Control Stop Leak

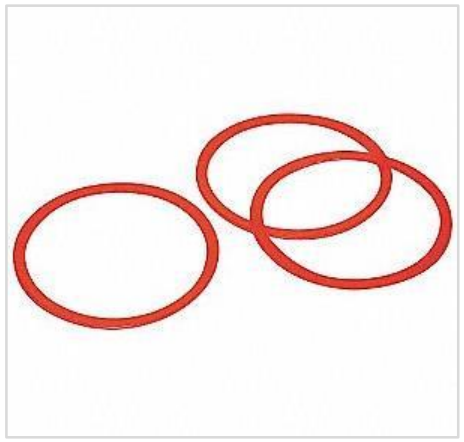

Sloan H541ASD repair kit

Sloan H543ASD repair kit

| Symptom | Cause | Solution |
|---|---|---|
| Leaking from control stop adjustment screw | O-ring inside the control stop is worn | Replace with H541ASD control stop repair kit (for older urinals, use H543ASD control stop repair kit) |

If unsure of which urinal control stop kit you have for units manufactured between 1964 and 1994, contact Sloan Tech Service

# Spud Flange Coupling Leak

Sloan F3 friction ring

Sloan VBF5 gasket

Sloan F5 gasket

| Symptom | Cause | Solution |
|---|---|---|
| Leaking from spud flange coupling | The spud flange coupling has loosened | Tighten spud flange coupling |
| | Spud flange coupling gaskets have become worn | Replace F3 friction ring and VBF5 gasket (1-1/4” or 1-1/2”) or F5 gasket (3/4” or 1”) |

Clean the threads prior to installation, and never use pipe dope or grease!


# Maintenance Recommendations

# Best Practices

- No Teflon tape
- Carry a white towel when removing solenoids to catch and inspect debris
- Tighten couplings and covers by hand, then “snug” with a wrench
- Fixed smooth-jawed wrench
- Avoid compression wrenches
- Carry 100% silicone grease
- Clean threads with a brass bristle brush
- Wet the gaskets before installing
- Clean with soap and water only

Clean with soap and water

Use Genuine Sloan Parts

“Snug” – don’t over tighten

# Summary

- Sloan invented the diaphragm flushometer in 1906 and the piston flushometer in 1928
- ESS Exposed Sensor Flushometers have been a customer favorite since 1978
- Units share many components with Manual Flushometers
- Easy access to Genuine Sloan Parts
- World class Tech Support team
- Vast network of reps to provide assistance
- Follow best practices


Elmhurst Hospital, Elmhurst, IL USA

# Next Sections in This Series

Part 6 – ESS Concealed
Electronic Solenoid Sensor

Part 7 – ESS TMO

Part 8 – Hydraulic 900 Series

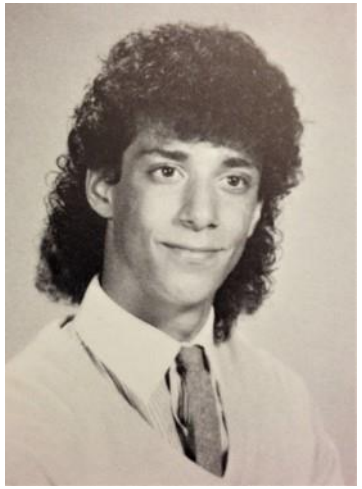
Part 9 – CX Sensor

Part 10 – CX Manual

Part 11 – Bedpan Washers

**Companion Webinars**

- Piston vs Diaphragm
- Regal vs Sloan vs Royal
- Flushometer Components 101
- Converting Manual to Sensor
- Battery Truths and Myths



Dominick after Part 1

Dominick after Part 5

Dominick after Part 10

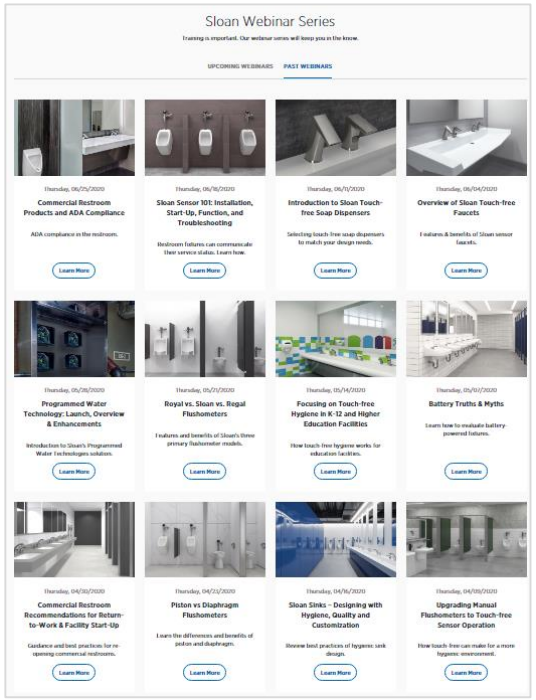
# Product Installation & Maintenance Materials

## Product Repair and Maintenance Guides

Sloan Optima Plus Flushometers
Sloan Ecos Flushometers
Sloan Solis Flushometers

## Videos

Flushometer Basic Maintenance
Flushometer Tailpiece Removal Instructions
Control Stop Repair kit Installation
Ground Joint Control Stops and Adjustable Control Stops Explained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Questions?

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## Sloan Rep Locator tool

- Local code knowledge
- Familiarity with existing sites
- Product knowledge
- Available for onsite consultation

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# Upcoming Sloan Training Webinars

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April 1, 2021

American Rescue Plan (ARP) Funding for Public Restrooms in Educational Facilities

April 8, 2021

American Rescue Plan (ARP) Funding for Public Restrooms in Airports

April 15, 2021

American Rescue Plan (ARP) Funding for Public Restrooms in Restaurants

April 22, 2021

Sustainability Updates – LEED v4 vs LEED v4.1 and WELL v1.0 vs WELL v2.0

# Training Comments, Questions, or Suggestions?

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