SAFESPILL

USER'S MANUAL

SAFESPILL HANGAR FLOOR (ILDFA)
NAVAL BASE VENTURA COUNTY – POINT MUGU
PM351

2024
Rev. 0

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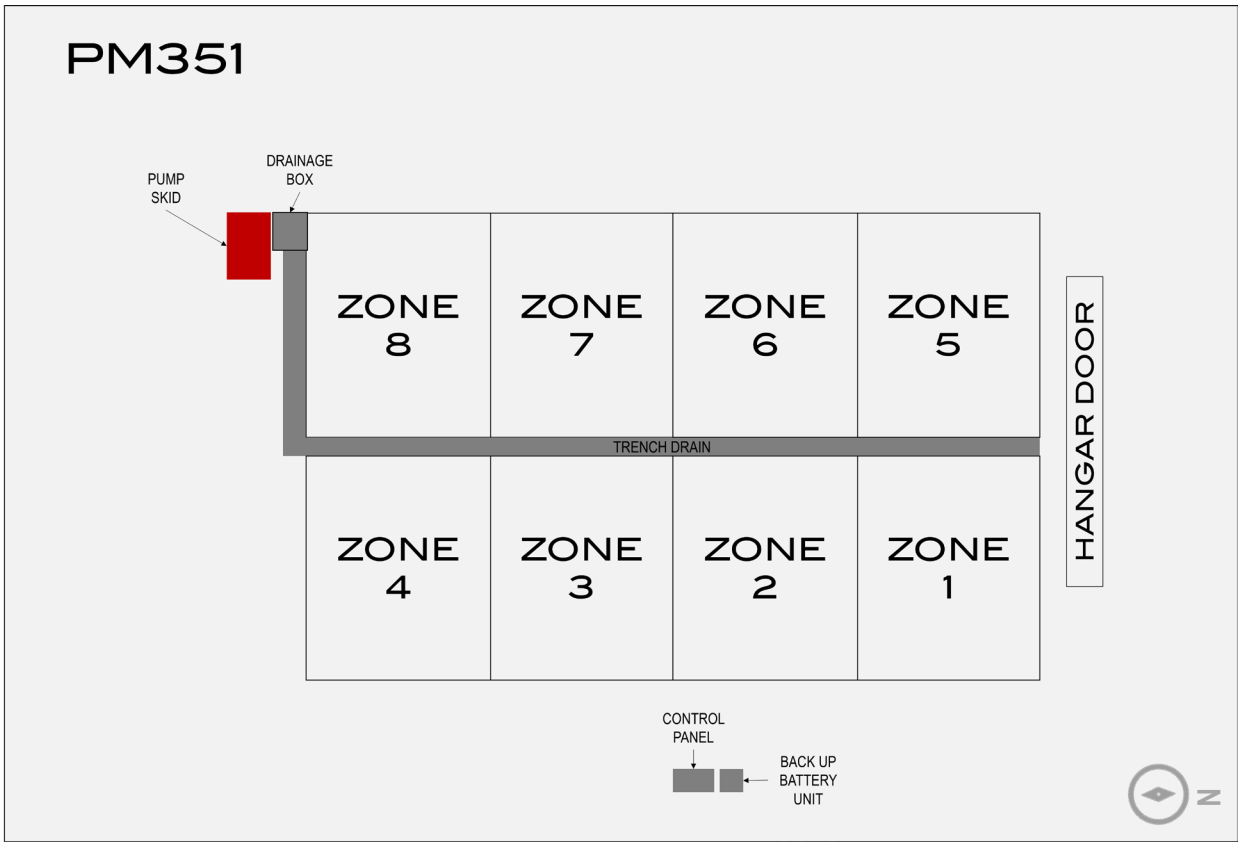
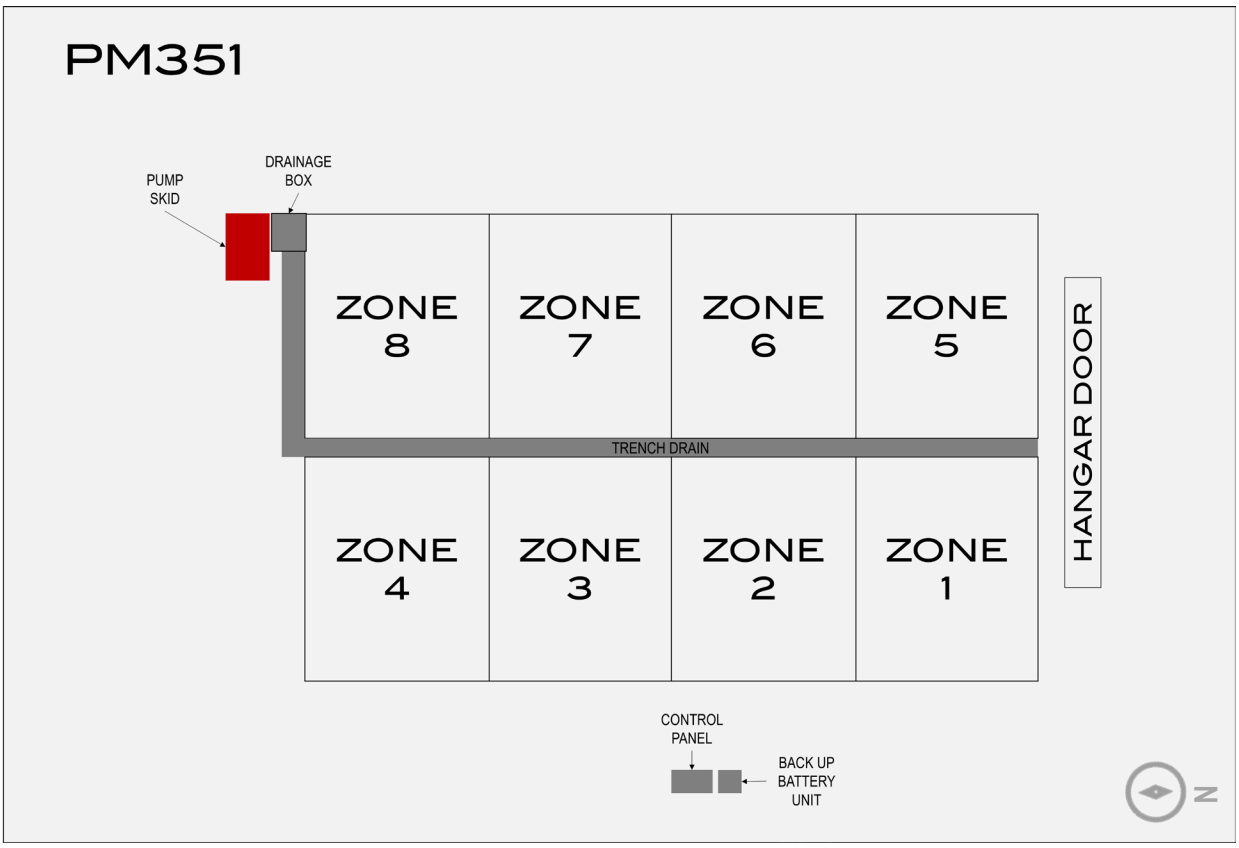
1 Introduction

This user's manual has been prepared specifically for the Safespill Hangar Floor System in PM351 located at Naval Base Ventura County Point Mugu. This manual covers the general layout of the system, controls functions, general maintenance and troubleshooting scenarios.

The Safespill Hangar Floor is designed to remove ignitable liquid spills before they can develop into a pool fire. When a spill occurs, the liquid flows into the hollow floor profiles through specially machined drain holes on the top surface. An internal flushing system flushes the spilled liquid into the trenches which routes the spilled liquid to the drainage box. The pump skid pumps the liquid from the drainage box to the containment tank. The system is set up to operate in zones. An individual zone will activate if a spill is detected in that zone. If a spill occurs across both zones, both zones will activate.

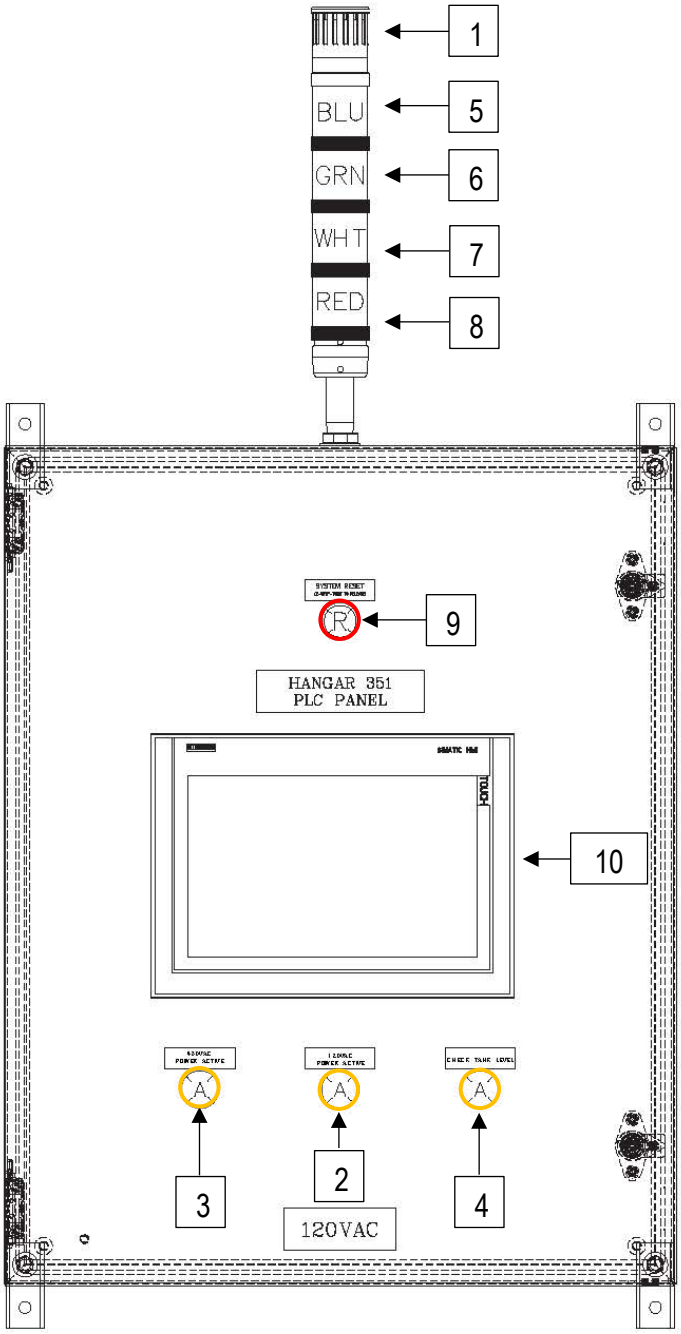


2 System Overview



3 Control Panel

3.1 Control Panel Layouts



1	Audible Alarm	6	Green Tower Light Indicating Cleaning Mode
2	Amber LED Indicating 120VAC Power Active	7	White Tower Light Indicating System Trouble
3	Amber LED Indicating 480VAC Power Active	8	Red Tower Light Indicating Spill Alarm
4	Amber LED Indicating Check Tank Level	9	"E-stop" Red Illuminated Twist-to-Release Push Button
5	Blue Tower Light Indicating System Armed	10	Interactive Human-Machine Interface (HMI)

3.2 Standard Operation

Blue tower light indicating system armed (5) located on top of the Control Panel illuminates when the system is powered on and not in cleaning or E-stop mode. When armed, the system detects liquid spills and activates the flushing manifold in the zone(s) where a spill occurs.

"E-stop" red illuminated twist-to-release push button (9) is push-to-engage and twist-to-release. When engaged, the button illuminates red, and all flushing manifold functions are disabled. During normal operations, this button must be disengaged for proper system function. This button should ONLY be used to turn off flushing manifolds after a spill has occurred and the event has ended.

When liquid is detected, the corresponding zone(s) is highlighted yellow on HMI (10). If the system is armed, liquid detection activates the red tower light indicating spill alarm (8) on top of the Control Panel and the flushing manifold(s) in the corresponding zone(s). If the system is not armed and liquid is detected, zone(s) will still be highlighted yellow on the HMI, flushing manifold(s) will not activate. An alert is sent to the local fire department.

The HMI can be used for activation of a cleaning cycle for a specific zone(s). When a cleaning cycle is started, the flushing manifold runs for 3 minutes. After 3 minutes, the flushing manifold turns off. The green tower light indicating cleaning mode (6) remains illuminated for 15 minutes. During these 15 minutes, the system is disarmed, which allows liquid to drain out of the system, preventing a false spill activation. After 15 minutes, the system automatically resumes "System Armed" mode. No additional actions are required.

The HMI can be used to manually activate a flushing manifold zone if a spill occurs, and liquid is not detected immediately. Manual activation turns on fire alarms in the hangar and alerts the local fire department. Therefore, manual mode should only be used when a spill has occurred. When activated, the red spill alarm light (8) illuminates, the zone is highlighted red on HMI (10), and the flushing manifold for that zone turns on for one (1) minute. This minute duration flushes any spill in that zone. If there is enough liquid for the system to detect the spill, the system remains activated in spill mode.

The discharge containment tank liquid level is indicated in percentage full on the HMI (10). 0% indicates that the tank is empty, 100% indicates that the tank is full. When the level rises above 50%, the amber LED indicating check tank level (4) illuminates, and a trouble signal is sent to the fire panel. When the tank rises above 95%, the system becomes inactive, the LED (4) remains illuminated, continuous audio alarm activates (1), and an alarm signal is sent to the local fire panel.

WARNING: WHEN THE DISCHARGE TANK LEVEL REACHES 95% THE SYSTEM WILL BECOME DEACTIVATED AND UNABLE TO REMOVE ANY SPILLED FUEL. **THERE WILL BE NO FIRE PROTECTION ACTIVE.**

In the event of a power outage, if 120VAC power is lost, the system utilizes the battery back-up power for control panel operation until power is restored OR for up to 48 hours standby or 15 minutes of active system use. A trouble alert is sent to the local fire panel if power is lost.

In the event of a power outage, if 480VAC power is lost. A trouble alert is sent to the local fire panel. Pumps are disabled and flushing manifolds are disabled. There will be no active fire protection.

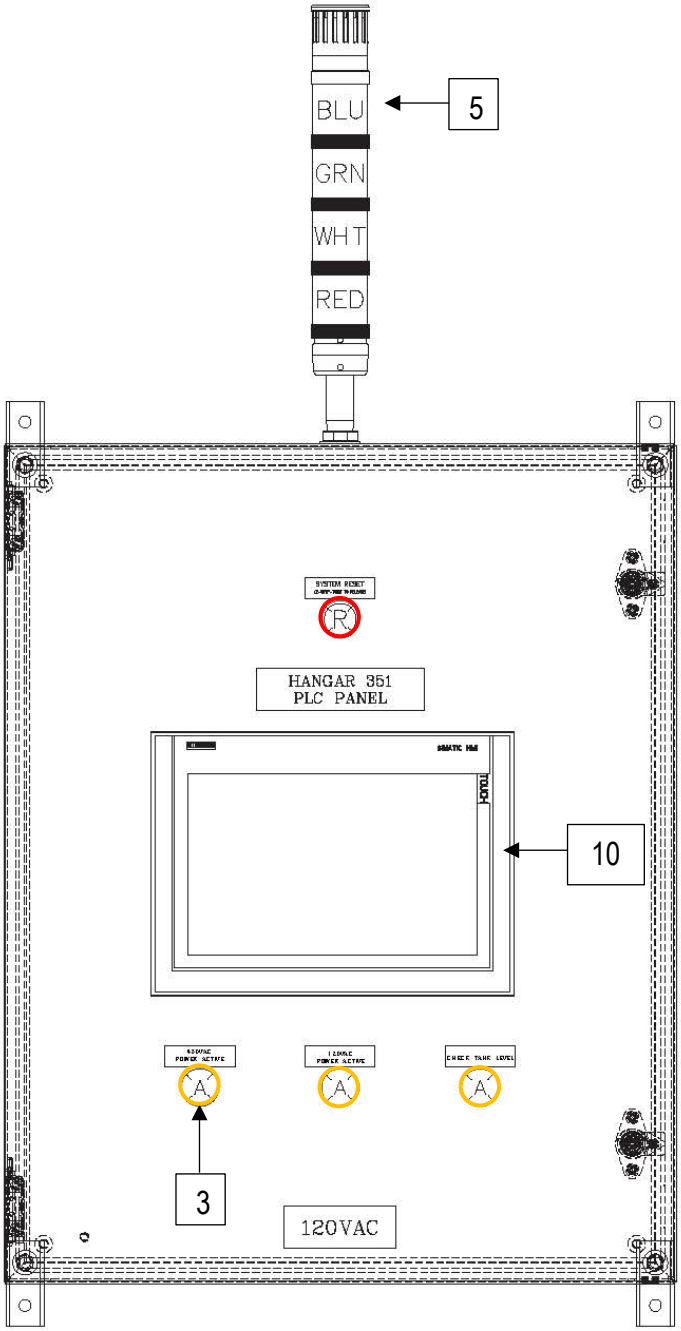
WARNING: IF 120VAC POWER IS LOST, THE BACKUP BATTERY CAN POWER THE CONTROL PANEL FOR UP TO 48 HOURS STANDBY OR 15 MINUTES OF ACTIVE USE. **THERE WILL BE NO FIRE PROTECTION ACTIVE.**

3.2.1 System Armed Mode

During normal operation, the power supply 480V (3) switch should be in the ON position and the system armed indicator light on Control Panel (5) is illuminated blue. Tank level reading on HMI (10) displays a value between 0-95%, indicating the percentage fill of the tank.

During standard operation, the system is armed and activates upon 3 scenarios.

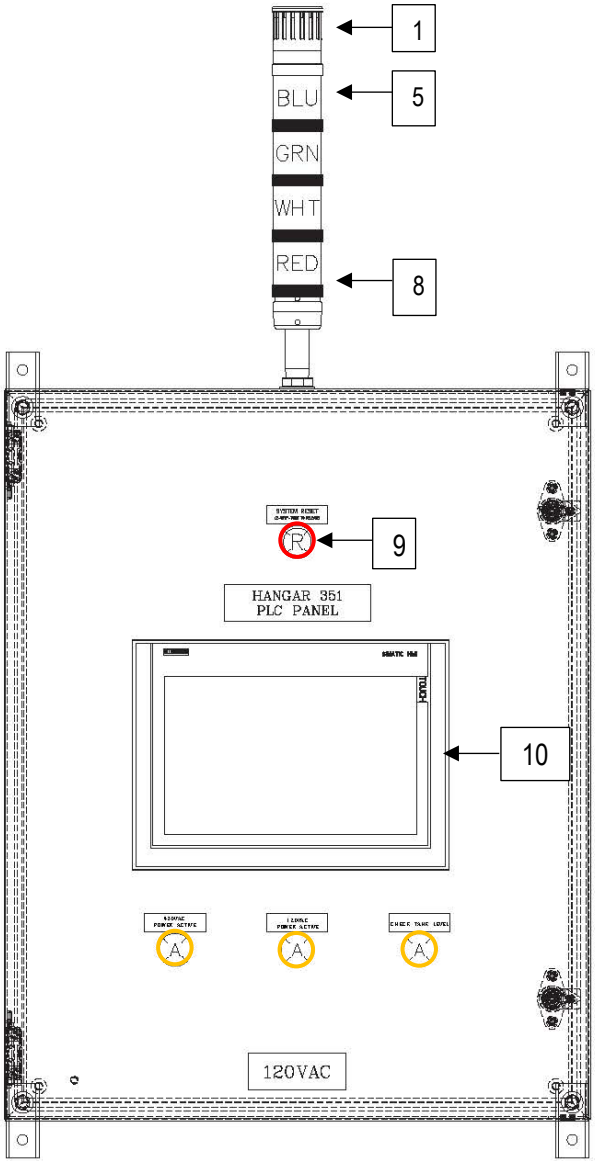
1. Liquid detection recognized as a "spill"
2. Manual system activation via HMI
3. Cleaning Mode activated via HMI



3.2.2 Spill Mode

When a spill occurs, liquid detection sensors in that zone(s) identify the presence of liquid. The zone(s) is highlighted yellow on HMI (10) indicating liquid detection. Audible spill alarm (1) activates. Flushing manifold in that zone(s) activates for 10 minutes and discharge pumps activate when liquid is detected in the drainage box. After 10 minutes, the flushing manifold shuts off. After an additional 10 minutes, the Control Panel checks for liquid detection. If no liquid is detected, the flushing manifold remains off. If liquid is detected, the flushing manifold cycle repeats. The discharge pumps stay activated until no liquid is detected in the drainage box for 15 consecutive seconds. The system will rearm itself once no liquid is detected. However, to clear status press "UPDATE ZONE STATUS" on the HMI screen (10).

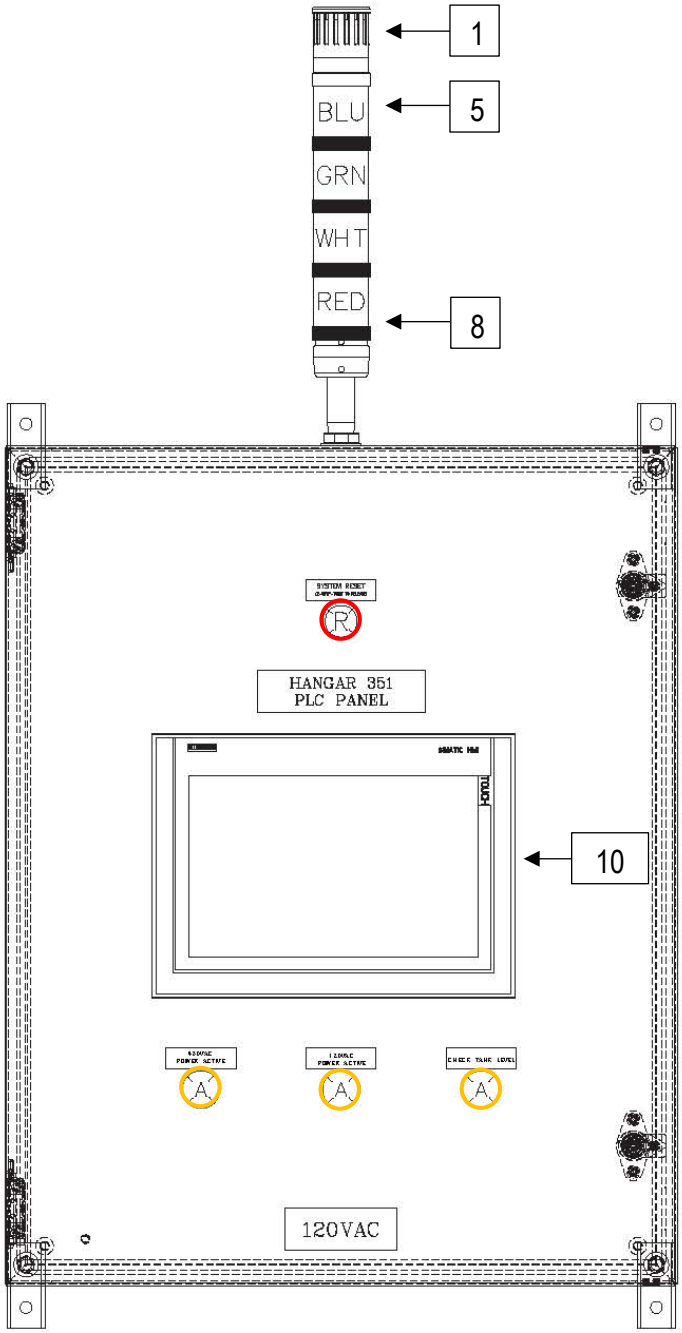
If an unknown activation has occurred, or the spill has stopped, the E-stop button (9) can be pressed to stop the flushing water and silence all alarms. The red tower light indicating spill alarm (8) remains illuminated until the liquid detection sensor is dry. After the pumps shut off and all yellow zones are reset on the HMI, release the E-Stop to rearm the system. Once rearmed, the blue system armed light (5) should be illuminated.



3.2.3 Manual Activation

Manual activation can be considered a shortcut to alert the system that a spill has occurred. Manual activation is initiated on the HMI (10) – See details in section 0

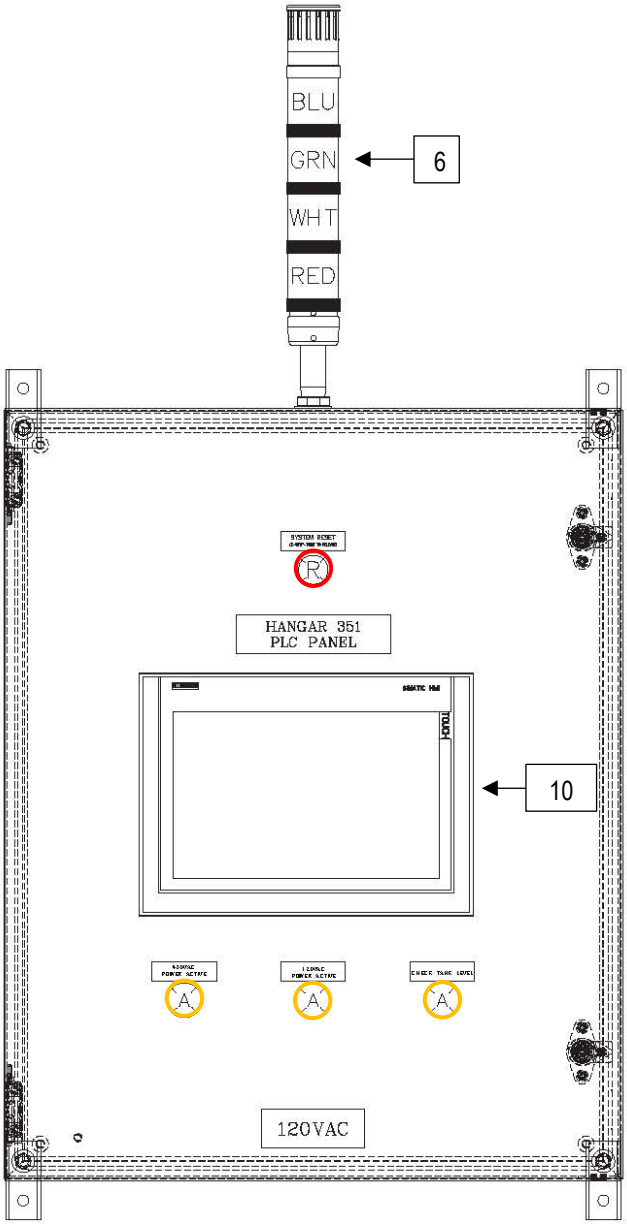
Zone Display. Once manual activation is selected for a zone and starts, the zone is highlighted red on the HMI, indicating that the system has recognized the activation. The button is on/off to start manual mode. When activated, the corresponding flushing manifold, the audible spill alarm (1) and red tower light spill alarm (8) activate. Once liquid is detected, the system operates as described in spill mode (3.2.2). After the pumps shut off, the system rearms itself. Once rearmed, the blue system armed light (5) is illuminated. To reset zones, press "UPDATE ZONE STATUS" on the HMI screen (10).



3.2.4 Cleaning Mode

Cleaning mode can be used at any time to clean a specific zone of the floor. To activate cleaning mode for a specific zone, press the desired zone and select cleaning mode on HMI (10). To activate full floor cleaning cycle, use the "CLEAN ALL ZONES" touchscreen switch on the HMI (10). The green tower light indicating cleaning mode (6) illuminates. The flushing manifolds in the corresponding zone(s) run for 3 minutes. Discharge pumps activate when liquid is detected in the drainage box. After 3 minutes the flushing manifold stops; the system remains in cleaning mode for 15 minutes to allow flushing water to drain without a false activation under spill mode. The floor is disabled for spill mode activation (3.2.2) for as long as the cleaning mode light remains illuminated. System rearms after 15 minutes.

WARNING: WHEN CLEANING MODE IS ACTIVATED, THE ENTIRE FLOOR IS DISABLED FOR SPILL MODE ACTIVATION. **THERE WILL BE NO STANDARD SAFESPILL FIRE PROTECTION ACTIVE.**

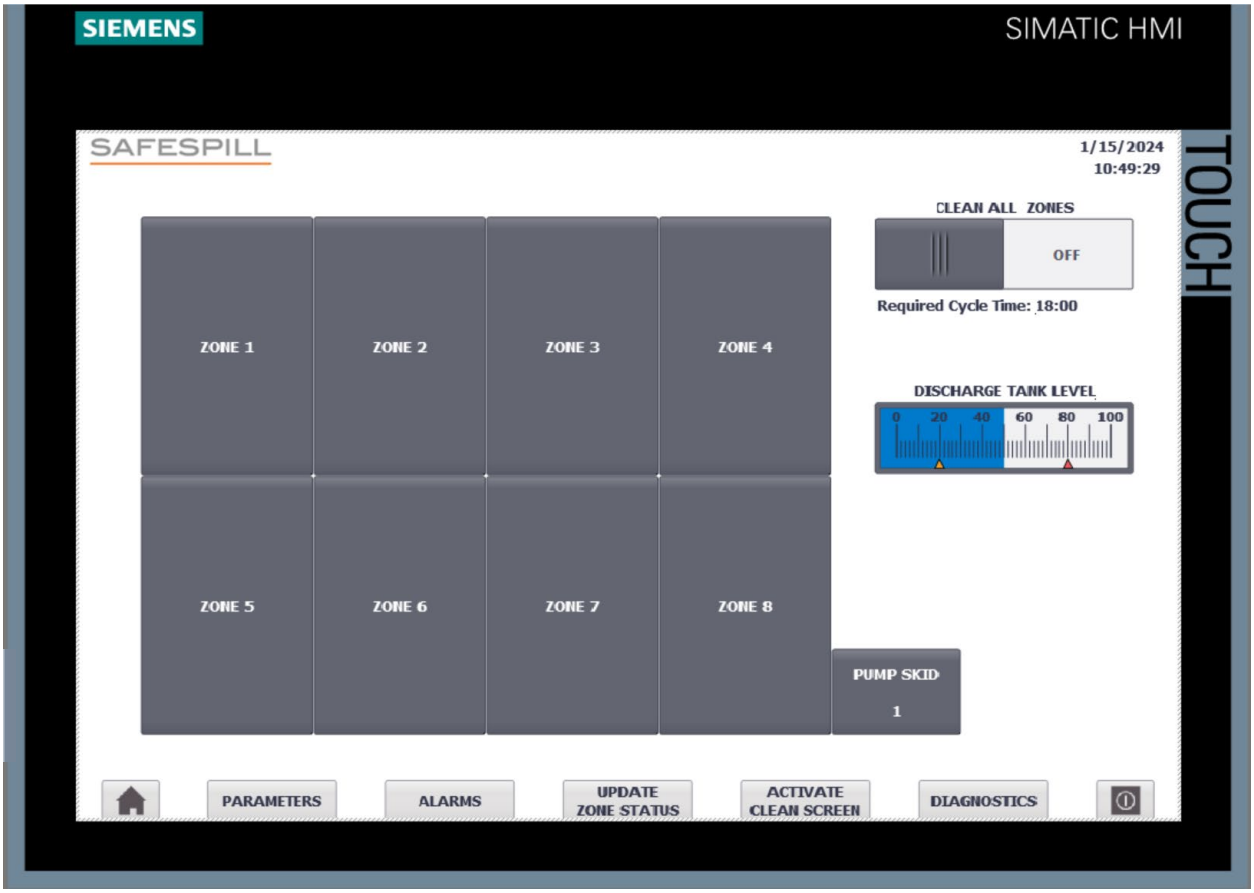


3.3 HMI Functions

A Human-Machine Interface (HMI) is installed on the front of the PLC Panel to monitor the floor status, activate cleaning and manual mode, allow the user to observe current and past alarms, and to modify pre-set timers. The HMI features 4 pages which can be navigated to using touch screen. The pages are HOME, PARAMETERS, ALARMS AND DIAGNOSTICS.

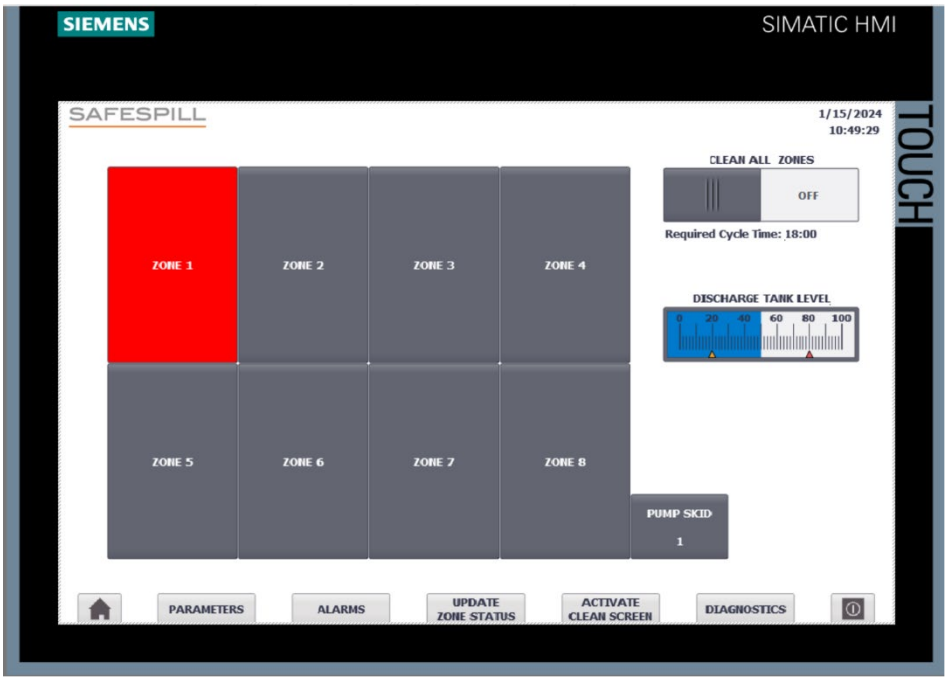
3.3.1 HMI Status

Below is the default display for the HMI. It shows a status zone map of the floor, tank level, and allows for access to other displays. When a spill, manual activation, or cleaning mode occurs in a zone, the condition is displayed on the HMI. The zone condition remains in the most recent state until it is cleared by pressing "UPDATE ZONE STATUS" on the HMI screen (10), except for the cleaning mode which automatically resets. See examples on next pages.



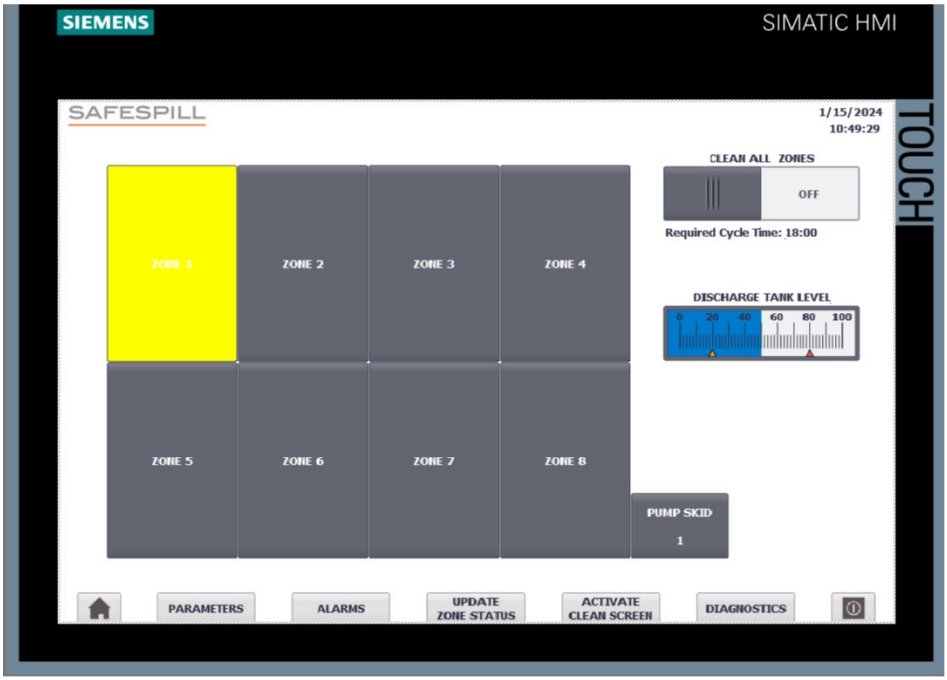
HMI STATUS EXAMPLE 1

Zone 1 – Red: Indicates that Zone 1 was manually activated



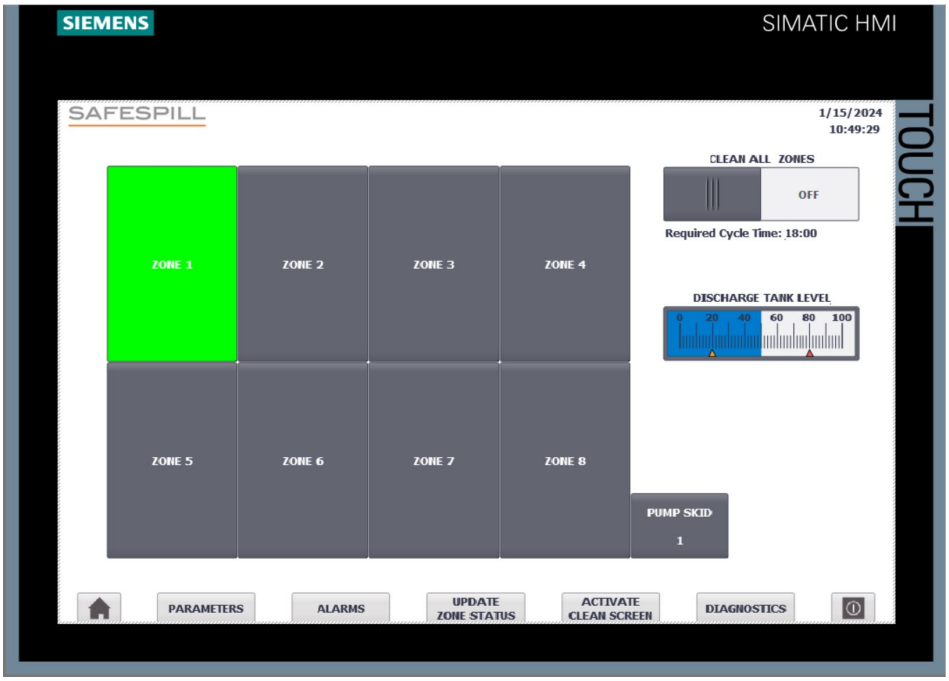
HMI STATUS EXAMPLE 2

Zone 1 –Yellow: Indicates that a spill has been detected in Zone 1



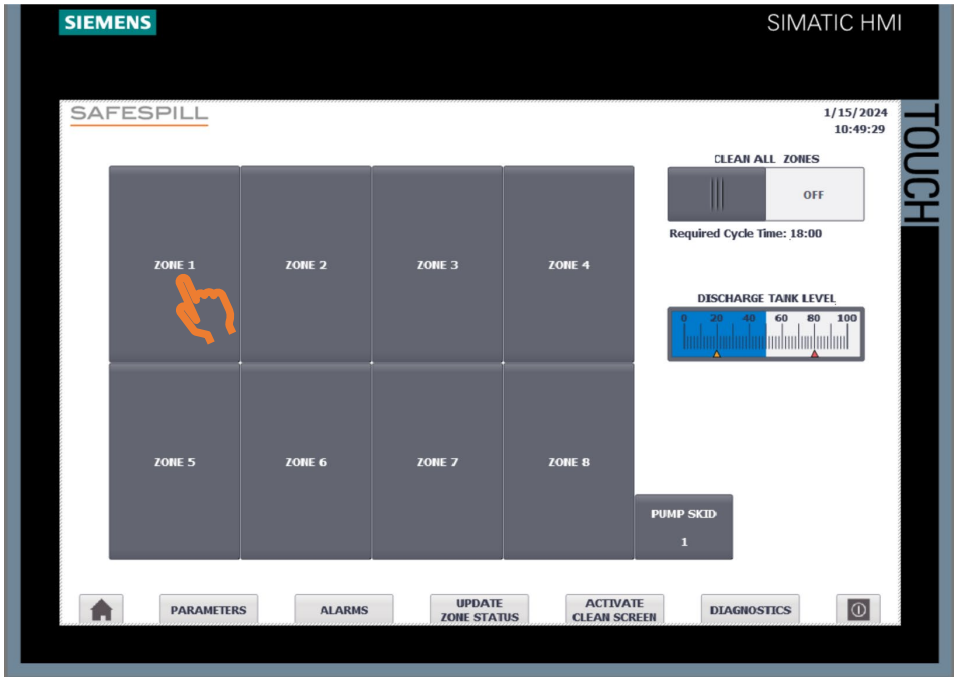
HMI STATUS EXAMPLE 3

Zone 1 – Green: Indicates that cleaning mode has been activated in Zone 1

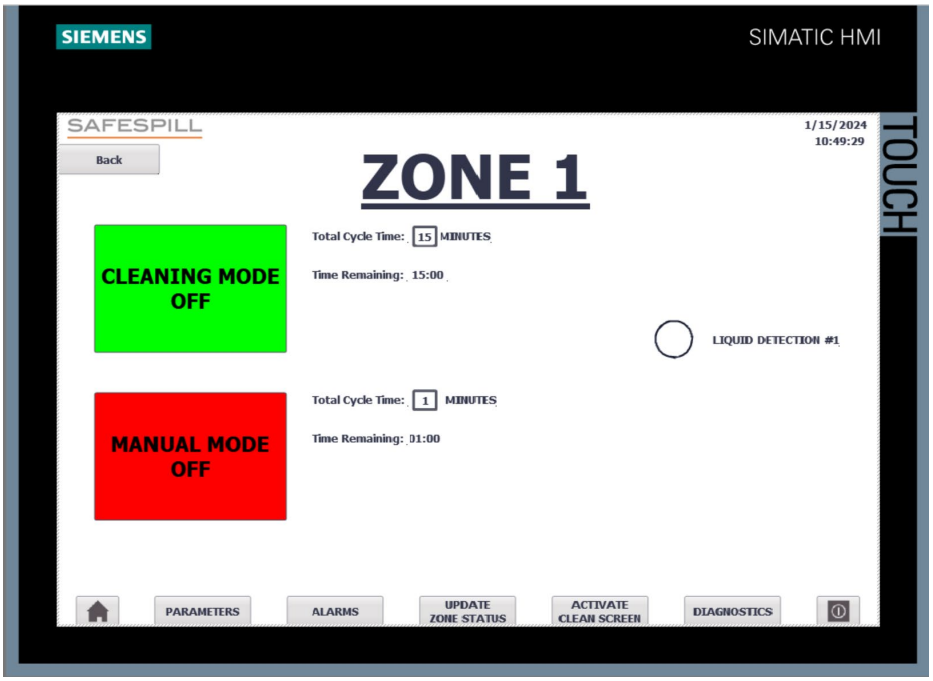


3.3.2 Zone Display

Select a zone from the home screen on the touchscreen of the HMI. This will navigate to the Zone Display.

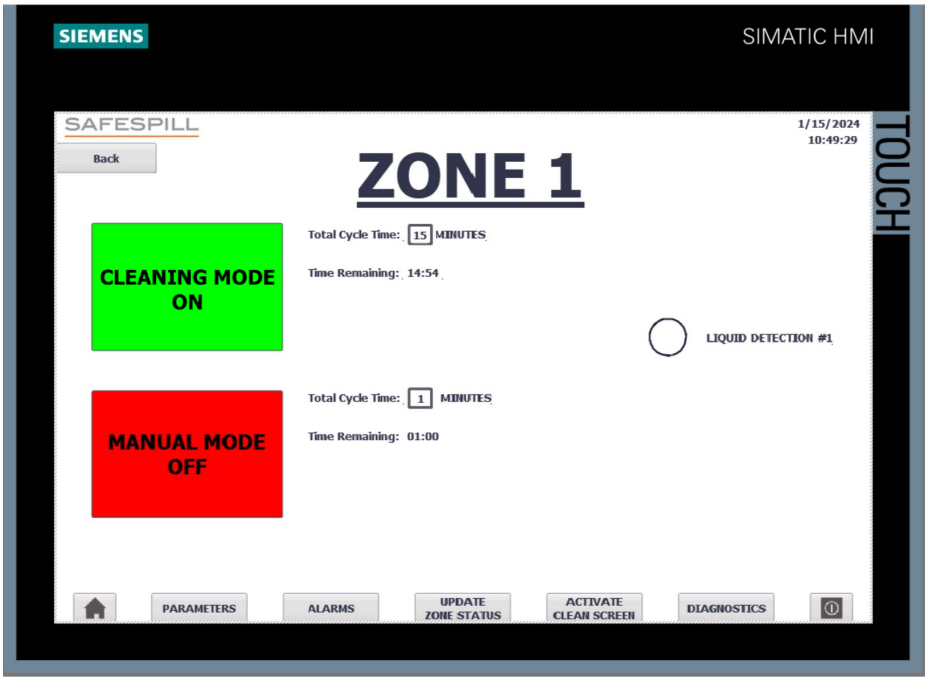


From this screen, you can see the status of the zone for liquid detection, cleaning, and manual mode. You can also activate zone specific cleaning mode and manual mode by pushing the green or red touchscreen buttons respectively.



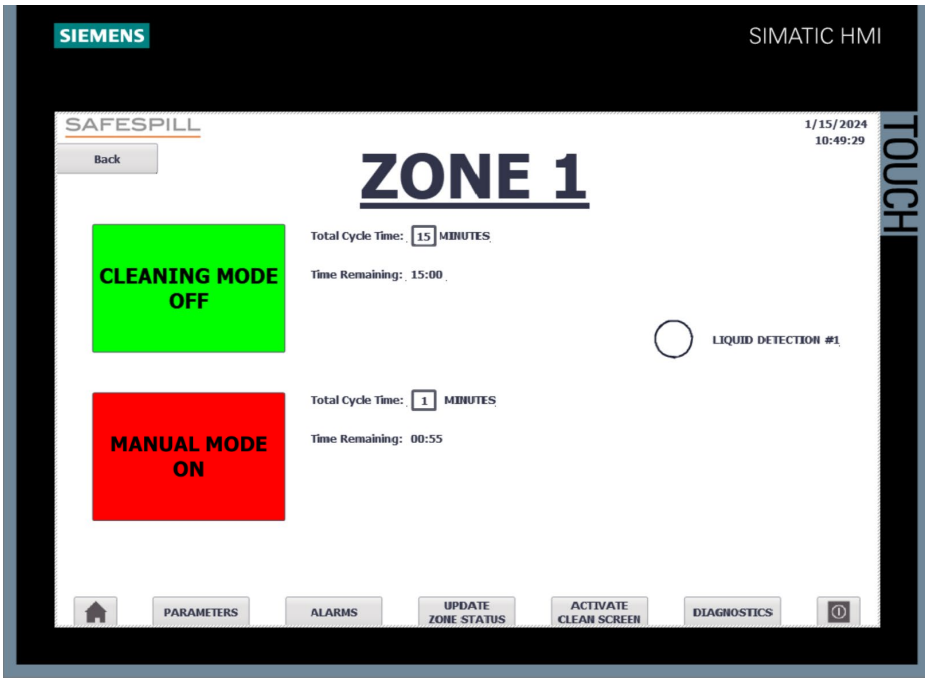
HMI ZONE STATUS EXAMPLE 1

Zone 1 Cleaning Mode activated with 14 minutes and 54 seconds remaining in cycle.

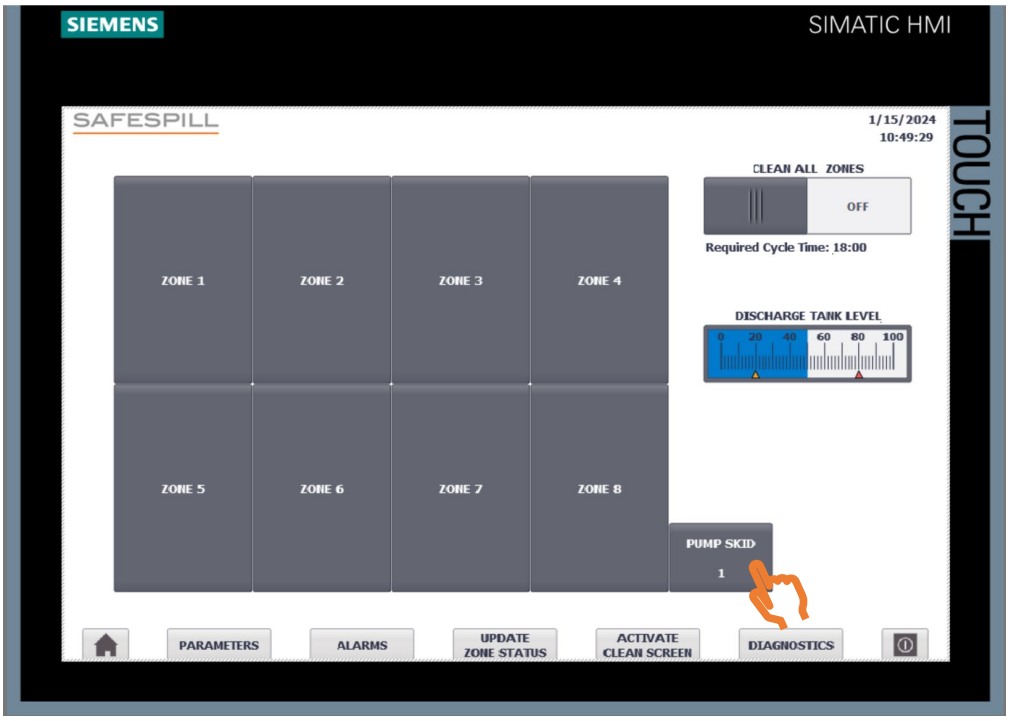


HMI ZONE STATUS EXAMPLE 2

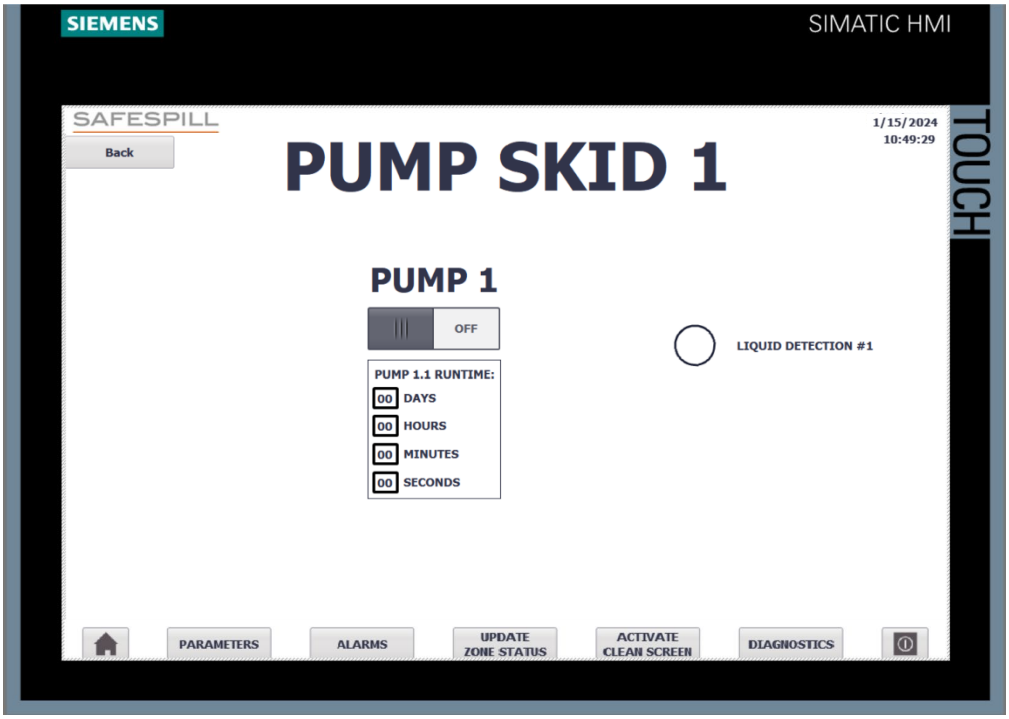
Zone 1 Manual Mode activated with 55 seconds remaining in cycle.



3.3.3 Pump Skid Display



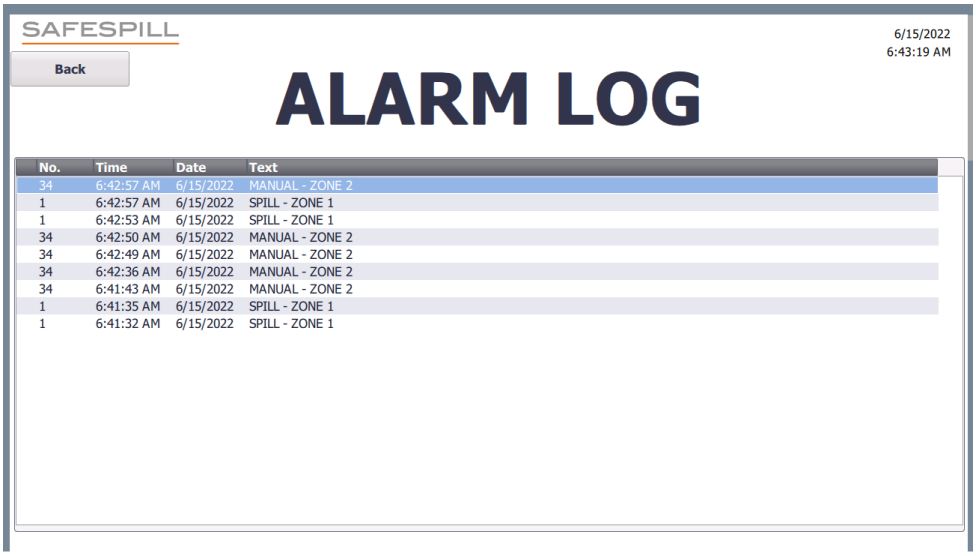
On the home touchscreen, select the pump skid.



Once selected, the pump skid status will appear including liquid detection status (red indicates liquid is being detected) and pump run times. To test run a pump, switch the desired pump on using the HMI. Return to "OFF" when complete.

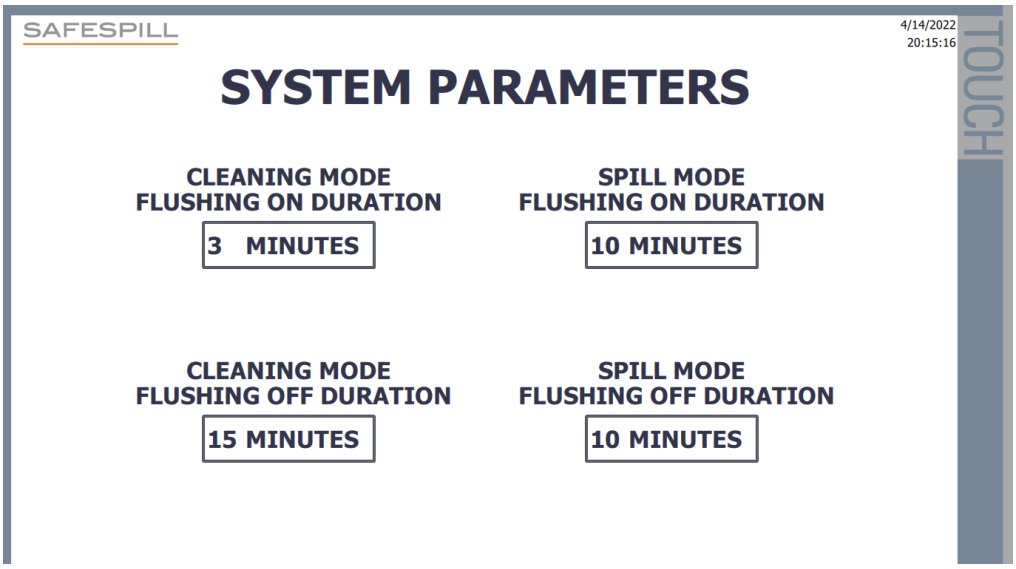
3.3.4 HMI Alarms

Navigate to the HMI Alarms using the button labeled "Alarms". The alarms page can be used to view past events. Each event includes a timestamp. Two events will occur for each alarm, the first indicating the time at which the event began and the second indicating when it ended. For example, in the screenshot below, a spill mode cycle in zone 1 began at 6:42:53 on 6/15/22 and ended at 6:42:57 on 6/15/22.



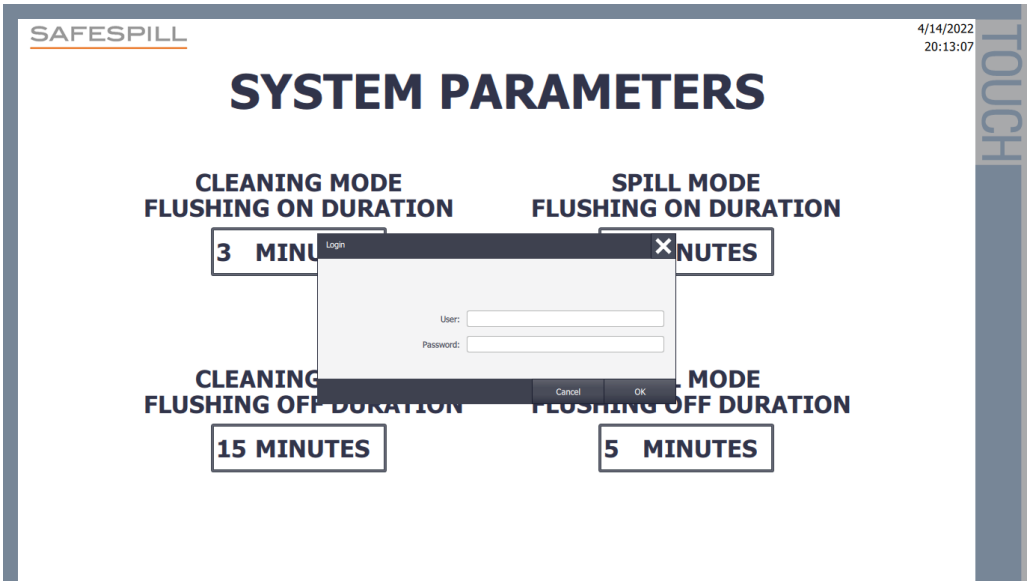
3.3.5 HMI Parameters

Navigate to the HMI Parameters using the button labeled "Parameters". The parameters screen can be used to alter the duration of pre-set timers. The parameters will set the run-time for each of the icons listed. **All parameters are password-protected to prevent unauthorized access.**

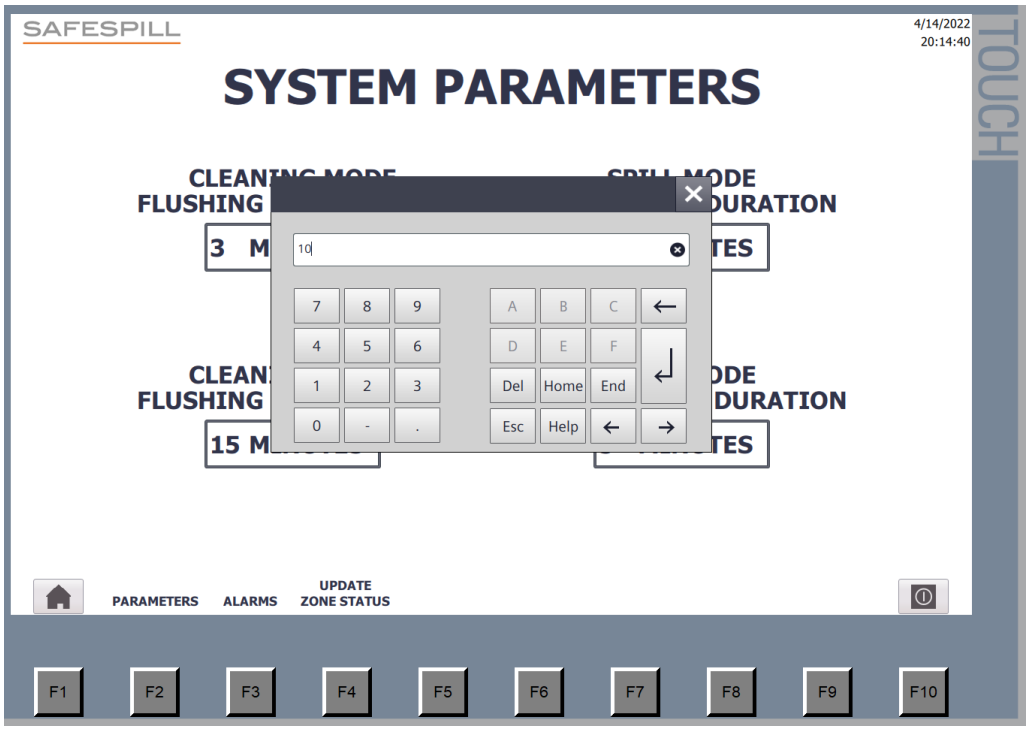


A parameter can be altered by pressing the desired parameter.

Then, enter the user and password for the device.



Next, use the keypad to enter the desired value in MINUTES and press enter to save the change.



The parameter changes update immediately, but parameters should not be altered DURING an event. For instance, if the flushing manifold is actively running, the parameter for "Flushing Duration After Spill" should not be altered until after the spill cycle has stopped.

4 Discharge Tank

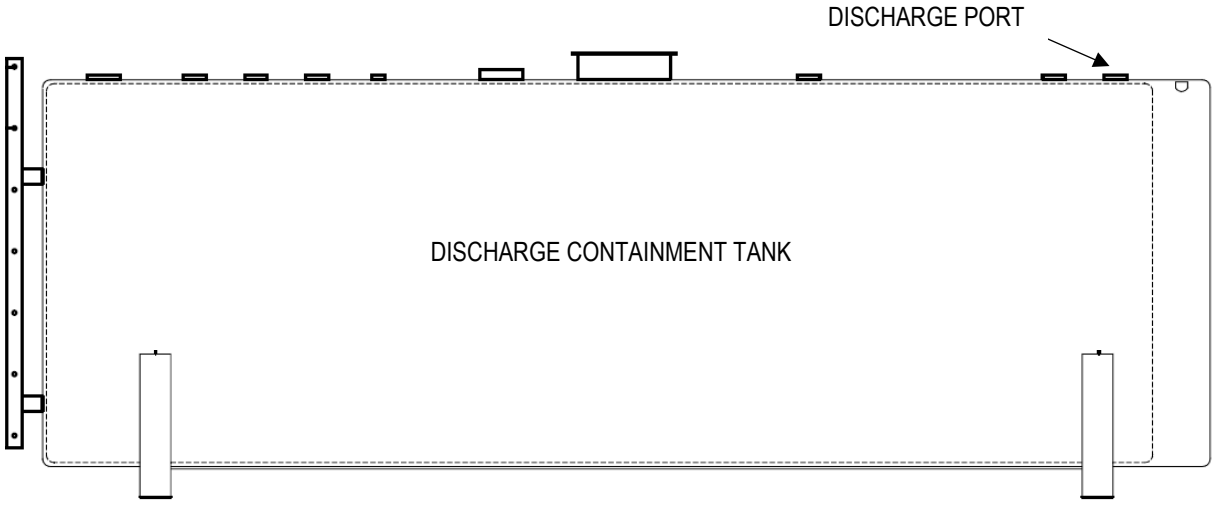
The Safespill system in PM351 is connected to a discharge containment tank. The discharge containment tank should not rise above 50% full. For details on tank level alerts reference the section 6.3, in this manual.

WARNING: IF THE DISCHARGE TANK LEVEL IS OVER 50%, A WORST-CASE SCENARIO SPILL WILL NOT BE CONTAINED. THE SPILL WILL OVERLOAD THE TANK.

4.1 Discharge Tank Details

An oil water separator (OWS) is part of the system. The OWS will pump water out of the containment tank.

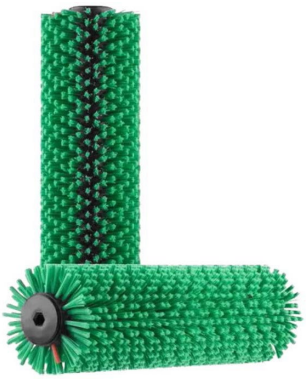
If the discharge containment tank needs to be emptied without the OWS, a discharge port located at the top of the tank can be used to drop in a suction hose. Use caution when removing cap to avoid damaging tank sensors. The "Discharge Tank Level" on HMI can be used to monitor the tank level while the tank is being emptied. Once the tank is emptied, re-secure all tank connections that were removed.



5 General Maintenance

The top surface of the floor can be cleaned using a dust broom and sponge mop. First use the broom to remove dust and dirt from the floor. Then, prepare the mop bucket with water and floor cleaner mixture. Safespill recommends using a commercial grade floor cleaner or degreaser, such as, Simple Green Heavy-Duty Cleaner that can be diluted at a 1:5 ratio. Use a red bucket nested in the yellow mop bucket to separate the dirty water. Alternatively, a ride on floor cleaner is acceptable for use. It is recommended to run a cleaning mode for all zones on the system at least monthly to ensure dust build up is flushed out.

Alternatively, a ride-on or walk-behind floor cleaner with a drum style brush is acceptable for use. The floor cleaner must be run parallel to the floor profiles.



RECOMMENDED MAINTENANCE SCHEDULE	
ITEM	**INTERVAL**
CLEANING CYCLE FOR EACH ZONE	MONTHLY
CLEAN TOP SURFACE	MONTHLY

Safespill has a standard inspection procedure that will be performed by Safespill or a trained third party semiannually to ensure the system is operating properly. Maintenance recommendations will be made during these scheduled inspections to ensure the system is functioning optimally. Any service calls or maintenance requests can be emailed to: service@safespill.com or by calling our main line: 713.645.4370

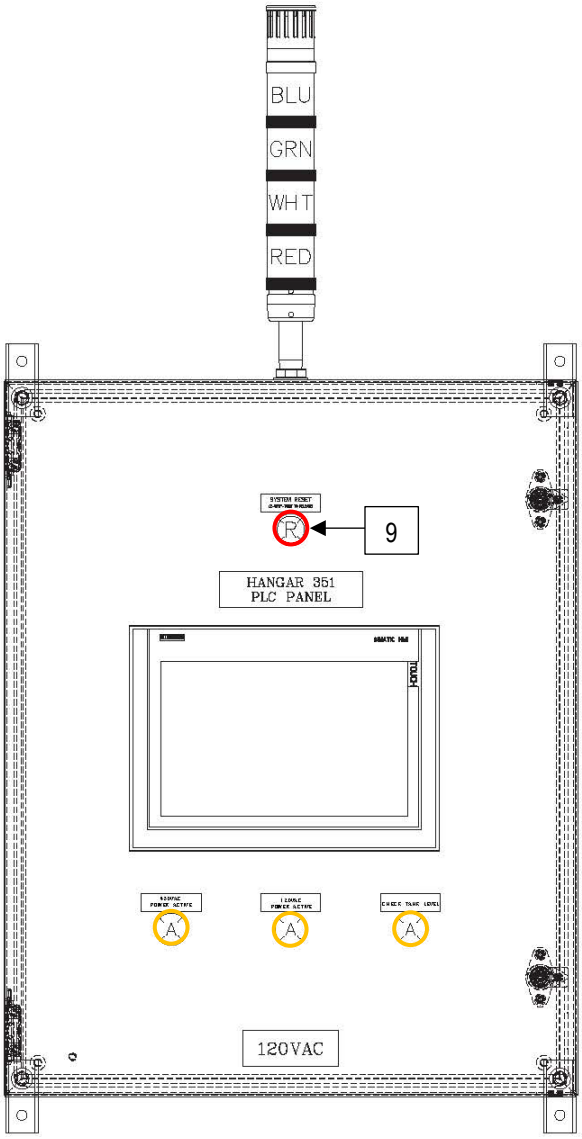
6 Troubleshooting Operations

The following are troubleshooting scenarios with steps to resolve.

6.1 Problem: E-Stop Activated

When the E-stop button is engaged (9), all flushing manifolds are disabled, and no alarms related to spills will activate. However, discharge pumps will still activate if liquid is detected in the drainage box. Trouble alarms related to power loss and tank levels will remain active. Twist to release E-stop button to disengage and return system to armed mode.

WARNING: IF E-STOP IS ENGAGED, ALL ALARMS AND FLUSHING MANIFOLDS ARE DISABLED. WHILE PUMPS WILL STILL REMAIN FUNCTIONAL, THIS WILL COMPROMISE FIRE PROTECTION EFFICIENCY AND SPEED.



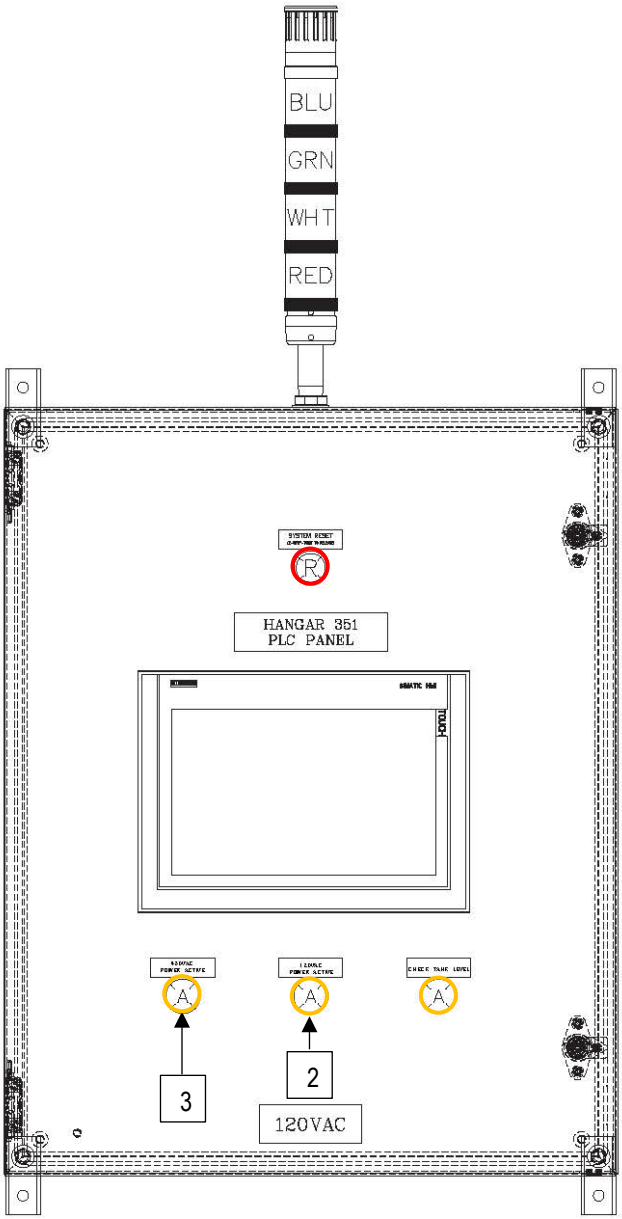
6.2 Problem: Power Loss

6.2.1 Loss of 480VAC Power

If 480VAC power is lost, the amber LED indicating 480VAC Power Active (3) will turn off and the white tower light indicating system trouble (7) will illuminate to indicate and alert personnel that 480VAC power has been lost. A trouble signal will be sent to the local fire alarm panel. Tank level sensors, liquid detection sensors, and audio alarms remain active for 48 hours or 15 minutes of active use.

System will automatically revert to "system armed" when power is restored.

WARNING: IF 480VAC POWER IS LOST, THE BACKUP BATTERY CAN RUN THE CONTROL PANEL FOR UP TO 48 HOURS OF STANDBY OR 15 MINUTES OF ACTIVE USE. PUMPS WILL BE DISABLED. THERE WILL BE NO FIRE PROTECTION ACTIVE.



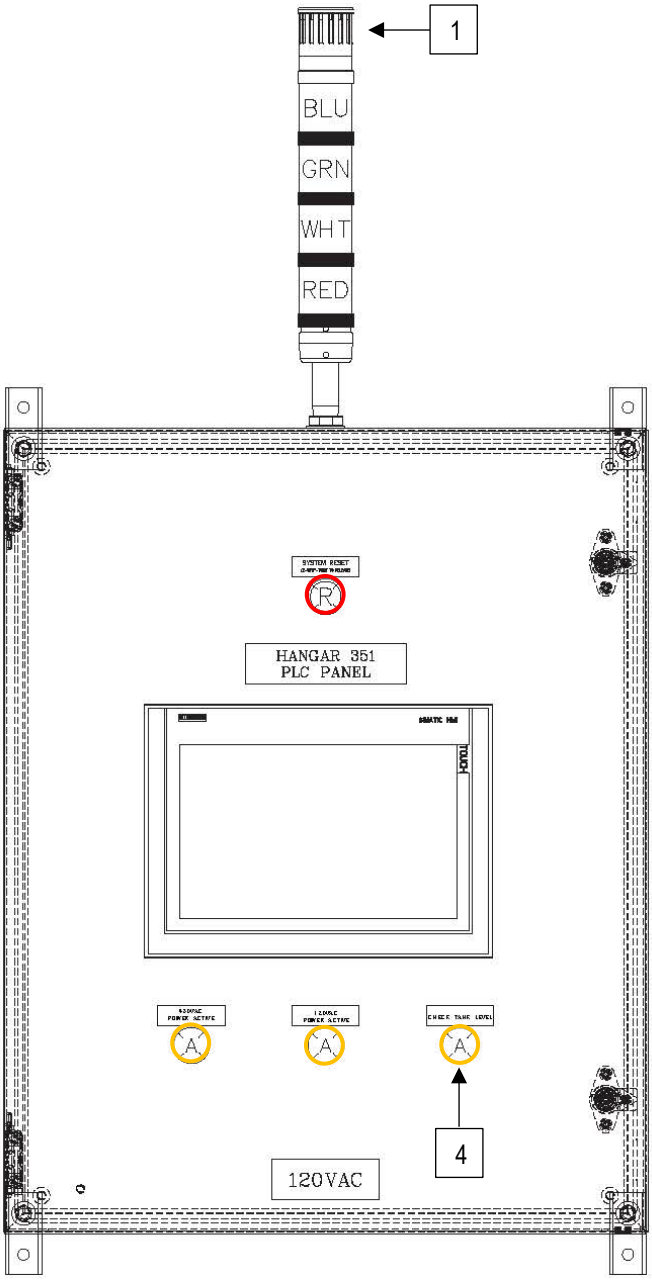
6.3 Problem: Discharge Tank Alarm

Trouble alarms will be activated if the discharge tank level is out of range.

6.3.1 Discharge Tank – High Level Warning

If tank level rises above 50% (but below 95%), the tank alarm indicating light (4) will illuminate. The audible trouble alarm (1) will activate for a period of 30 seconds every hour. All system functions will remain active.

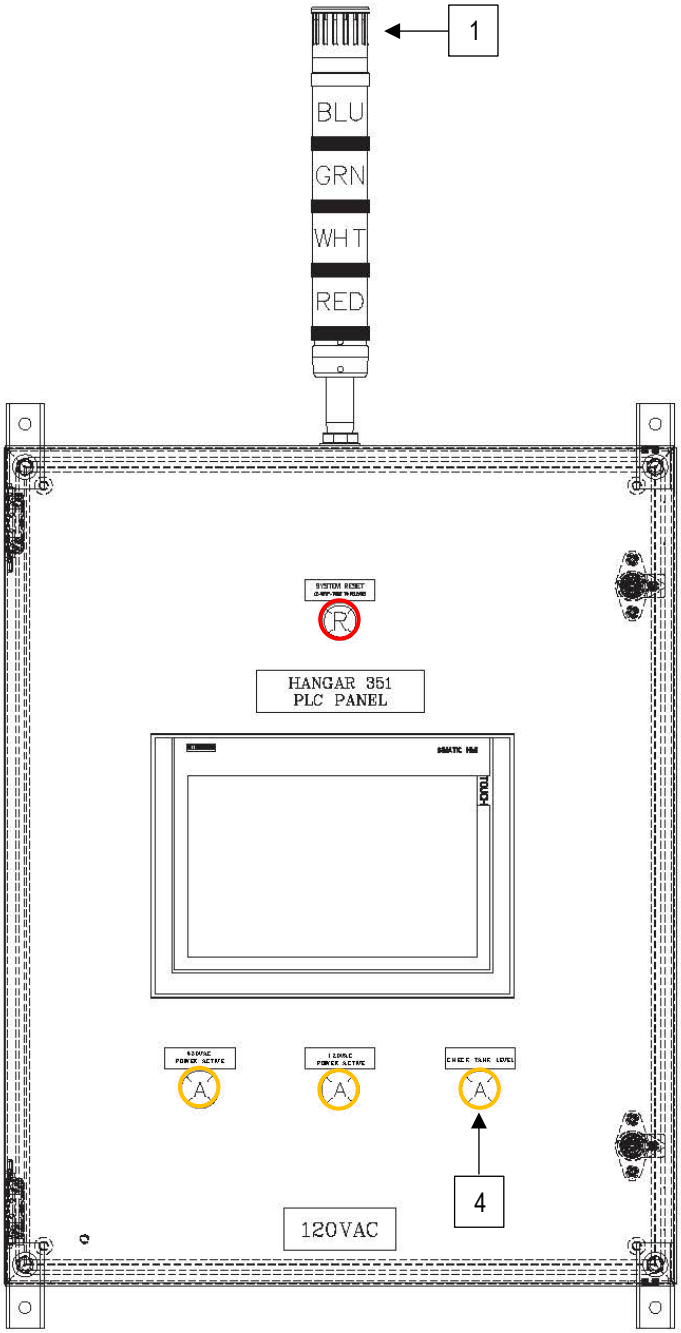
WARNING: IF THE DISCHARGE TANK LEVEL IS OVER 50% A WORST-CASE SCENARIO SPILL WILL NOT BE CONTAINED. THE SPILL WILL OVERLOAD THE TANK.



6.3.2 Discharge Tank – High Level Deactivates System

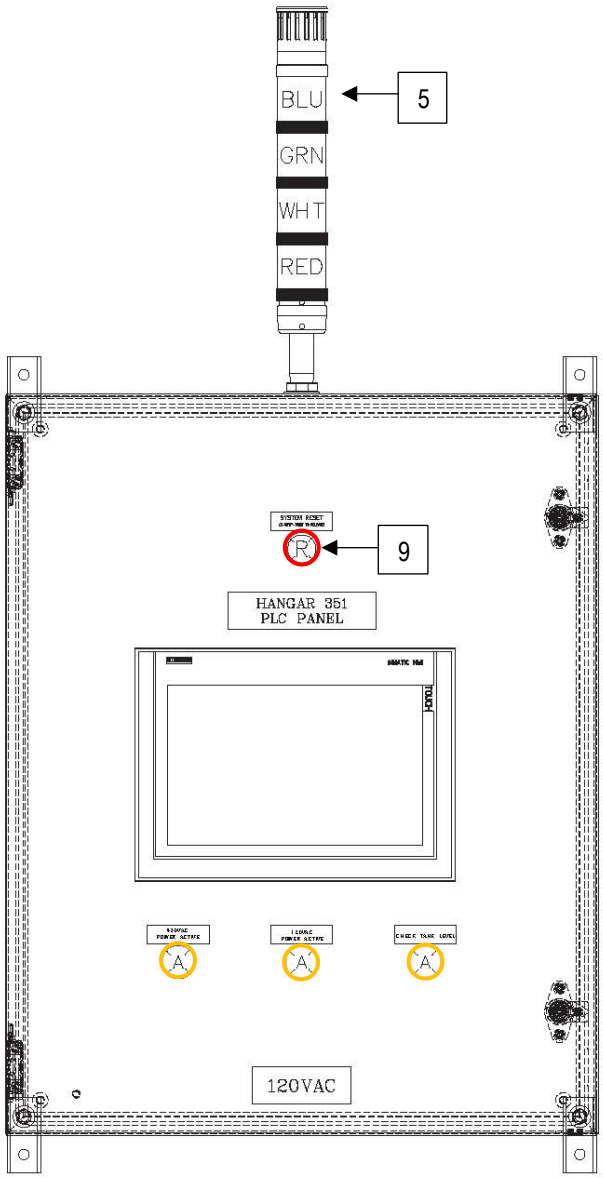
If tank level rises above 95%, the tank alarm indicating light (4) will be illuminated. The audible trouble alarm (1) will activate continuously until the issue is resolved. All flushing manifolds and discharge pumps will deactivate. The discharge tank needs to be emptied as soon as possible for system to be fully functional.

WARNING: WHEN THE DISCHARGE TANK LEVEL REACHES 95% THE SYSTEM WILL BECOME DEACTIVATED AND UNABLE TO REMOVE ANY SPILLED FUEL. THERE WILL BE NO ACTIVE FIRE PROTECTION.



6.4 Problem: Unknown Activation

If the system activates and there is no visible spill, push the E-Stop button (9) to stop the system. When the E-Stop button is pushed, the flushing system will stop running and discharge pumps will continue to run; the pumps will automatically shut off once liquid is removed. After the pumps shut off and all zones are reset on HMI, release the E-Stop to rearm the system. Once rearmed, the blue system armed light (5) should be illuminated.



Have you tried the recommendations above and are still having problems?

For technical support call us at (713) 645-4370 or email service@safespill.com.

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