



## PREFERRED UTILITIES LS-8C LEAK SENTRY

### LEAK DETECTION SYSTEM

Revised May 18, 2020

#### PRODUCT DESCRIPTION

The Preferred Utilities Leak Sentry uses an industrial microprocessor to monitor and alarm up to eight separate leak detectors. Leak detector inputs can be:

- 120 VAC float switches (Preferred RBS, PS-LDS, or PLS)
- Low voltage float switches (commercial float switches)
- 4-20 mA output discriminating leak detectors (Preferred HD-A2-C)

Each leak input is individually annunciated with indicating lights on the front of the unit. An alarm horn and alarm horn silence pushbutton is included. Leak status is also available via Modbus RS-485 digital communication.

Up to ten Leak Sentries can be digitally connected via Preferred Nodenet two channel redundant communication network. Up to 31 Leak Sentries can be connected via Modbus.

The NEMA 4X enclosure is resistant to rain, dust, and direct sunlight.

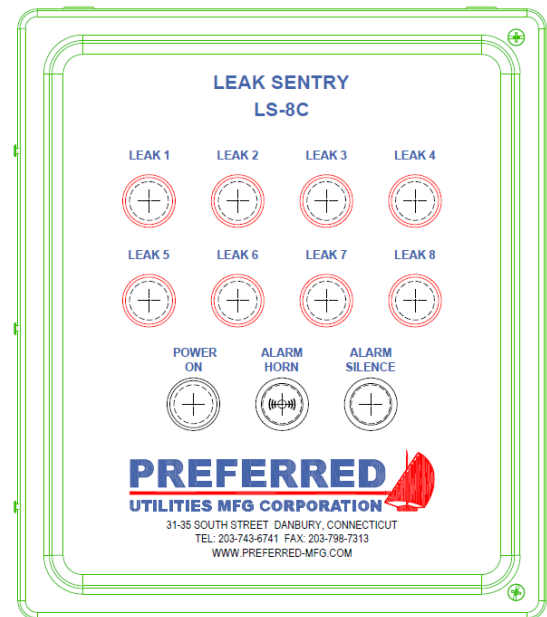


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## FEATURES

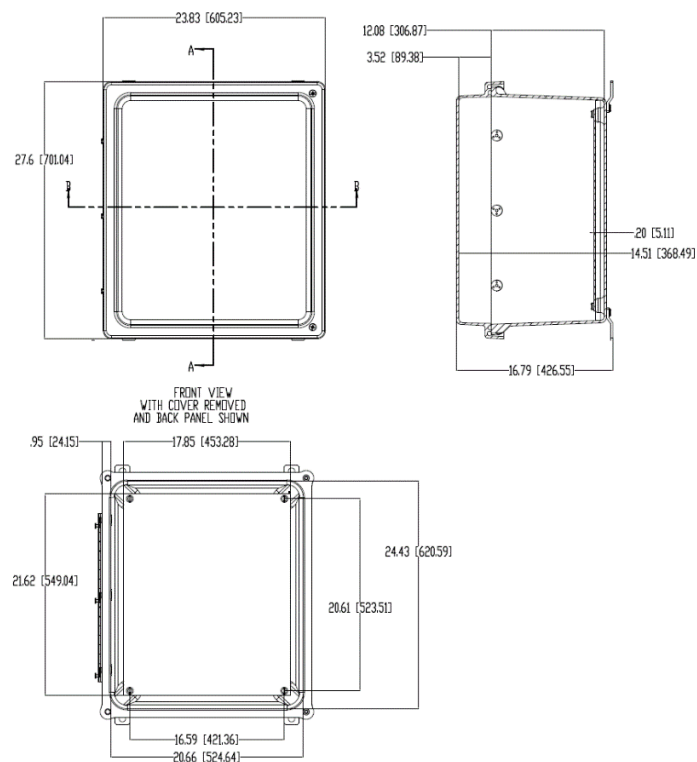
- Monitors and alarms up to eight leak detectors
- Interfaces with 120 VAC and 24 VDC float switch leak detectors
- Interfaces with Preferred Utilities HD-A2-C oil/water discriminating leak detectors
- Field configurable
- Sensor wiring fault detection
- RS-485 Modbus compatible
- Up to 10 Leak Sentrys can be connected via Preferred Nodenet two channel redundant communication network.
- Up to 31 Leak Sentrys can be connected via Modbus RS-485.



## SPECIFICATIONS

Mechanical:	12.13" H by 10.26" W by 6.13" D
Weight:	7 lbs.
Enclosure:	NEMA 4X
Operating Temperature:	32° F to +122 °F
Electrical:	Voltage: 120 VAC +10% - 15%, 50/60 Hz
Power consumption:	26 VA
Leak Detector Inputs:	Eight 120 VAC digital inputs Eight analog inputs configured for 4-20 mA input or 24 VDC rated contact
Intrinsic Safety:	Zenier barriers (optional)
Alarm Outputs:	Eight SPST contacts, one per leak channel 1.5 amp rating
Common alarm	1.5 amp rating
Communication:	Modbus, RTU. 38,400 baud

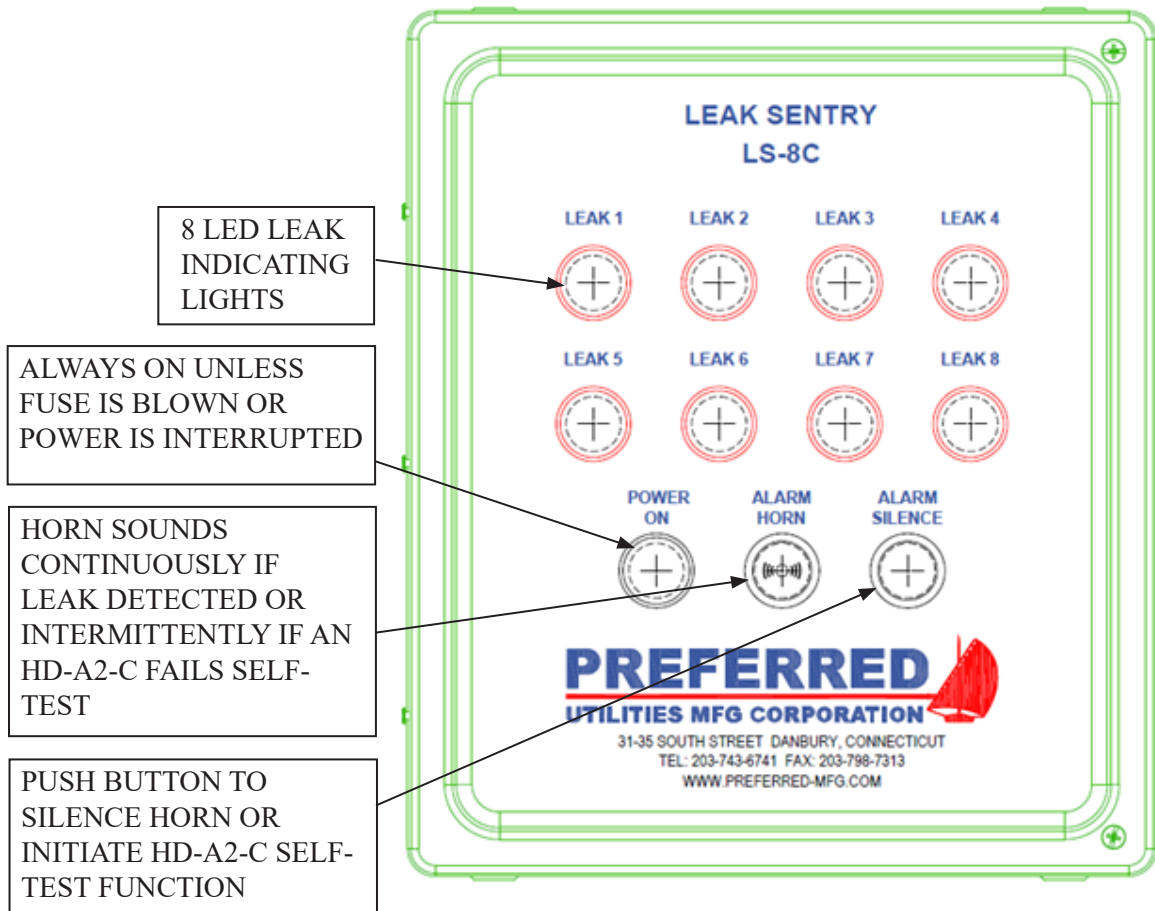
## DIMENSIONS



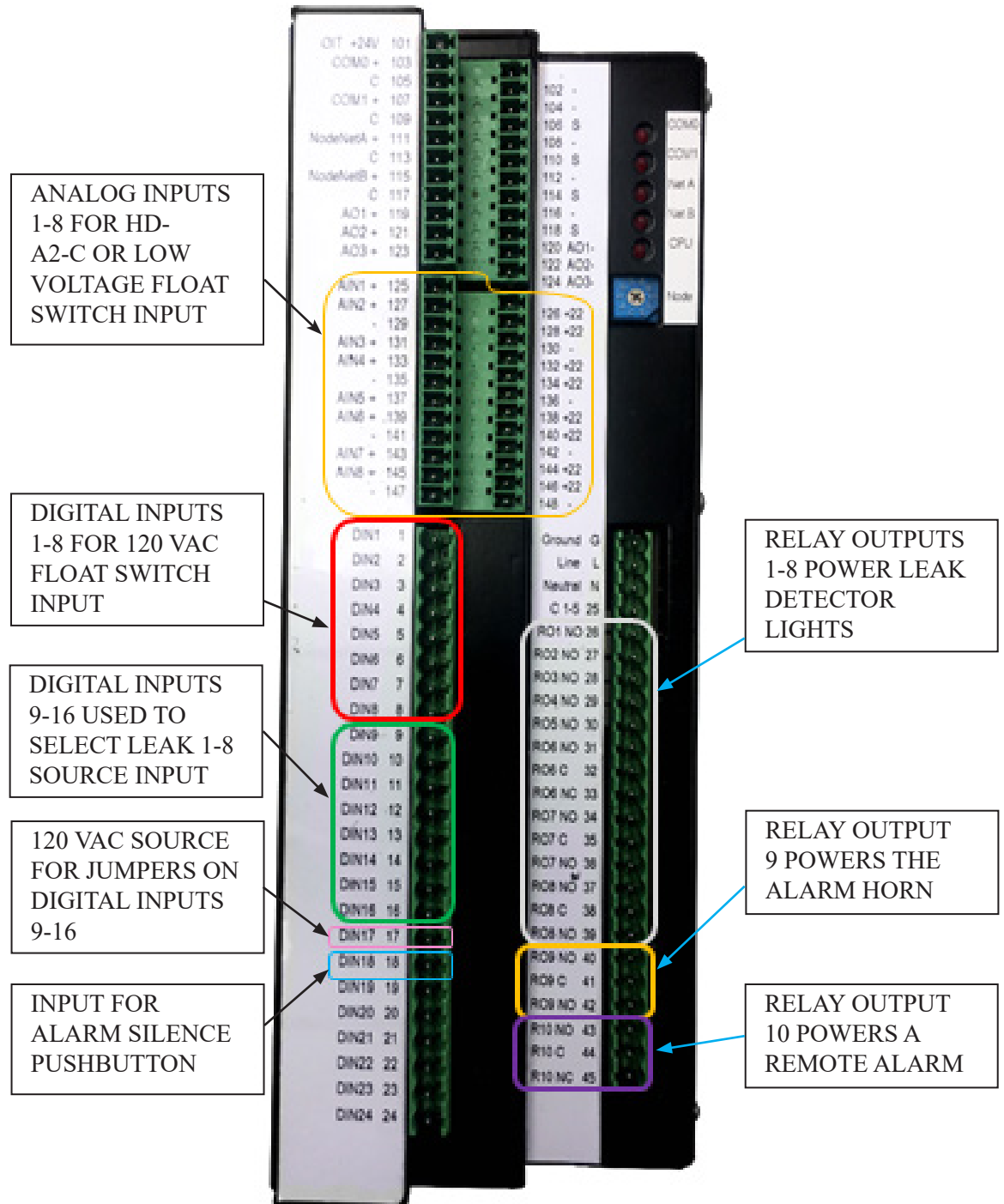
**KEY ABBREVIATIONS**

DIN	Discrete Input
AIN	Analog Input
CH	Channel
PS	Power Supply
ASPB	Alarm Silence Push Button
RBS	Rupture Basin Switch
PLS	Liquid Level Switch
UI	User-Interface
x	Number shown on the FSC

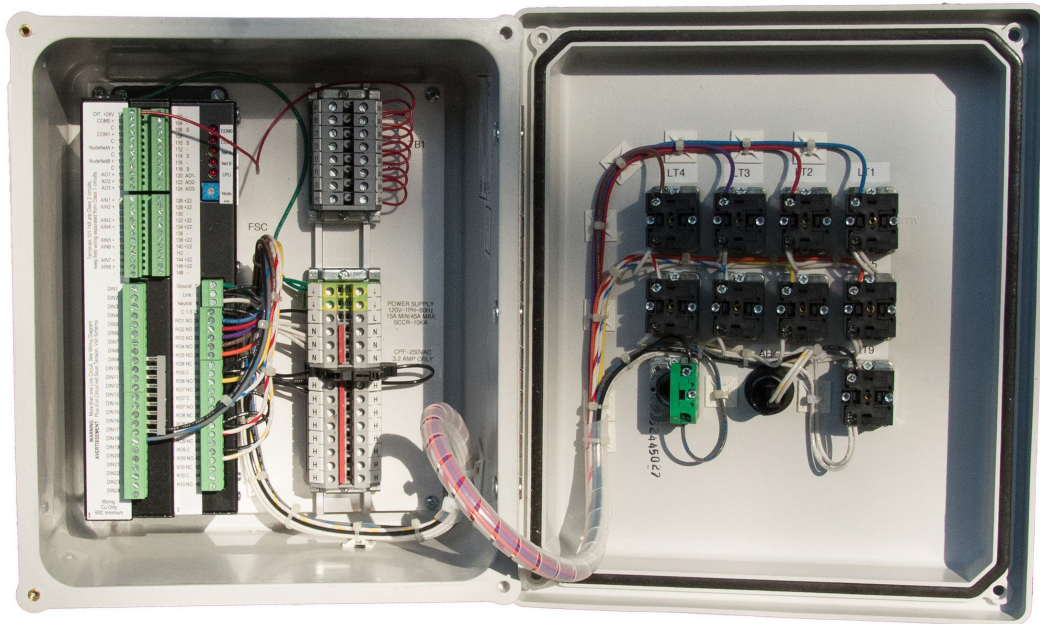
**FRONT PANEL DESCRIPTION**



**LEAK SENTRY MICROPROCESSOR CONTACTS**



## LEAK SENTRY INTERIOR



### Installation Notes:

1. The Leak Sentry enclosure is rated NEMA 4X. When installed correctly and the door is tightly closed, it is rain and hose resistant.
2. The enclosure door should only be opened by qualified electricians and technicians for trouble-shooting purposes.
3. For trouble-shooting in adverse weather, the Leak Sentry should be installed with external rain, snow, and sun protection.
4. Rigid conduit, Seal-tite flexible conduit, or other waterproof conduit should be used to ensure water doesn't enter the conduit and run to the Leak Sentry.
5. Conduit penetrations should only be made in the bottom of the Leak Sentry enclosure.
6. High voltage wires (120 VAC) and low voltage wires (24 VDC) cannot be run in the same conduit.

## PREFERRED HD-A2-C LEAK DETECTOR INSTALLATION

### Installation Notes:

1. The HD-A2-C probe must be oriented horizontally. Use the optional HD-HSG protective housing, if needed.
2. The HD-A2-C is typically zip tied in a convenient location for reading the three LED lights.
3. The output wires from the HD-A2-C card can be spliced to two-conductor Beldan cable in an appropriate electrical enclosure or J-box.
4. See HD-A2-C manual for more complete installation instructions.



## PREFERRED RBS INSTALLATION

### Installation Notes:

1. Orient the RBS switch as shown, otherwise it won't work.
2. Install in a protected location. The float sensor won't survive standing on, kicking, pounding, or other mechanical abuse.
3. The sensor can be threaded into a 1/2" NPT half coupling.



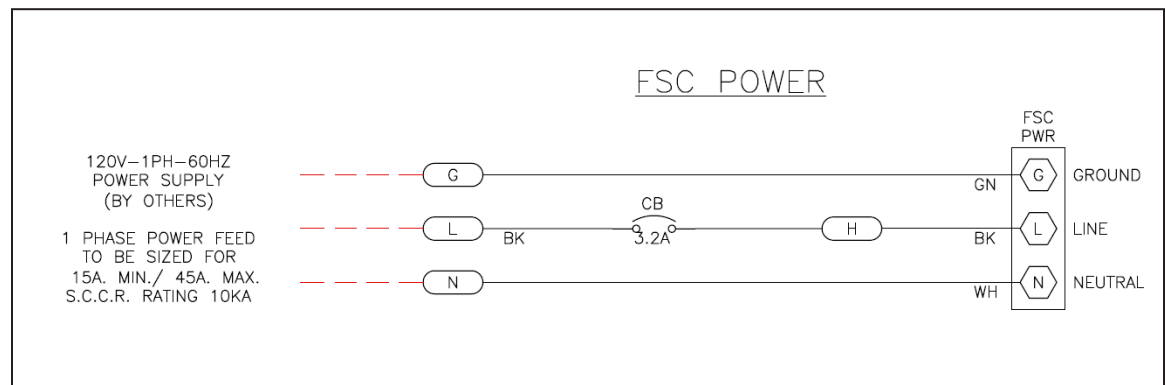
## PREFERRED PS-LDS INSTALLATION

### Installation Notes:

1. The PS-LDS is usually connected to 1/2" rigid conduit. A conduit clamp near the switch assembly will keep it secure.
2. If Seal-tite flexible conduit is to be used, install a 1/2" pipe nipple and full coupling. A conduit clamp should be installed over the pipe nipple to secure the switch in place.



## LEAK SENTRY WIRING

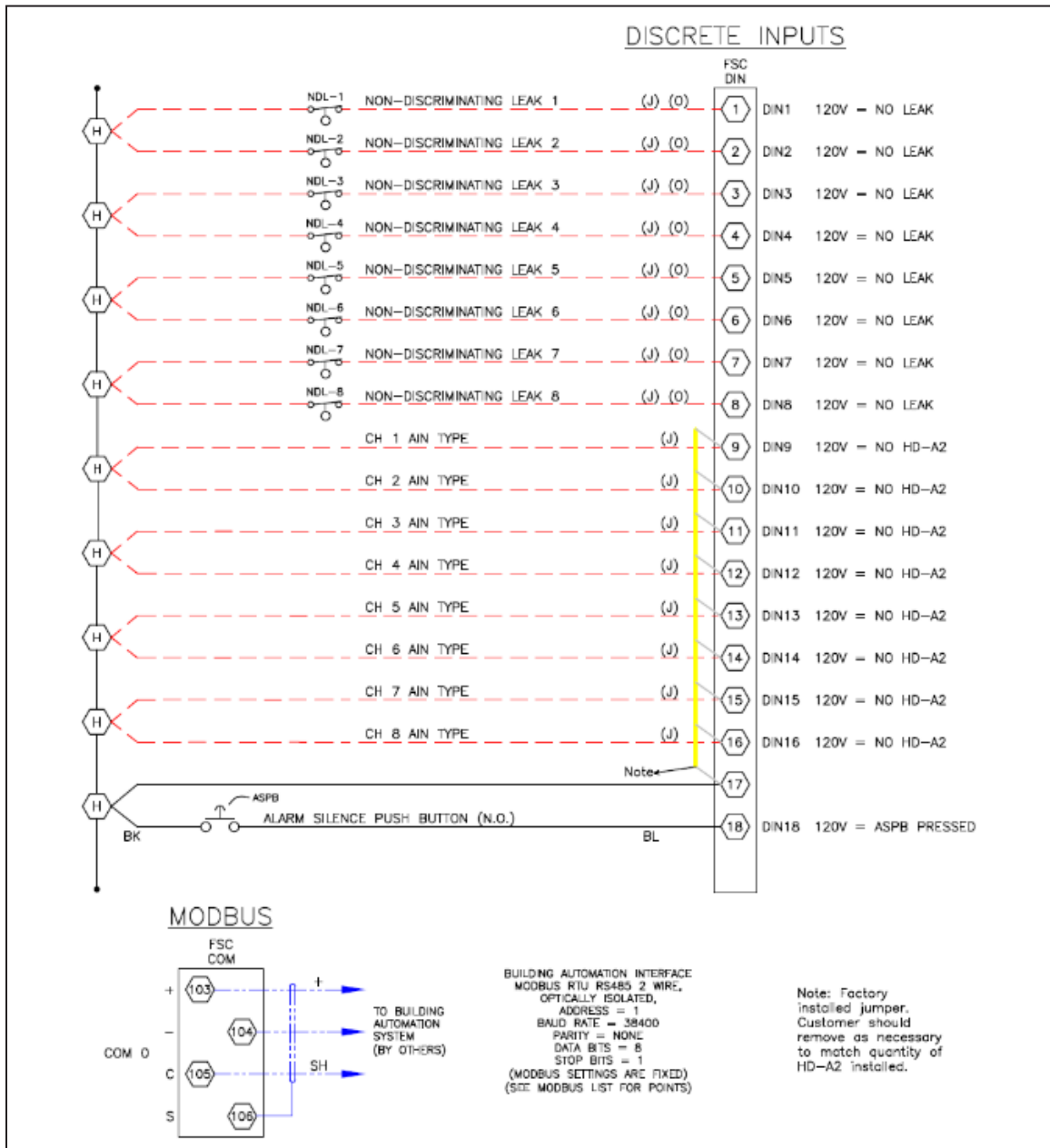


### Wiring Notes:

1. Do not put power to the Leak Sentry until all sensor wiring is connected and checked.



**FIELD WIRING**



**High Voltage Wiring Notes:**

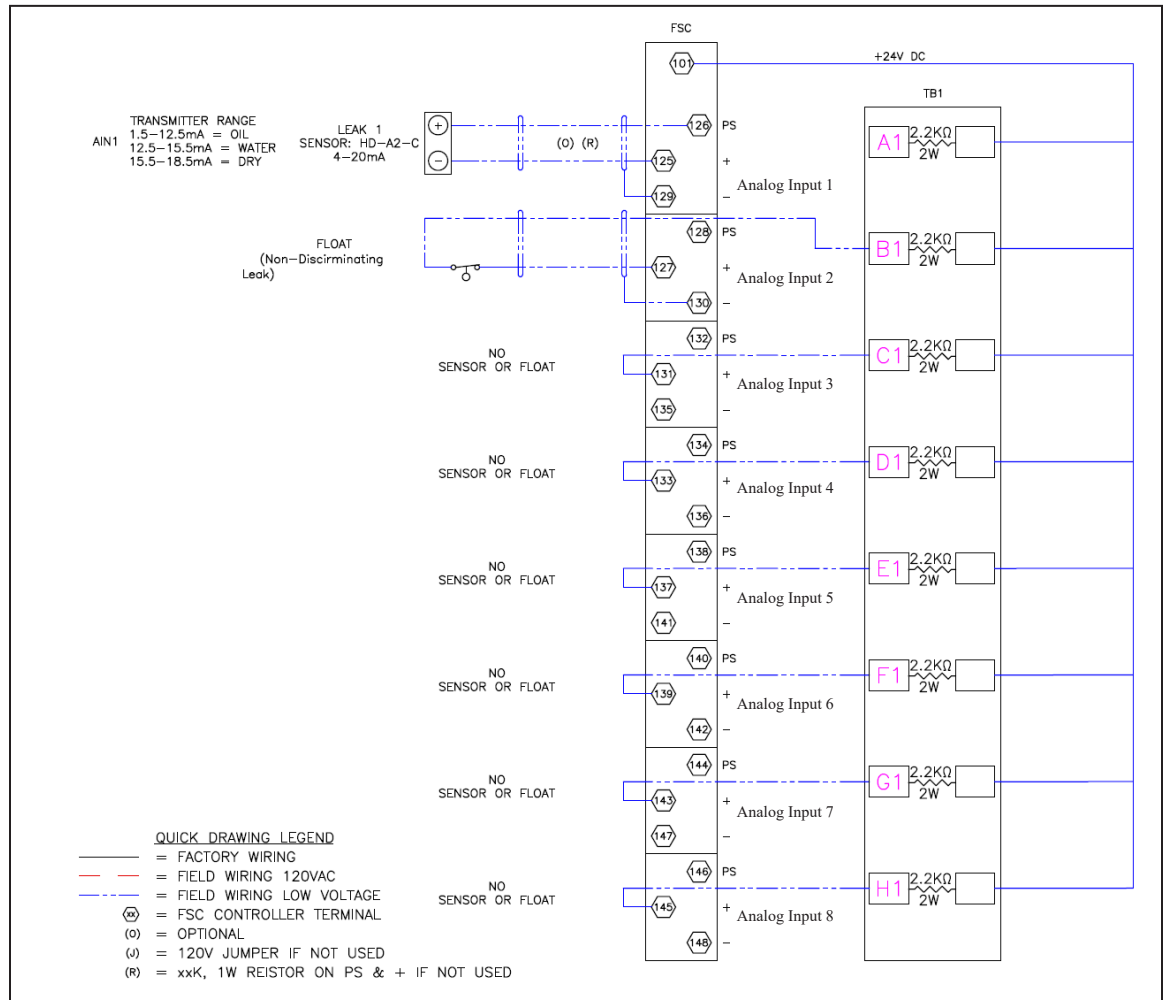
1. Each leak detector channel (1 through 8) can be triggered by a digital input or analog input, determined by the state of digital inputs 9 through 16. For example, if digital input 9 is hot (120 VAC), leak 1 is triggered by loss of voltage on digital input 1. If digital input 9 is cold (0 VAC) leak 1 is triggered by analog input 1.
2. Digital inputs 9 through 16 are jumpered to 120 VAC in the Preferred factory. If a low voltage switch or analog input (Preferred HD-A2-C) is going to be used for a particular input, remove power from the corresponding digital input (9 through 16)



High Voltage Wiring Notes continued:

3. 120 VAC power on digital inputs 1 through 8 proves no leak on that input. Loss of voltage indicates a leak. Preferred leak detectors, including models RBS, PS-LDS, and PLS, are configured this way out of the box.
4. The action of many third party leak detectors can be reversed by removing the snap ring holding in the float, and reversing the direction of the float.
5. Ensure third party float switches are rated for 120 VAC. If they are not 120 VAC rated, wire them to an analog input as shown below.

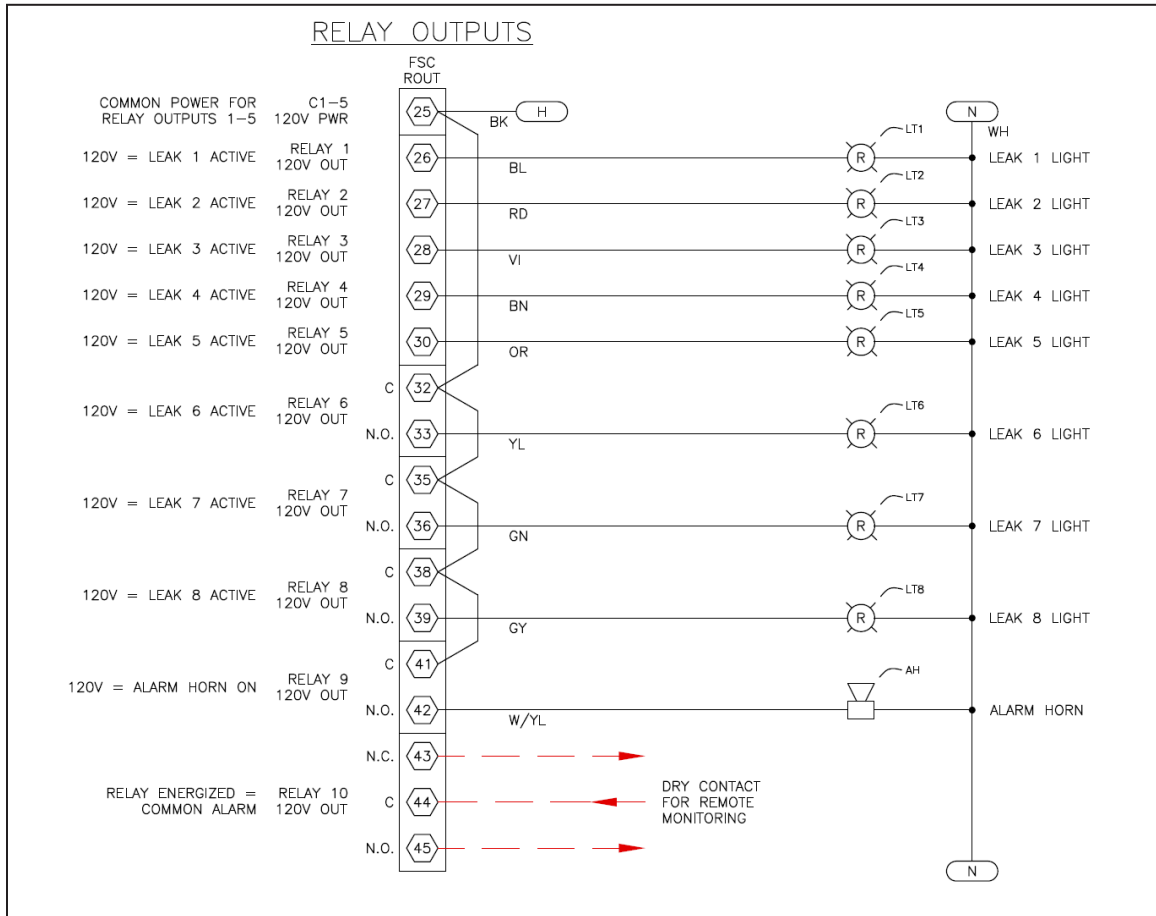
Low Voltage Wiring



Low Voltage Wiring Notes:

1. The schematic above shows example wiring for a Preferred HD-A2-C discriminating leak detector on analog input 1 and a low voltage float switch on analog input 2.
2. Analog inputs are only active if power is removed from the corresponding digital input (terminal 9 for analog input 1, terminal 10 for analog input 2, etc)
3. If a project uses a mix of HD-A2-C and float type leak detectors, wire both as shown above because low voltage switch wires and HD-A2-C 4-20 mA circuits can be run in the same conduit. 120 VAC switch contacts and 4-20 mA DC wires **cannot** be run in the same conduit.

## Output Wiring

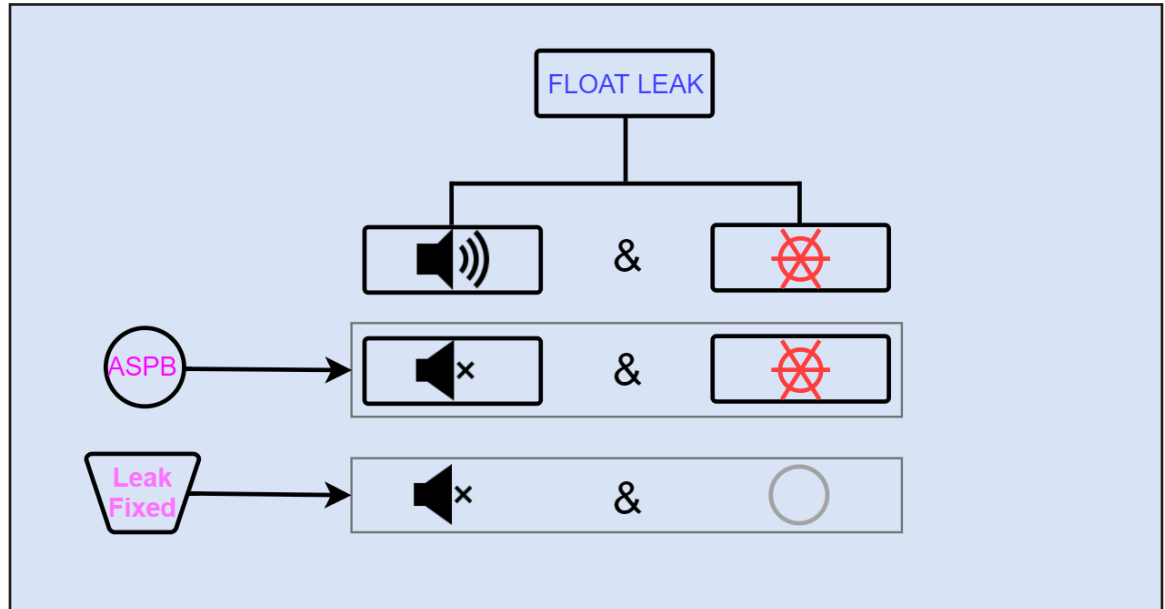


### Output Wiring Notes:

1. The only field wiring on the above schematic is relay output 10, usually used to power a remote alarm. Relay 10 is a dry contact (no voltage on the common) It is rated for 120 VAC, 1.5 amps.
2. Do not apply DC voltage to any of the relay outputs shown above.

## INTERPRETING ALARMS AND LIGHTS

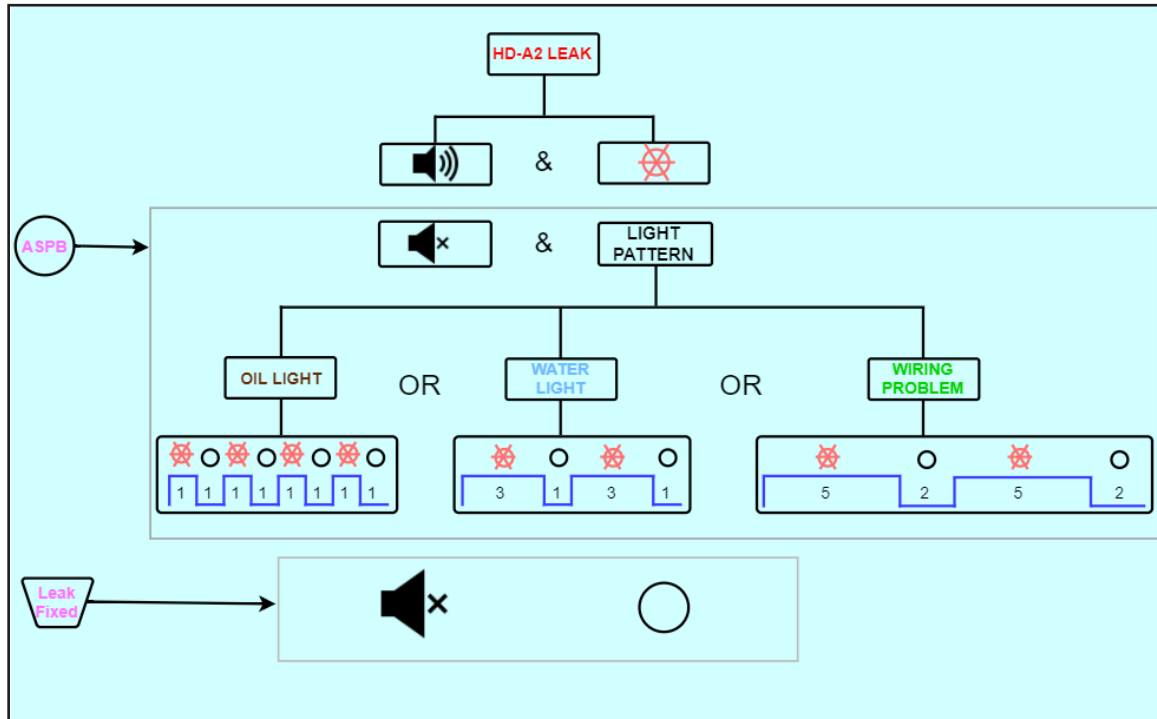
### Float Switch Leak Detected



#### Float Switch Leak Description:

- If a float switch detects a leak the alarm horn and appropriate leak light come ON.
- Pressing the Alarm Silence Push Button (ASPB) de-energizes the horn.
- If the leak is still detected, the appropriate leak light will remain ON.
- If a leak is detected and then cleared, the appropriate leak light will remain on until the ASPB is pressed. The sensor for that leak detector channel should be inspected.

Discriminating Leak Detected (by HD-A2-C sensor)

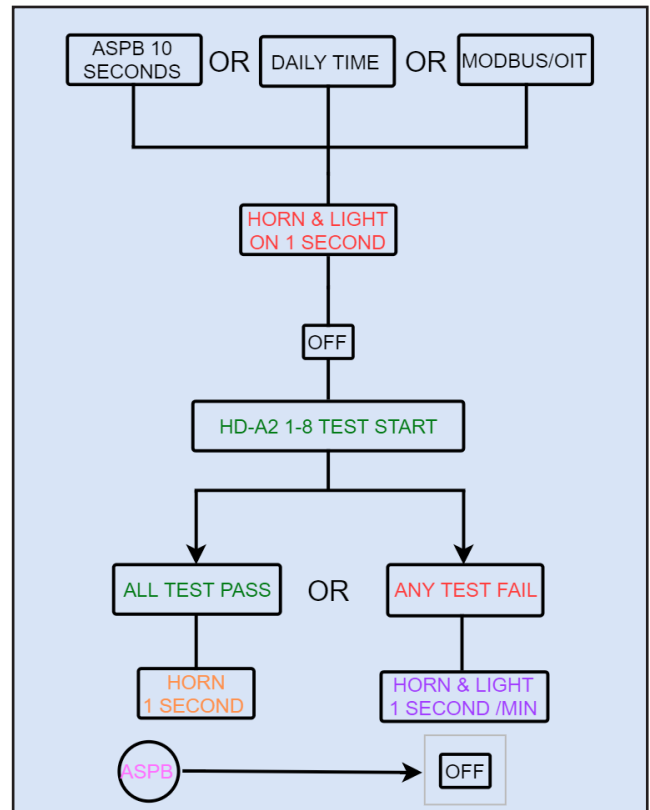


- When the HD-A2-C detects a leak, the alarm horn and the appropriate light come ON simultaneously and remain steady.
- The horn may be silenced by pressing the ASPB but if the leak is not cleared the light will blink in a repetitive pattern that indicates the type of leak that has occurred.
- If an oil leak is detected, the appropriate light will be ON for 1 second, OFF for 1 second and repeat this pattern till the leak is cleared.
- If a water leak is detected, the appropriate light will be ON for 3 seconds and OFF for 1 second and repeat this pattern till the leak is cleared.
- If a wiring problem is detected, the appropriate light will be ON for 5 seconds and OFF for 2 seconds until the problem is fixed.
- If a leak is detected and then cleared, the appropriate leak light will remain on until the ASPB is pressed. The sensor for that leak detector channel should be inspected.

## HD-A2-C Functionality Test

The Preferred HD-A2-C discriminating leak detectors performs a self-test every time power to the sensors is interrupted and restored. This will happen automatically every night at midnight. A self-test can be manually initiated by pushing the ASPB button for at least ten seconds or remotely via Modbus command.

- During a self-test, the horn and light come ON for a second and go OFF simultaneously when the self-test is initiated.
- Channels that have the DIN jumpered to indicate the absence of an HD-A2-C are skipped during the test.
- Any channel that passes the test will show nothing to indicate it passed. However, if all channels pass the test the alarm horn and light will beep for a second.
- If there is a leak and a test is initiated the channel with the leak will report a test aborted.
- If any leak sensor channel fails the test the horn and light will come ON simultaneously for a second and will repeat this every minute. (1 sec ON per 1 minute). Pressing the ASPB de-energizes the horn.



**Trouble-shooting**

SYMPTOM	TROUBLESHOOTING PROCEDURE	RESULT
No Light but Horn Sounds.	1. Press ASPB to turn alarm off. Does the Horn go off?	(Yes) ASPB works proceed to step 2.  (No) Alarm Horn is faulty proceed to step 3
	2. Manually initiate HD-A2-C test. Does the light come on for all the channels that have HD-A2-Cs connected to them? Wait for HD-A2-C functionality test to be completed before going to the next step.	(Yes) All light bulbs work properly proceed to step 3.  (No) Light bulb is probably burnt out proceed to step 4
	3. Check the wiring for the Alarm Horn to make sure it is correct. Is there is a problem?	(Yes) proceed to step 5  (No) go to step 7
	4. For the channel(s) that did not show light, replace the bulb(s) with a working bulb and initiate the HD-A2 test again. Do all the channels with HD-A2-Cs now show light to indicate the test has begun?	(Yes) Problem Solved.  (No) Probably wiring problem at relay proceed to step 6
	5. Fix the wiring problem. Try step 2 again does the Horn stop sounding?	(Yes) Problem Solved. Horn fixed.  (No) Disconnect Horn and call Preferred Utilities for help.

SYMPTOM	TROUBLESHOOTING PROCEDURE	RESULT
No Light but Horn Sounds. (continued)	6. Check the wiring for the Light to make sure it is in good state. Is there a problem with the wiring?	(Yes) Fix the wiring problem. Proceed to step 8  (No) Disconnect the lamps and call Preferred Utilities for help.
	7. Call Preferred Utilities for help.	
	8. Perform step 2. Is the problem solved now?	(Yes) Problem solved. Light wiring fixed.  (No) Disconnect light and call Preferred Utilities for help.
Light is ON but no Alarm sounds	1. The ASPB might have been pushed but leak not fixed. Manually initiate the HD-A2-C self-test. Does the Horn sound to indicate the test has started?	(Yes) Horn works but still proceed to step 2.  (No) Alarm Horn is faulty. Proceed to step 4.
	2. If an HD-A2-C is connected to the channel where the light is coming from, is the lamp blinking in a pattern to indicate a leak?	(Yes) There is a leak of some sort, check the Horn and Light label inside the LS-8C container.  (No) Do you have a float switch instead? Proceed to step 3.
	3. Check the location where the float is located for the presence of a leak. Is there a leak?	(Yes) Clear the leak.  (No) Proceed to step 4.
	4. Check the Alarm Horn connections. Is there a wiring problem and can it be fixed?	(Yes) Proceed to step 5.  (No) Disconnect the Alarm then call Preferred Utilities
	5. After the wiring problem has been fixed. Has the light gone off?	(Yes) Good.  (No) Disconnect the Alarm Horn then call Preferred Utilities



SYMPTOM	TROUBLESHOOTING PROCEDURE	RESULT
Alarm Silence Push Button not working.	1. Press the ASPB for 10 secs and wait for Horn and Light to beep indicating the begin of HD-A2-C self-test. Do the Horn and Alarm come ON?	(Yes) Seems to be working. Call Preferred if the problem persists.  (No) ASPB wiring problem. Proceed to Step 2
	2. Check the ASPB wiring to make sure there is no problem. Is there a problem?	(Yes) ASPB wiring problem. Proceed to Step 3.  (No) Call Preferred Utilities
	3. Fix the wiring problem. Try step 1 again. Do the Horn and Alarm come ON?	(Yes) Problem solved.  (No) Call Preferred Utilities
HD-A2-C self-test is conducted occasionally without being initiated.	1. Check the ASPB to make sure it is not in the ON position. Is it?	(Yes) ASPB faulty. Proceed to step 2.  (No) Proceed to step 3
	2. Replace the ASPB. Test the ASPB by pressing it repeatedly and holding it down for some seconds to make sure it does not get stuck again. Does it?	(Yes) Repeat step 2 and make sure the ASPB is of good quality.  (No) Problem Solved.
	3. Check via Modbus the default time set for automatic HD-A2-C self-test. Does the default time seem to match the period the test is conducted?	(Yes) Change time to the time preferred.  (No) Call Preferred Utilities for help.

## MODBUS ADDRESS LIST

Factory Default Settings:

Protocol: RTU

Address: 1

Baud: 38400

Parity: None ('No Parity' requires 2 Stop bits')

Register Format: Signed Integers, -32767 to +32767

Modbus Commands: Read/Write Holding Registers. Read/Write Discrete Coils.

Maximum of 256 Coils and 64 Registers

DESCRIPTION	REGISTER ADDRESS	NOTES	RANGE		UNITS
			0=4mA	10000=20mA	
CH1 AIN VALUE	40001	Note (i)	4	20	mA
CH2 AIN VALUE	40004	Note (i)	4	20	mA
CH3 AIN VALUE	40005	Note (i)	4	20	mA
CH4 AIN VALUE	40008	Note (i)	4	20	mA
CH5 AIN VALUE	40009	Note (i)	4	20	mA
CH6 AIN VALUE	40010	Note (i)	4	20	mA
CH7 AIN VALUE	40011	Note (i)	4	20	mA
CH8 AIN VALUE	40012	Note (i) Next page	4	20	mA
HD-A2 OIT TEST START MIN	40021	Gives the capability to set the HD-A2 functionality test Mi-nute from the OIT UI	0	59	---
HD-A2 OIT TEST START HOUR	40022	Gives the capability to set the HD-A2 functionality test Hour from the OIT UI	0	23	---
FSC Sec	409081	Capability to read FSC's Sec	0	59	---
FSC Min	409082	Capability to read FSC's Min	0	59	---
FSC Hour	409083	Capability to read FSC's Hour	0	23	---
FSC Day of Week	409084	Capability to read FSC's day of the week	1	7	---
FSC Day Of Month	409085	Capability to read FSC's Day	1	31	---
FSC Month	409086	Capability to read FSC's Month	1	12	---
FSC Year	409087	Capability to read FSC's Year	1	99	---
CH1 HDA2 Status	40013	Note (ii)	---	---	---
CH2 HDA2 Status	40014	Note (ii)	---	---	---
CH3 HDA2 Status	40015	Note (ii)	---	---	---
CH4 HDA2 Status	40016	Note (ii)	---	---	---
CH5 HDA2 Status	40017	Note (ii)	---	---	---
CH6 HDA2 Status	40018	Note (ii)	---	---	---
CH7 HDA2 Status	40019	Note (ii)	---	---	---
CH8 HDA2 Status	40020	Note (ii) Next Page	---	---	---

Notes

- (i). 1.5-12.5 mA = Oil  
12.5-15.5 mA = Water  
15.5-18.5 mA = Dry
- (ii). 1= Open Wiring; 2= Oil Detected; 3= Water Detected; 4= Dry; 5= High Ambient Light;  
6= Shorted Wiring; 7= Test in Progress; 8= Test Passed; 9= Test Failure; 10= Test Aborted

DESCRIPTION	COIL ADDRESS	0=	1=
CH1 120V Float Switch	00001	0= 120 V not Connected	1= 120 V Connected
CH2 120V Float Switch	00004	0= 120 V not Connected	1= 120 V Connected
CH3 120V Float Switch	00005	0= 120 V not Connected	1= 120 V Connected
CH4 120V Float Switch	00008	0= 120 V not Connected	1= 120 V Connected
CH5 120V Float Switch	00009	0= 120 V not Connected	1= 120 V Connected
CH6 120V Float Switch	00010	0= 120 V not Connected	1= 120 V Connected
CH7 120V Float Switch	00011	0= 120 V not Connected	1= 120 V Connected
CH8 120V Float Switch	00012	0= 120 V not Connected	1= 120 V Connected
CH1 HD-A2 Enabler	00013	0= Open HD-A2 may be connected	1= 120V Jumpered No HD-A2
CH2 HD-A2 Enabler	00014	0= Open HD-A2 may be connected	1= 120V Jumpered No HD-A2
CH3 HD-A2 Enabler	00015	0= Open HD-A2 may be connected	1= 120V Jumpered No HD-A2
CH4 HD-A2 Enabler	00016	0= Open HD-A2 may be connected	1= 120V Jumpered No HD-A2
CH5 HD-A2 Enabler	00017	0= Open HD-A2 may be connected	1= 120V Jumpered No HD-A2
CH6 HD-A2 Enabler	00018	0= Open HD-A2 may be connected	1= 120V Jumpered No HD-A2
CH7 HD-A2 Enabler	00019	0= Open HD-A2 may be connected	1= 120V Jumpered No HD-A2
CH8 HD-A2 Enabler	00020	0= Open HD-A2 may be connected	1= 120V Jumpered No HD-A2

DESCRIPTION	COIL ADDRESS	0=	1=
CH1 Low Voltage Float Leak	00115	0= No leak detected for 24VDC float	1= Leak detected for 24 VDC float
CH2 Low Voltage Float Leak	00116	0= No leak detected for 24 VDC float	1= Leak detected for 24 VDC float
CH3 Low Voltage Float Leak	00117	0= No leak detected for 24 VDC float	1= Leak detected for 24 VDC float
CH4 Low Voltage Float Leak	00118	0= No leak detected for 24 VDC float	1= Leak detected for 24 VDC float
CH5 Low Voltage Float Leak	00119	0= No leak detected for 24 VDC float	1= Leak detected for 24 VDC float
CH6 Low Voltage Float Leak	00127	0= No leak detected for 24 VDC float	1= Leak detected for 24 VDC float
CH7 Low Voltage Float Leak	00128	0= No leak detected for 24 VDC float	1= Leak detected for 24 VDC float
CH8 Low Voltage Float Leak	00129	0= No leak detected for 24 VDC float	1= Leak detected for 24 VDC float
Scheduler's Test Pulse	00130	0= No Pulse sent	1= Scheduler sends pulse to enable Daily test
OIT Test Start PB	00131	0= OIT Test push button NOT pressed	1= OIT Test push button pressed
Daily Test Enabler	00132	0= No Signal No Daily Alarm.	1= Signal sent to Scheduler to send Test Pulse. 1 by default

DESCRIPTION	COIL ADDRESS	0=	1=
CH1 Float Leak	00032	0= No Float leak detected	1= Float (120 V or 24 VDC) leak detected
CH2 Float Leak	00033	0= No Float leak detected	1= Float (120 V or 24 VDC) leak detected
CH3 Float Leak	00034	0= No Float leak detected	1= Float (120 V or 24 VDC) leak detected
CH4 Float Leak	00035	0= No Float leak detected	1= Float (120 V or 24 VDC) leak detected
CH5 Float Leak	00036	0= No Float leak detected	1= Float (120 V or 24 VDC) leak detected
CH6 Float Leak	00037	0= No Float leak detected	1= Float (120 V or 24 VDC) leak detected
CH7 Float Leak	00038	0= No Float leak detected	1= Float (120 V or 24 VDC) leak detected
CH8 Float Leak	00039	0= No Float leak detected	1= Float (120 V or 24 VDC) leak detected
CH1 HDA2 Open Wiring	00041	0= No Open wiring	1= Open Wiring connection
CH1 HDA2 Oil	00042	0= No Oil Leak	1= Oil Leak
CH1 HDA2 H2O	00043	0= No Water Leak	1= Water Leak
CH1 HDA2 High Ambient Light	00044	0= Surrounding Light is good	1= Surrounding light is too much
CH1 HDA2 Dry	00045	0= There is a problem (Leak or Wiring)	1= No Oil or Water Leak
CH1 HDA2 Short	00046	0= No Shorted wiring	1= Shorted Wiring connection
CH1 HDA2 Test Pass	00047	0= Clear	1= HD-A2 Functionality Test passed
CH1 HDA2 Test Fail	00048	0= Clear	1= HD-A2 Functionality Test Failed

DESCRIPTION	COIL ADDRESS	0=	1=
CH2 HDA2 Open Wiring	00049	0= No Open wiring	1= Open Wiring connection
CH2 HDA2 Oil	00050	0= No Oil Leak	1= Oil Leak
CH2 HDA2 H2O	00051	0= No Water Leak	1= Water Leak
CH2 HDA2 High Ambient Light	00052	0= Surrounding Light is good	1= Surrounding light is too much
CH2 HDA2 Dry	00053	0= There is a problem (Leak or Wiring)	1= No Oil or Water Leak
CH2 HDA2 Short	00054	0= No Shorted wiring	1= Shorted Wiring connection
CH2 HDA2 Test Pass	00055	0= Clear	1= HD-A2 Functionality Test passed
CH2 HDA2 Test Fail	00056	0= Clear	1= HD-A2 Functionality Test Failed
CH3 HDA2 Open Wiring	00057	0= No Open wiring	1= Open Wiring connection
CH3 HDA2 Oil	00058	0= No Oil Leak	1= Oil Leak
CH3 HDA2 H2O	00059	0= No Water Leak	1= Water Leak
CH3 HDA2 High Ambient Light	00060	0= Surrounding Light is good	1= Surrounding light is too much
CH3 HDA2 Dry	00061	0= There is a problem (Leak or Wiring)	1= No Oil or Water Leak
CH3 HDA2 Short	00062	0= No Shorted wiring	1= Shorted Wiring connection
CH3 HDA2 Test Pass	00063	0= Clear	1= HD-A2 Functionality Test passed

DESCRIPTION	COIL ADDRESS	0=	1=
CH3 HDA2 Test Fail	00064	0= Clear	1= HD-A2 Functionality Test Failed
CH4 HDA2 Open Wiring	00065	0= No Open wiring	1= Open Wiring connection
CH4 HDA2 Oil	00066	0= No Oil Leak	1= Oil Leak
CH4 HDA2 H2O	00067	0= No Water Leak	1= Water Leak
CH4 HDA2 High Ambient Light	00068	0= Surrounding Light is good	1= Surrounding light is too much
CH4 HDA2 Dry	00069	0= There is a problem (Leak or Wiring)	1= No Oil or Water Leak
CH4 HDA2 Short	00070	0= No Shorted wiring	1= Shorted Wiring connection
CH4 HDA2 Test Pass	00071	0= Clear	1= HD-A2 Functionality Test passed
CH4 HDA2 Test Fail	00072	0= Clear	1= HD-A2 Functionality Test Failed
CH5 HDA2 Open Wiring	00073	0= No Open wiring	1= Open Wiring connection
CH5 HDA2 Oil	00074	0= No Oil Leak	1= Oil Leak
CH5 HDA2 H2O	00075	0= No Water Leak	1= Water Leak
CH5 HDA2 High Ambient Light	00076	0= Surrounding Light is good	1= Surrounding light is too much
CH5 HDA2 Dry	00077	0= There is a problem (Leak or Wiring)	1= No Oil or Water Leak
CH5 HDA2 Short	00078	0= No Shorted wiring	1= Shorted Wiring connection



DESCRIPTION	COIL ADDRESS	0=	1=
CH5 HDA2 Test Pass	00079	0= Clear	1= HD-A2 Functionality Test passed
CH5 HDA2 Test Fail	00080	0= Clear	1= HD-A2 Functionality Test Failed
CH6 HDA2 Open Wiring	00081	0= No Open wiring	1= Open Wiring connection
CH6 HDA2 Oil	00082	0= No Oil Leak	1= Oil Leak
CH6 HDA2 H2O	00083	0= No Water Leak	1= Water Leak
CH6 HDA2 High Ambient Light	00084	0= Surrounding Light is good	1= Surrounding light is too much
CH6 HDA2 Dry	00085	0= There is a problem (Leak or Wiring)	1= No Oil or Water Leak
CH6 HDA2 Short	00086	0= No Shorted wiring	1= Shorted Wiring connection
CH6 HDA2 Test Pass	00087	0= Clear	1= HD-A2 Functionality Test passed
CH6 HDA2 Test Fail	00088	0= Clear	1= HD-A2 Functionality Test Failed
CH7 HDA2 Open Wiring	00089	0= No Open wiring	1= Open Wiring connection
CH7 HDA2 Oil	00090	0= No Oil Leak	1= Oil Leak
CH7 HDA2 H2O	00091	0= No Water Leak	1= Water Leak
CH7 HDA2 High Ambient Light	00092	0= Surrounding Light is good	1= Surrounding light is too much
CH7 HDA2 Dry	00093	0= There is a problem (Leak or Wiring)	1= No Oil or Water Leak
CH7 HDA2 Short	00094	0= No Shorted wiring	1= Shorted Wiring connection

DESCRIPTION	COIL ADDRESS	0=	1=
CH7 HDA2 Test Pass	00095	0= Clear	1= HD-A2 Functionality Test passed
CH7 HDA2 Test Fail	00096	0= Clear	1= HD-A2 Functionality Test Failed
CH8 HDA2 Open Wiring	00097	0= No Open wiring	1= Open Wiring connection
CH8 HDA2 Oil	00098	0= No Oil Leak	1= Oil Leak
CH8 HDA2 H2O	00099	0= No Water Leak	1= Water Leak
CH8 HDA2 High Ambient Light	000100	0= Surrounding Light is good	1= Surrounding light is too much
CH8 HDA2 Dry	000101	0= There is a problem (Leak or Wiring)	1= No Oil or Water Leak
CH8 HDA2 Short	000102	0= No Shorted wiring	1= Shorted Wiring connection
CH8 HDA2 Test Pass	000104	0= Clear	1= HD-A2 Functionality Test passed
CH8 HDA2 Test Fail	000105	0= Clear	1= HD-A2 Functionality Test Failed
CH4 HDA2 Test Complete	000106	0= Test in Progress	1= HD-A2 Functionality Test Completed
CH3 HDA2 Test Complete	000107	0= Test in Progress	1= HD-A2 Functionality Test Completed
CH2 HDA2 Test Complete	000108	0= Test in Progress	1= HD-A2 Functionality Test Completed
CH1 HDA2 Test Complete	000109	0= Test in Progress	1= HD-A2 Functionality Test Completed

<b>DESCRIPTION</b>	<b>COIL ADDRESS</b>	<b>0=</b>	<b>1=</b>
CH8 HDA2 Test Complete	000110	0= Test in Progress	1= HD-A2 Functionality Test Completed
CH7 HDA2 Test Complete	000111	0= Test in Progress	1= HD-A2 Functionality Test Completed
CH6 HDA2 Test Complete	000112	0= Test in Progress	1= HD-A2 Functionality Test Completed
CH5 HDA2 Test Complete	000113	0= Test in Progress	1= HD-A2 Functionality Test Completed

<b>DESCRIPTION</b>	<b>COIL ADDRESS</b>	<b>0=</b>	<b>1=</b>
Alarm Silence Push Button	00021	0= No silence signal sent. If value =1 for > 10 seconds HD-A2 Test Begins	1= Alarm silence signal is sent
CH1 Light	00022	0= Light is OFF	1= Light is ON
CH2 Light	00023	0= Light is OFF	1= Light is ON
CH3 Light	00024	0= Light is OFF	1= Light is ON
CH4 Light	00025	0= Light is OFF	1= Light is ON
CH5 Light	00026	0= Light is OFF	1= Light is ON
CH6 Light	00031	0= Light is OFF	1= Light is ON
CH7 Light	00028	0= Light is OFF	1= Light is ON
CH8 Light	00029	0= Light is OFF	1= Light is ON
Common Alarm	00002	0=There is no problem	1=There is a problem. Relay 10 is energized
Alarm Horn	00030	0= Light is OFF	1= Light is ON
ASPB remote Access	00040	0=ASPB not energized	1= Energizes Alarm Silence Push Button