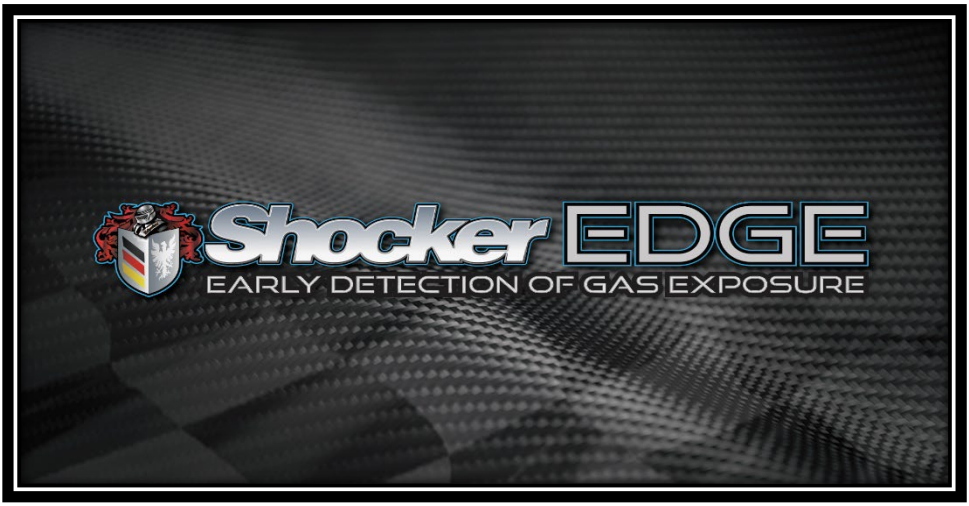
INSTALLER: This manual must remain in the unit for owner/operator.



OWNERS MANUAL

Headwind Solutions
1.844.304.7277
www.headwindsolutions.ca

CONGRATULATIONS
ON THE PURCHASE OF YOUR

What is ShockerEDGE?

ShockerEDGE is a patented advanced technology that uses a Molecular Property Spectrometer (MPS) flammable gas sensor in conjunction with our own ShockerEDGE engine control system. The ShockerEDGE controller interprets the data from the MPS sensor, which is mounted in the engine's clean air intake stream and transmits the information to the visual display. The engine control parameters are preset to warn the operator of anything above 0% Lower Explosive Limit (LEL) and to turn the engine off at 7.5% LEL. This is accomplished by connecting the ShockerEDGE controller to the engine control system (ECM or fuel shut-off solenoid). When the upper LEL is reached, the ShockerEDGE controller turns off the power to the ECM or fuel control solenoid and stops the supply of fuel to the engine. The engine *cannot* be restarted while hydrocarbons are still present inside the engine's air intake system. This will occur *before* the diesel engine ingests sufficient unburnt hydrocarbons to sustain an engine runaway situation or cause a gasoline engine to backfire and stop ignition hazards on hot surfaces, IE: exhaust manifolds, catalytic convertors, spark generating devices. Shocker EDGE detects airborne hydrocarbons. *It does NOT detect engine component failure*. Shocker EDGE is raising site safety to new levels that have never been obtainable before, by monitoring the atmosphere while the engine is running.

WHY Choose ShockerEDGE

EDGE is the only product on the market that displays real-time gas monitoring, and ensures you are truly protected.

The Display

Referred to as

DISPLAY

and within the display are multiple screens. Ex: details, event log, graph, etc.

Information is shown in real-time on the display located in the operator's compartment.

Display features:

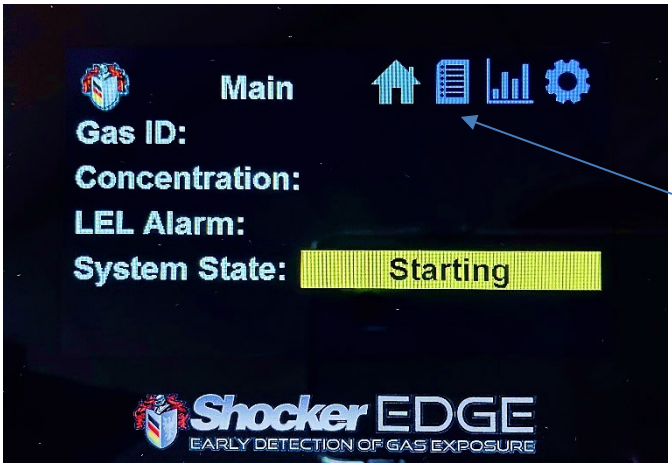
- **Gas Identification**
- **LEL Concentration**
- **LEL Alarm Status – Green, yellow, red**
- **System State – Monitoring, fault, check events, etc.**
- **Ambient humidity, temperature and pressure**
- **Event Log – Incidents & testing, graphs**
- **System Status – 37 system self-diagnostic events**
- **Details Screen – Set points, time, date, screen brightness, time out, etc.**

The display will:

- **Chirp at anything above 0% LEL warning level**
- **Constant audible buzz at 7.5 LEL shutdown**

Auxiliary PASS, warning lamps and audible alarms can also be connected to the ShockerEDGE system.

SYSTEM STARTUP MUST BE DONE IN A CLEAN AIR ENVIROMENT WITH 0% LEL AND AMBIENT TEMP BETWEEN -40°c/-40°f TO 75°c/167°f



Touch icon to clear starting alarm after monitoring is displayed.

IMPORTANT WARNING: System startup time is approximately 20-60 seconds and you are NOT protected until the display system reads "MONITORING".

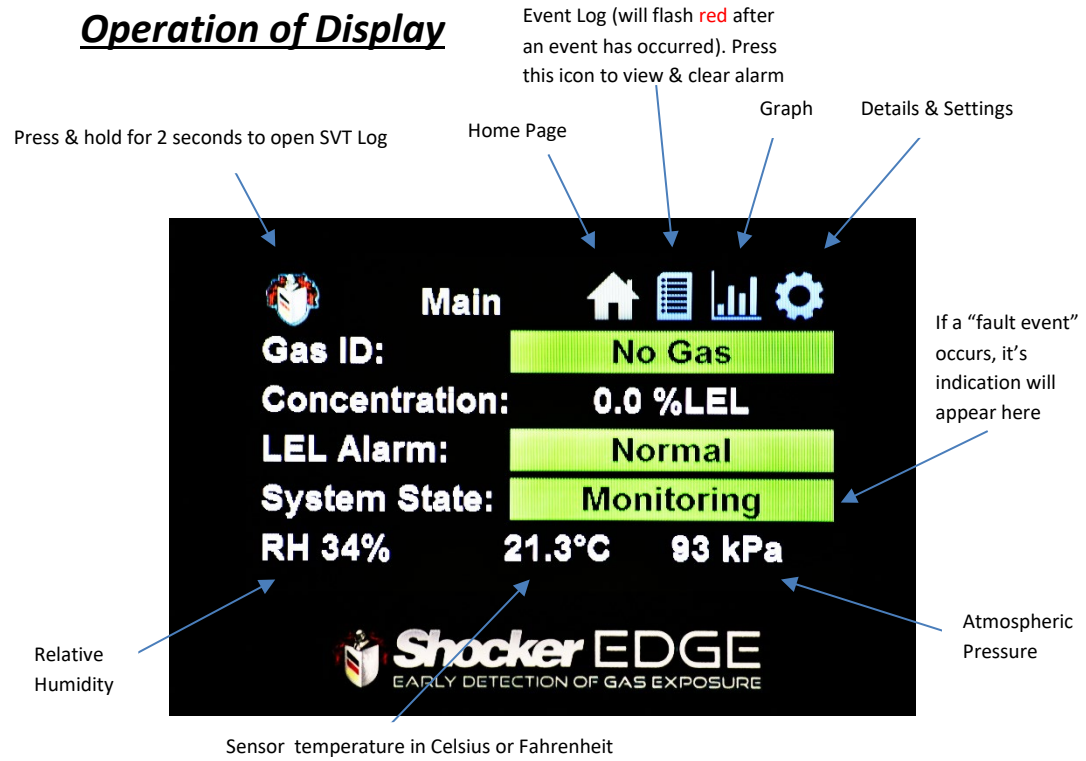
System will not calibrate properly if hydrocarbons are detected on startup.

Possible causes:

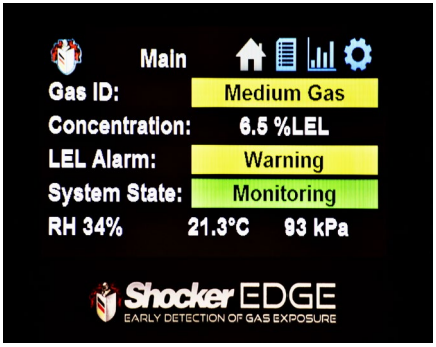
-Engine flooded
-Ether in the air intake
-Contaminated filter housing/piping
-Oiled type air filter used
-Airborne Hydrocarbons
-Contaminated air filter(s)

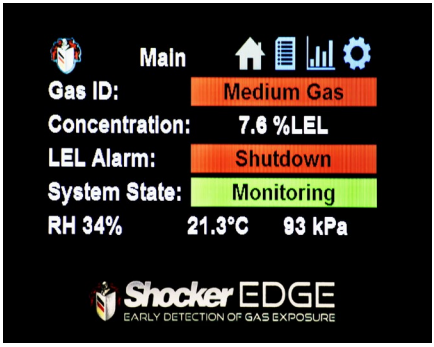
CALL 1-844-304-7277 FOR MORE ASSISTANCE

Operation of Display



Examples of "Warning" and "Shutdown" Screen

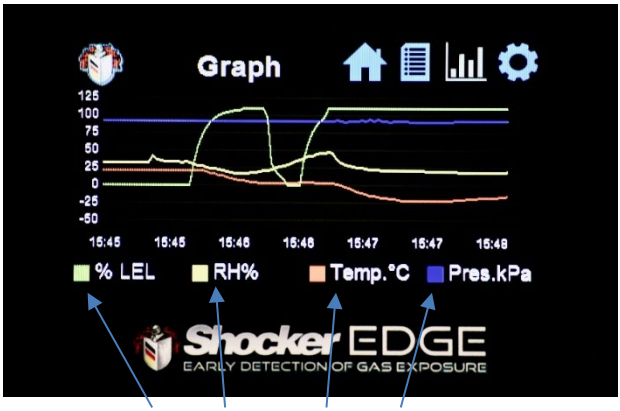




Normal

Warning

Shutdown



Press one of the four icons to remove or add a data line

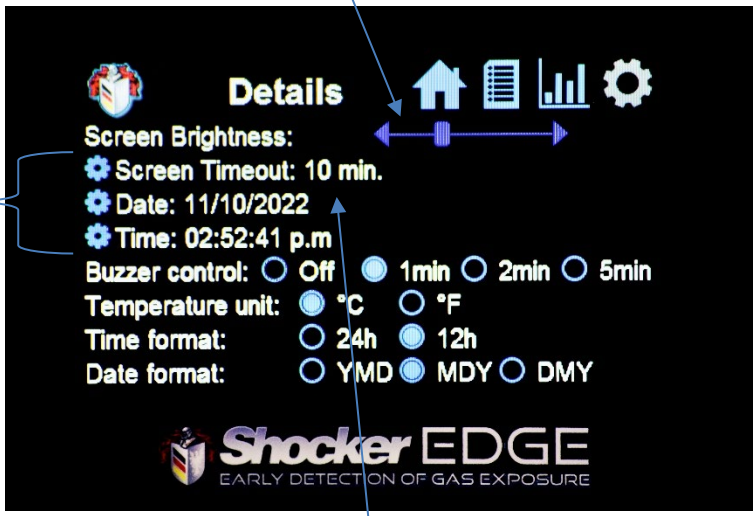
Example of "Fault Event" Screen

Examples of "fault" events

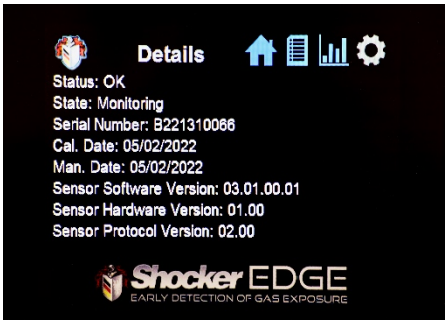
Details Screen

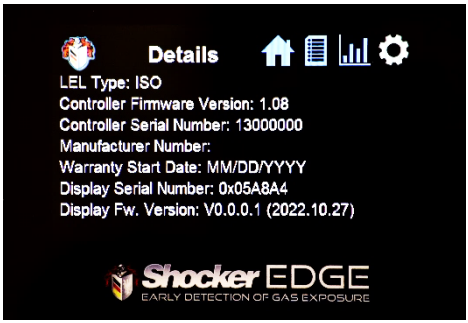
Press each gear symbol to edit: Screen Timeout, Date, and Time (follow exact layout when entering information)

Screen brightness indicator



Screen Timeout Function - IMPORTANT: The screen will shutoff following the amount of time selected. The screen will illuminate in event of alarm or system change, and shutoff after selected screen timeout has passed. When using this function, it is the ***operator's responsibility*** to check system state by tapping on the display to illuminate.





Back up Battery

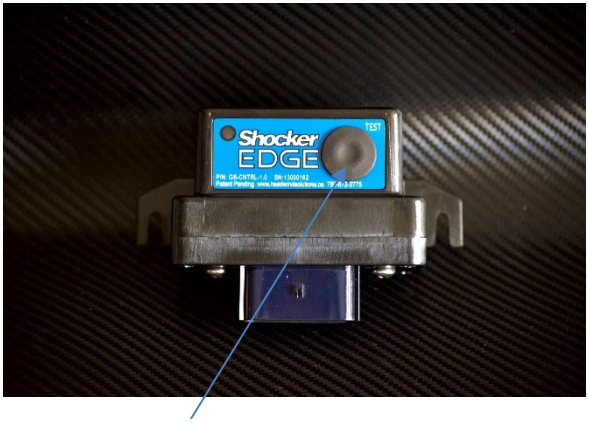
The display is equipped with a 2032 button battery, this battery should be replaced every 4 years. Please send display to Headwind Solutions for replacement.

DOES THIS SYSTEM REQUIRE MAINTENANCE OR TESTING?

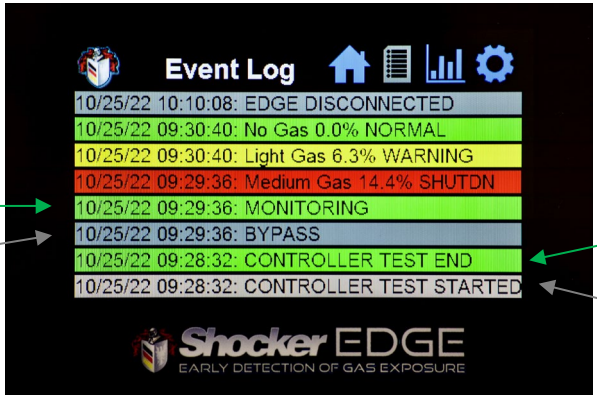
YES! TEST YOUR CONTROLLER WEEKLY AND COMPLETE SVT EVERY 90 DAYS MINIMUM!

Testing the Controller

With the engine running, press and release the "test" button. The engine will shut down, the display will alarm, and log the event. Make sure EDGE system works as intended and trips all functions that are connected.



1) Press and release the button to test the functionality of the electronics.
2) Press and hold the test button for 7 seconds to enable 1 minute bypass mode.



Monitoring

BYPASS

Controller test ended

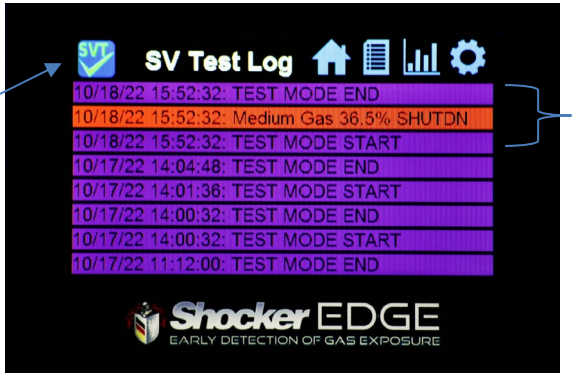
Controller test started

Sensor Verification Test **(SVT)**

PPE gloves and safety glasses required

1. **Begin test on a *cold non-running engine* in a clean air environment**
2. **Press and hold the Shocker emblem for 2 seconds to open the SVT Log**
3. **Press and hold SVT icon for 2 seconds to put the display into test mode (will time out in 3-minutes)**
4. **Remove the blue SV port cap on sensor housing**
5. **Install the nozzle on SVS can**
6. **Place nozzle from SVS can against filter element on test port**
7. **Give one burst from the SVS can (approximately 1-2 seconds)**
8. **Check SVT log for WARNING or SHUTDOWN events. Wait 10 seconds, if no event shows on the display, repeat Step 7. If no event has shown after a max of 2 attempts, call TECH SUPPORT @ 1.844.304.7277**
9. **Allow for gas to dissipate to 0% LEL or use the *bypass* function. ONLY use the bypass function if the home screen reads an LEL of less then 50% in the intake piping**
10. **Reinstall the blue cap on the sensor housing, finger tight - this is the responsibility of the owner/operator. Improper installation may cause damage to the engine**
11. **Start the engine**

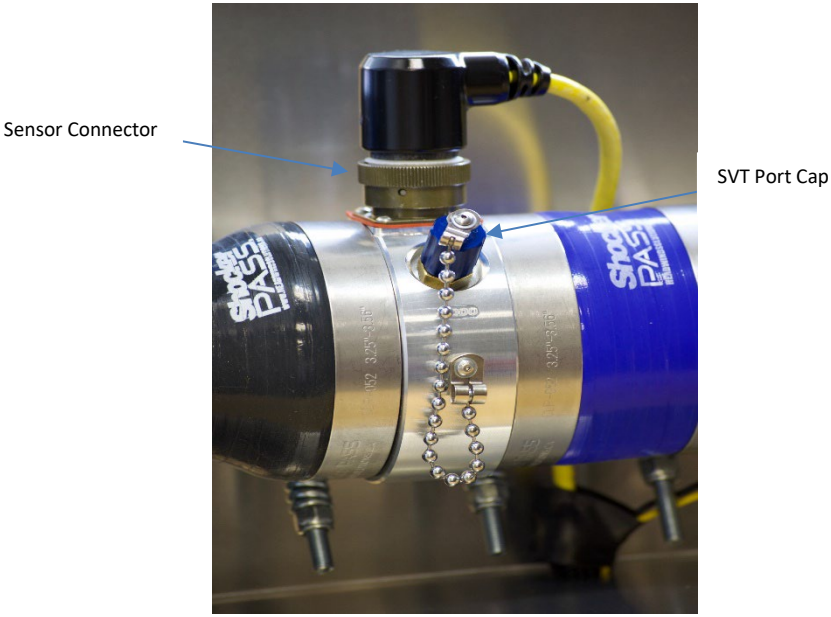
Press and hold for 2 seconds to start test (SVT icon will flash when it's in test mode)



Successful Test

****REMINDER****

YOU ARE NOT PROTECTED ONCE YOU ACTIVATE BYPASS MODE



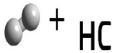
Important Reminders:

- **Inspect wiring every 90 days**
- **Check all connectors for visible damage**
- **Check that the sensor connector is tight, if the sensor connector has been disconnected from the housing, the sensor base gasket must be replaced**
- **Check hose for holes or cracks, and replace as required**
- **Inspect clamps for tightness or damage**
- **If using starting fluid on diesel engines, the MPS sensor must be removed if spraying air filter housing**
- **When cleaning mass airflow sensor – the MPS sensor must be removed**
- **The sensor has temperature protection - shutdown at -58°c/-72°f and 88°c/190°f**

GAS CLASSIFICATION

CLASS 1: Hydrogen
Molecular Weight: 2.0 [g/mol]
Density: 0.09 [kg/m^3]
Number of Carbons: 0

CLASS 2: Hydrogen Mixture
Avg. Mol. Weight: 1-14 [g/mol]
Avg. Density: 0.1-0.6 [kg/m^3]
Number of Carbons: varies

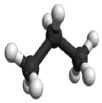


This classification is unique as it guarantees the presence of hydrogen and another flammable gas

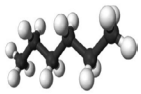
CLASS 3: Methane/Natural Gas
Avg. Mol. Weight: 16 to 19 [g/mol]
Avg. Density: 0.6-0.9 [kg/m^3]
Typical Number of Carbons: 0-2

Gases having molecular properties similar to that of methane may be classified as methane (e.g. ammonia, acetylene)

CLASS 4: Light Gas (or Light Gas Mixture)
Avg. Mol. Weight: 25 to 75 [g/mol]
Avg. Density: 1.2-2.5 [kg/m^3]
Typical Number of Carbons: 1-4
Example Gases: Ethane, Propane, Isopropanol



CLASS 5: Medium Gas (or Medium Gas Mixture)
Avg. Mol. Weight: 50 to 120 [g/mol]
Avg. Density: 1.5-4.0 [kg/m^3]
Typical Number of Carbons: 2-8
Example Gas: Pentane



CLASS 6: Heavy Gas (or Heavy Gas Mixture)
Avg. Mol. Weight: 80+ [g/mol]
Avg. Density: 3.5+ [kg/m^3]
Typical Number of Carbons: 6+
Example Gases: Octane, Toluene, Xylene

GASES

Gas	Formula	Class[5]	Detection Range [%LEL]	% Volume of gas at 100 %LEL (ISO 10156)	MPS Accuracy 0 to 50 %LEL (ISO 10156)	% Volume of gas at 100 %LEL (IEC60079-20-1)	MPS Accuracy 0 to 50 %LEL (IEC60079-20-1)
butane	C_4H_{10}	4	0-100	1.8 %VOL	±5 %LEL	1.4 %VOL	±5 %LEL
ethane	C_2H_6	4	0-100	3.0 %VOL	±5 %LEL	2.4 %VOL	±5 %LEL
hydrogen	H_2	1	0-100	4.0 %VOL	±5 %LEL	4.0 %VOL	±7 %LEL
isobutane	$HC(CH_3)_3$	4	0-100	1.8 %VOL	±5 %LEL	1.3 %VOL	±9 %LEL
isobutylene	C_4H_8	4	0-100	1.8 %VOL	±5 %LEL	1.8 %VOL	±5 %LEL
isopropanol	C_3H_8O	4	0-100	2.0 %VOL	±10 %LEL	2.0 %VOL	+20 %LEL
methane	CH_4	3	0-100	5.0 %VOL	±3 %LEL	4.4 %VOL	±3 %LEL
MEK	C_4H_8O	5	0-100	1.4 %VOL	±5 %LEL	1.5 %VOL	+16 %LEL
pentane	C_5H_{12}	5	0-100	1.5 %VOL	±5 %LEL	1.1 %VOL	±6 %LEL
propane	C_3H_8	4	0-100	2.1 %VOL	±6 %LEL	1.7 %VOL	±8 %LEL
propylene	C_3H_6	4	0-100	2.4 %VOL	±5 %LEL	2.0 %VOL	±5 %LEL
acetone	C_3H_6O	5	0-100	2.5 %VOL	+20 %LEL	2.5 %VOL	+24 %LEL
ethylene	C_2H_4	4	0-100	2.7 %VOL	−12 %LEL	2.3 %VOL	−14 %LEL
heptane	C_7H_{16}	5	0-100	1.1 %VOL	±12 %LEL	0.85 %VOL	±15 %LEL
octane	C_8H_{18}	6	0-100	1.0 %VOL	±12 %LEL	0.8 %VOL	±15 %LEL
styrene	C_8H_8	6	0-100	1.1 %VOL	−20 %LEL	1.0 %VOL	−17 %LEL
toluene	C_7H_8	6	0-100	1.2 %VOL	±12 %LEL	1.0 %VOL	±13 %LEL
xylene	C_8H_{10}	6	0-100	1.1 %VOL	±12 %LEL	1.0 %VOL	±13 %LEL

HWS has confirmed the MPS to detect difluoroethane, and diesel fuel(60*C). The MPS is also confirmed to detect other gases including hexane, ammonia, acetylene, ethanol and methanol. The MPS does not detect Carbon Monoxide (CO) or Hydrogen Sulfide(H2S).

CONTROLLER LED

LED Usage

There is a tri-color LED (red, blue, green) that signifies the operational status of the Shocker Edge controller. LED colors are assigned as follows:

- **RED signals LEL detected**
- **BLUE signals operation of the gas sensor**
- **GREEN signals communications**

Powerup-Normal

1. **The blue LED blinks for ~1 second**
2. **The green LED blinks once after 3 seconds and then blinks every 25 seconds after approximately 2 minutes**
3. **The red LED will flash periodically**

Powerup-Abnormal

1. **The blue LED is constantly blinking means the sensor failed to start, reinitiate start up procedure**
2. **All colors blinking rapidly is an internal software issue, contact Headwind Solutions 1-844-304-7277**

Event Log Messages

Class		Event Log Message	Details
Display	Red	EDGE comms fail	Comm failure controller to display
Alarm	Green	Gas ID/LEL % NORMAL	LEL- Normal - 0-2.49%
	Yellow	Gas ID/LEL %WARNING	LEL- Warning - 2.5-7.49%
	Red	Gas ID/LEL %SHUTDOWN	LEL- Shutdown - < 7.5%
Controller	Red	GAS SENSOR OFF	Powered down-needs restart
Status	Yellow	STARTING	Sensor powering up
	Green	MONITORING	Normal operation
	Red	FAILED	Sensor has failed
	Grey	BYPASS	LEL detection has been bypassed
Sensor	Green	SENSOR NORMAL	Sensor working normally
Status	Blue	SENSOR COMM ERR	CRC-sensor detected a comm error
	Blue	SENSOR COMM ERR	Bad parameter-comms error
	Red	SENSOR FAIL	Failed execution of command
	Red	SENSOR FAIL	Insufficient memory
	Blue	SENSOR COMM ERR	Error in command received
	Blue	SENSOR COMM ERR	Incomplete command received
	Blue	SENSOR AO ERR	Analog out malfunction
	Blue	SENSOR VOLT ERR	Internal voltage out of range
	Blue	SENSOR REF VOLT ERR	Reference voltage out of range
	Blue	SENSOR P,T,H ERR	Pressure/Temp/Humidity out of range
	Red	SENSOR ERR	Malfunction
	Red	SENSOR CPU ERR	Microcontroller error
	Blue	SENSOR INIT ERR	Initialization error
	Blue	SENSOR LEL TOO LOW	Level less then-15% LEL
	Blue	SENSOR CONDENSATION	Condensation detected
	Red	SENSOR ELEM ERR	Element malfunction
	Blue	SENSOR HUMIDITY SURGE	Suspected humidity surge
	Blue	GAS SENSOR STARTING	Will not report LEL for 104 seconds
	Red	GAS DETECTED AT STARTUP	Gas at startup-move to clean air
	Red	GAS SLOW BUILD DET	Detection of a slow buildup of gas
Over	Green	SENSOR CURRENT NORMAL	Current draw normal
Current	Red	SENSOR CURRENT HIGH	Over current-check wiring
Shutdown	Green	CONTROLLER TEST END	Shutdown test ended
	Brown	CONTROLLER TEST START	Start shutdown test

Test Button

The "test" button on the front of the controller can be used for two purposes:

- **Providing a test simulation of a high LEL being detected.**
- **Providing a temporary bypass by putting the controller in a normal state if a high LEL is detected.**

LEL Test

Upon pressing and holding the "test" button, the blue LED will turn on, and if it is released before 5 seconds then the controller will simulate a LEL high gas detection.

LEL Bypass

Upon pressing and holding the "test" button, the LED will turn blue. If it is pressed for greater than 5 sec, the blue LED will start flashing. If the "test" button is released while the LED is flashing blue, the following will occur:

1. **Terminates any LEL high gas detection**
2. **Sets Engine Shutdown pins 1-7 closed**
3. **Opens the Hold Valve pin 5**
4. **Turns off the Positive Air Shutdown pin 11**

Operation of these outputs (2-4) is disabled for 60 sec.

Warning

Before initiating the bypass mode on the ShockerEDGE System—You must test your environment for airborne hydrocarbons—The atmosphere must read 0% LEL and the intake piping below 50% LEL before using the ShockerEDGE bypass mode! YOU ARE NOT PROTECTED IN BYPASS MODE! Headwind Solutions assumes no responsibility for damage or incidents while in bypass mode.

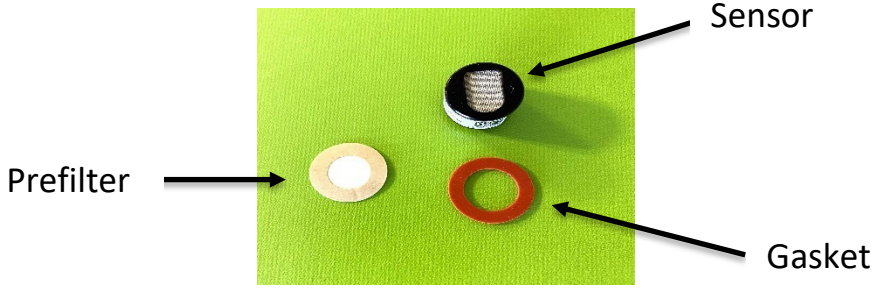
Maintenance

Every 90 days

- Perform SVT
- Inspect all wires and cables for wear
- Inspect all connections for corrosion and ensure they are tight
- Inspect controller, display, and mount for damage
- Inspect hoses and clamps if applicable
- Check that the sensor connector is tight, if the sensor connector has been disconnected from the housing, the sensor base gasket must be replaced

Yearly

- All the above
- Remove sensor and inspect dust screen for cleanliness (if cleaning required spray SVS on the sensor @ a 30–45-degree angle.) Do not spray at a 90-degree angle as damage to the sensor could occur. Sensor base gasket and prefilter must be replaced before reinstalling sensor.



IMPORTANT

Minimum 12 GA wire must be used on the power and ground supply.
Do not extend power and ground harness wires; doing so will void the warranty.
Connect controller to battery direct power
Connect display only to key-on key-off power

Warranty Disclaimer

Headwind Automotive Solutions Ltd. ("Headwind") wants you to be completely satisfied with your ShockerEDGE product (the "Product"). That is why Headwind offers a one-year limited warranty (the "Warranty") to the original purchaser or end user (the "Purchaser") for any Product sold. This Warranty does not cover any components sold by anyone other than Headwind.

Headwind will replace any defective Product part or entire Product which breaks or fails to function under normal use, so long as the failure is due to a defect in material or workmanship. This Warranty extends only to the repair or replacement of the defective part and does not extend to the cost of any repairs performed by the Purchaser.

To access this Warranty protection, the Purchaser must provide Headwind with written notice of any claimed defects with the product within ten (10) days after the Purchaser discovers the defect, along with proof of purchase. If approved for inspection, Headwind will issue an RMA# to be affixed on the return box and any paperwork accompanying the shipment, including the proof of purchase. Product returned for repair or replacement under this Warranty must be shipped with freight prepaid by the Purchaser to Headwind and will be returned freight collect.

This Warranty will be considered void in the following circumstances:

a) If the Product has been modified, neglected, improperly maintained, misused, abused, accidentally damaged, tampered with, or if it appears that the damage to the Product has been caused by a failure to provide proper maintenance.

b) If the Product has been exposed to the elements, including but not limited to floods, fire, lightning, storm, hurricanes, tornadoes, etc.

c) If the Product has been subject to repairs not authorized in writing by Headwind

d) If written notice of the defect is not provided to Headwind within one year of the purchase of the Product, or within ten (10) days of discovery of the defect, as stated above.

Headwind will charge the Purchaser for any costs arising if:

a) The Purchaser fails to return the defective Product within 60 days of submitting a claim.

b) The SKU of the returned product does not match the Product sold.

c) The defective Product is returned with missing components.

d) The returned Product is defective due to any of the circumstances detailed above rendering the Warranty void.

This limited Warranty will continue to protect the Product after any Warranty repairs are completed for the period of 90 days from the date of repair, or the remainder of the original warranty period for that Product, whichever is greater.

There are no express warranties offered by Headwind except for what is listed above. Headwind will not be liable for incidental or consequential damage resulting from the use of any Product or arising out of any breach of Warranty. All express or implied warranties, including warranties of the merchantability and fitness for a particular purpose are limited to the applicable warranty laid out above.

As there are many variables and requirements involved with any installation, Headwind assumes no responsibility or liability for actual use beyond that covered by this Warranty. Individuals purchasing ShockerEDGE products must look at all variables of their application and use their own judgment in evaluating product selection and determining product placement for each application and site requirements.

The Purchaser and/or End User is entirely responsibility for the correct selection, installation, routine testing, use, and all maintenance of ShockerEDGE products.

Check our website for troubleshooting videos and tips: www.headwindsolutions.ca

Sensor Verification Spray

GS-SVS

SVT Log

Date:	Time:	Event:

Complete SVT every 90 days minimum

THANK YOU FOR CHOOSING

Manufactured in North America.

Check our website for

troubleshooting videos and tips.

www.headwindsolutions.ca

Toll Free: 1-844-304-7277

www.headwindsolutions.ca

OCT 2025 3X