



SECTION 24M THERMASAN SYSTEM

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GENERAL INFORMATION

SYSTEM OPERATION

The Thermasan System is a waste destruction system that eliminates the inconvenience of holding tank evacuation stops. A chemical reaction occurs first in the contents of the holding tank. This waste is then pumped into the engines exhaust system through an ejection orifice. The waste is destroyed to the extent that all remaining gaseous by-products are rendered invisible, bacteria free, harmless and meet emission requirements of Public Health and Federal Emission Standards. The system is not designed to empty the holding tank but lower the level to a point where frequent holding tank dumpings are minimized.

To operate the Thermasan System, two factors must be present:

1. Exhaust temperature of at least 900-1000°F.
2. Vehicle speed must exceed 35 mph. Operation of the control panel without these factors being present will not start the system. If the exhaust temperature should drop below limits, or if vehicle speed is reduced, system operation will be temporarily interrupted.

CONTROL PANEL OPERATION

The thermasan controls are located to the right of the steering column in the driver's compartment. The panel face contains an "ON/OFF" switch, and three indicator lights. The "ON/OFF" switch contains a rheostat control for dimming if desired during night operation and a "PULL TO TEST" feature for testing pump operation.

When switched to the "ON" position, the green "READY" indicator will light. This is an indication that the system is operational. When the speed and temperature requirements are met, the red "REACTION" indicator will light, indicating physical destruction of waste if present. When the white indicator light is lit, the system has destroyed all

waste available and should be turned "OFF". When the "ON/OFF" switch is in the "ON" position and is pulled out, this will produce flashing of the "REACTION" light indicating actual pump operation and waste ejection.

The system operates on 12-volts DC and will destroy up to five gallons of waste per hour (For wiring diagram see figure 3).

CAUTION: *Do not put any combustible material such as kerosene, alcohol, or gasoline in the holding tank as this could result in system damage.*

Do not winterize the Motor Home with fuel oil or kerosene, which might get into the holding tank. We also recommend that facial type tissue be kept from the holding tank because it has "wet strength" which will not properly dissolve for passage through the waste pump. Toilet paper **MUST BE** water soluble.

Occasional draining of the holding tank at an approved dumping station is recommended. This should be done once or twice annually to remove any foreign particles or insoluble matter.

SYSTEM COMPONENTS

The Thermasan System contains six basic components (Refer to figure 1):

1. pump
2. control panel
3. speed switch
4. heat switch
5. holding tank
6. ejection orifice

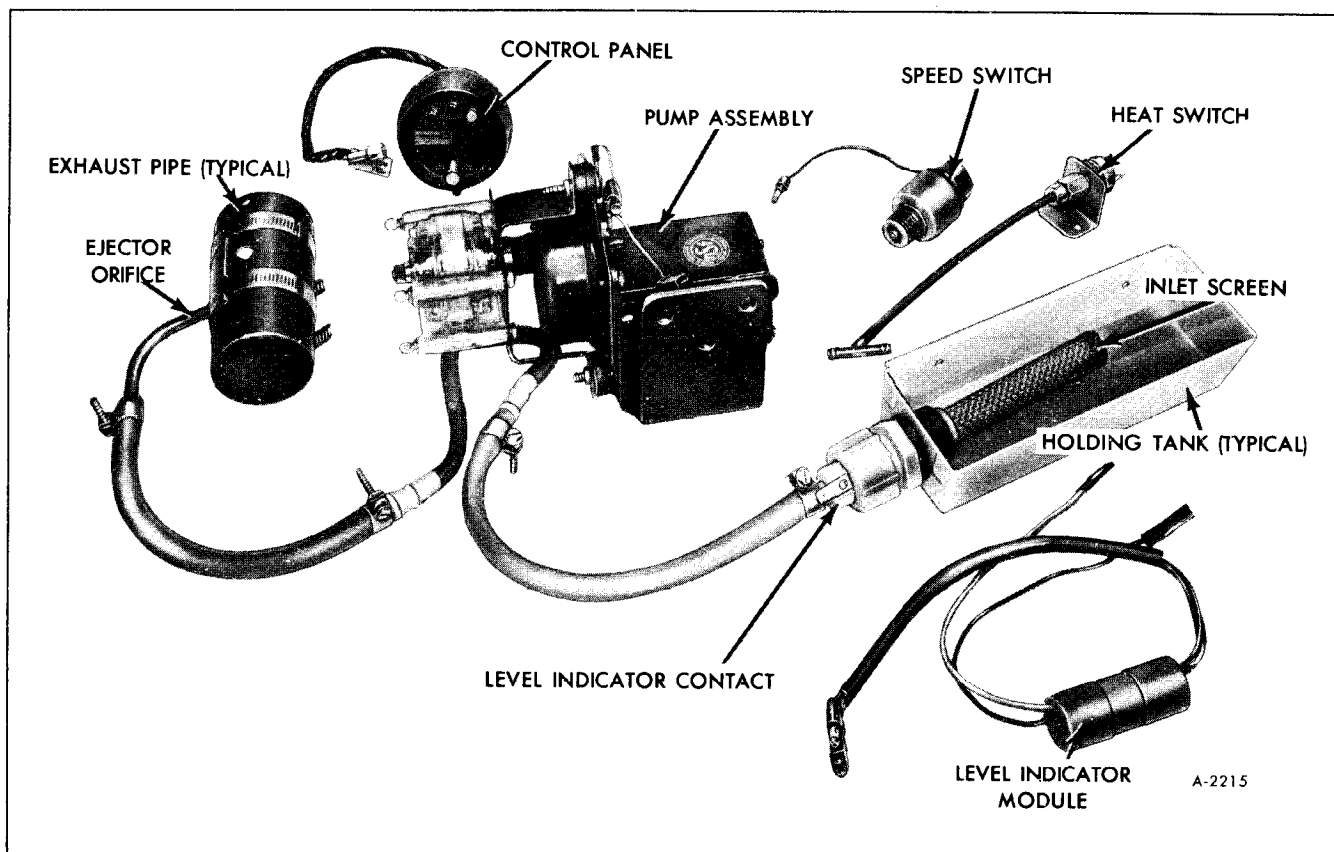


Figure 1—Thermasan Components

WASTE PUMP

The pump, is basically a windshield wiper motor connected to a tube pump which moves the liquid wastes from the holding tank to the vehicle exhaust pipe. When the system is turned "ON" and operating conditions are met, the pump will force waste material into the vehicles exhaust system until the holding tank level is below the pick-up screen. At that time the "EMPTY" light will come on and the system should be turned "OFF".

After the "EMPTY" light first comes on, due to remaining tank material slosh, it will probably flicker for another 1/2 hour of operation. The remaining waste material can be removed by manually dumping holding tank, however it is not necessary that the tank be completely empty. By leaving an amount of liquid material in the tank, it prevents hardening of remaining material.

CONTROL PANEL

The control module is used to provide the operator, at a glance with what the waste disposal system

is doing and when the system should be turned off. The control module lights are the replaceable type and should be checked first when the system operates abnormally. The "PULL TO TEST" feature of the control panel, meters the waste pump breaker points which open and close the "REACTION" light circuit. The system will operate the same whether the "ON/OFF" switch is in or out. The ON/OFF switch also controls "READY" and "REACTION" light intensity by rotating the knob.

SPEED SWITCH

The speed sensor provides a ground for the ejection pump circuit when the vehicle speed is 35 mph or more. The switch is driven off the transmission and works in conjunction with the heat switch to allow the "REACTION" light to glow.

HEAT SWITCH

The exhaust temperature switch used on the Thermasan System is a normally open vacuum

switch which is calibrated at 16 1/2-inches vacuum. When the engine vacuum drops below the 16 1/2-inch limit the switch contacts complete the pump circuit providing vehicle speed is 35 mph or more.

With 16 1/2-inches or less vacuum, engine exhaust temperature is above the 900°F requirement. The vacuum switch is wired in series with the speed switch and both must provide circuit continuity for system operation.

HOLDING TANK

The waste pump is fed from the holding tank through a screen which filters out any insoluble waste material. This screen is completely removable by disconnecting the waste pump feed line at the

tank and pulling the screen out. The coupled end of the feed hose from the pump houses the low level contacts which activate the control module "EMPTY" light.

EJECTION ORIFICE

The ejection orifice is located just behind the transmission and ahead of one of the vehicle mufflers. It consists merely of a tube connected to the pump by a high temperature hose to resist high temperatures developed.

Clamped connections should be checked when dripping or leaking occurs when the system is operating.

TROUBLE DIAGNOSIS

CHECK OUT PROCEDURE

To check the operation of the control panel and waste pump, the following procedure can be used.

1. Disconnect the white connector from the heat switch.

2. Connect a jumper to ground from the heat switch terminal.

3. With the control panel switched to the "ON" position the green "READY" light will light and the red "REACTION" light will come on and the pump will run.

4. If the holding tank is empty the "EMPTY" light should come on.

5. When the "ON/OFF" switch is pulled out the red "REACTION" light should flash intermittantly if the pump is working.

With the system connected but not operating as explained above, the following conditions should be checked for problem source:

READY OR REACTION LIGHTS DO NOT GLOW WHEN SYSTEM IS TURNED ON

1. Inspect the power feed connection at the vehicle positive battery stud located on the bulkhead panel behind the right hand access door.

2. Remove and inspect the in-line fuse on the red lead near the battery stud connection. If this fuse is blown, it indicates a possible short in the entire Thermasan harness and its' connections should be inspected for possible frayed or burned wires or loose connections allowing a short to ground.

NOTE: DO NOT replace the 5 amp fuse until the harness has been inspected and under no circumstances should a larger amperage fuse be used.

3. Check the connector between the harness and control panel for proper connections. The male and female pins housed within the connector body should be straight and of equal height. They should be firmly attached to their respective wires (See figure 2).

When inspection is completed carefully mate the connector bodies and press firmly until the snap tabs are locked into place.

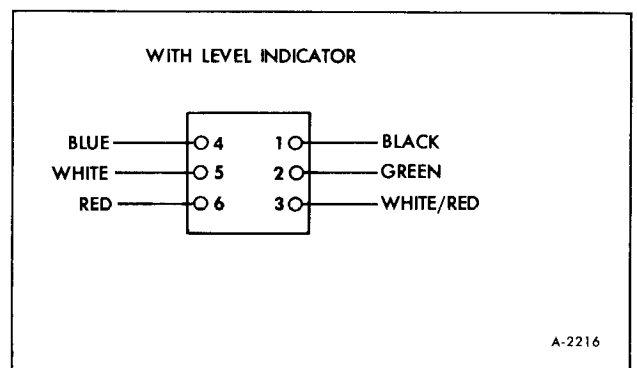


Figure 2—Control Panel Connector

4. Test the switch and its connections for defects.

a. Remove the set screw from the side of the base on the control panel. Slide the control panel off its base by exerting a firm forward pull.

b. Remove the screw from the back of the control panel and separate the housing from the bezel. Using a test lamp for locating shorts, check the switch. By reversing the steps above, reinstall the control panel.

READY LIGHT WORKS, REACTION LIGHT DOES NOT LIGHT ABOVE 35 MILES PER HOUR

1. Check for a burned out bulb and/or loose connections.

2. Inspect the connector between the harness and the control panel.

3. Check the heat switch leads for loose connections at the terminals.

4. Test for a possible faulty control panel relay.

a. Disconnect the blue lead from the harness to the heat switch.

b. Turn the system on and ground the lead to any clean unpainted part of the frame.

c. If the ready light does not come on, the relay is faulty. Replace the control panel.

5. Test for a possible faulty heat switch.

a. Turn the system on with the engine not running ground the blue lead from the heat switch to the speed switch.

b. If the system does not operate the heat switch is at fault. Replace the heat switch.

6. If after testing for above conditions, the system does not operate at 35 mph, the problem lies with the speed switch and it must be replaced.

a. Remove the speedometer cable from the speed switch and disconnect its electrical fitting.

b. Unscrew the speed switch and replace it with a new part by reversing this procedure.

BOTH LIGHTS WORK, BUT UNIT DOES NOT SEEM TO PUMP WASTE

1. Pump motor leads may be disconnected.

a. Remove the (2) pan head screws holding the terminal dust cover in place.

b. Check the terminals and their leads for a faulty connection.

c. Inspect the connections in the plastic pin housing that plugs into the dust cover.

d. Install cover and replace screws.

2. Inspect all waste lines for possible kinks.

3. Inspect all waste lines for possible plugs. Clean by using compressed air or a steel rod to force plug from hose if present. In the case where a line blockage has caused hose rupture within the pump, refer to "Pump Repair."

4. Check the holding tank evacuation probe (inlet screen) and inspect it for possible clog (See figure 1).

a. Remove the evacuation probe inlet screen by unscrewing the plastic nut on the outside of the holding tank.

b. If the system has a level indicator, note alignment of the terminals.

c. Flush the screen to remove the plugging.

d. Reinstall the screen, washer and nut.

e. Align level indicator connectors. They should be at 45° to the pavement.

NOTE: Either lead can be placed on the right or left terminals.

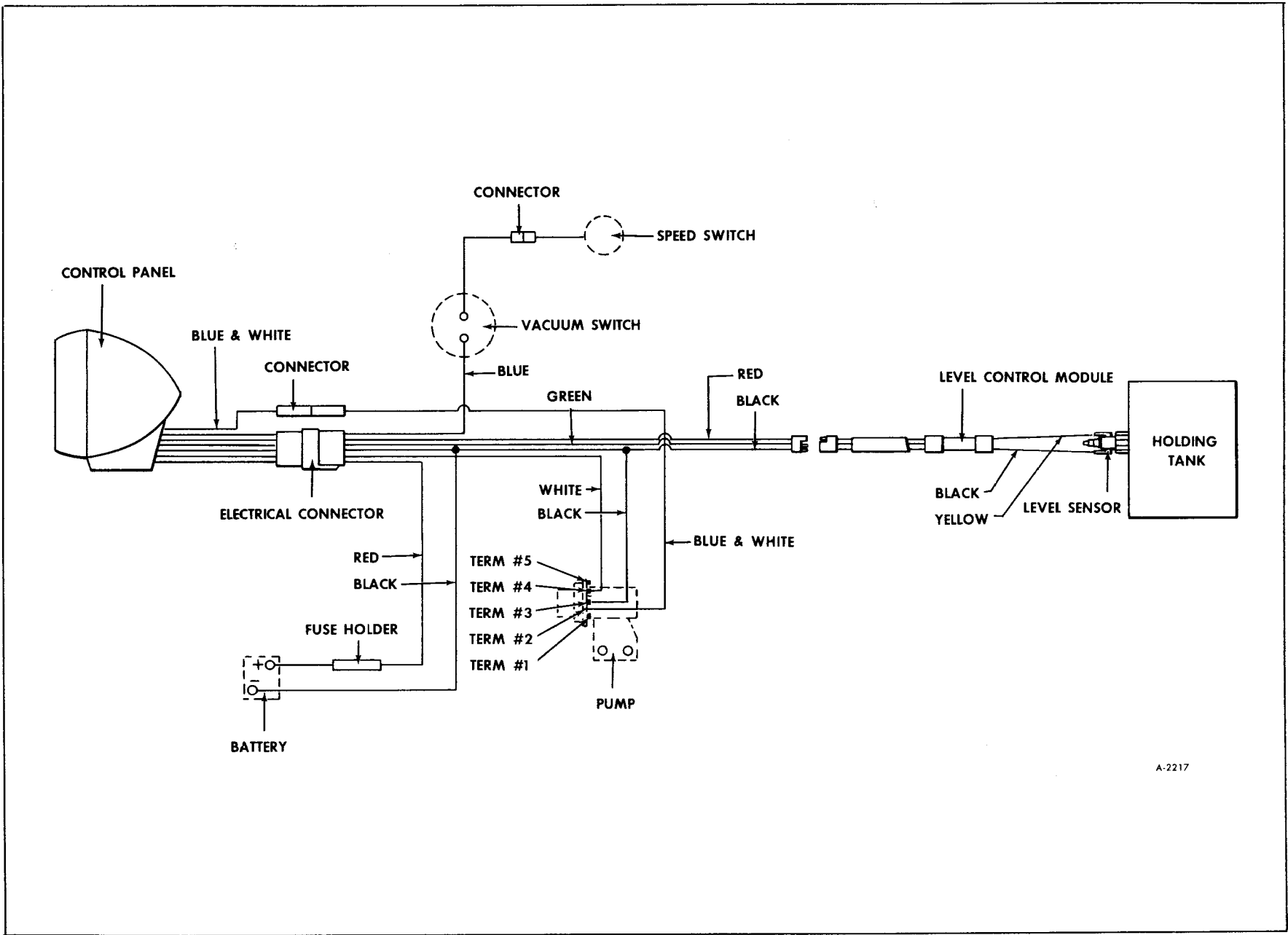
f. Inspect all hose clamps for possible air leaks.

REACTION LIGHT STAYS ON EVEN WHEN DECELERATING

This indicates a faulty heat sensor and it should be replaced.

BOTH READY AND REACTION LIGHTS FLICKER ON AND OFF

1. If the lights flicker at a constant rate, the prob-



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Figure 3-Thermasan Wiring

lem may be in the "PULL TO TEST" circuit. Check the leads for a broken solder joint. If none is indicated replace control panel.

2. If the wiring harness ground is not connected, the ready and reaction lights may flicker. Inspect the contact of the black wire at the battery.

GREEN LIGHT FLICKERS ON AND OFF

Check for possible loose lead at the light, on/off switch or power source. Check and secure all connections.

REACTION LIGHT FLICKERS ON AND OFF WHEN OPERATING CONDITIONS PERMIT SYSTEM OPERATION CONTINUOUSLY

1. If the flicker is constant, the speed sensor is faulty. Replace the speed sensor.

NOTE: When tightening the speed sensor to the transmission, 1/4 turn past finger tight is sufficient.

2. If the flicker is intermittent type, a loose connection is at fault.

a. Inspect the blue wire to the heat switch and speed switch for a possible short or incomplete connection.

b. Check six pin plastic connector near the control panel (figure 2) and inspect the pins to be certain they are seated properly and making good connection.

READY AND REACTION LIGHT WORK BUT DO NOT PULSE WHEN "PULL TO TEST" IS SWITCHED

1. Check the (1) pin connector near the control panel.

2. Inspect the blue/white wire at the pump for proper connection.

3. Remove the control panel and check the ON-OFF switch for broken or poor solder joints.

EMPTY LIGHT DOES NOT GO OFF

1. This is normal system operation, indicates the holding tank level is below the probe.

2. If the light is on and visual inspection indicates the tank is full, then:

a. Inspect the black and yellow connections to the evacuation probe.

b. Test for a possible defective level indicator module. Remove the yellow lead to the evacuation probe. Jump the yellow wire to the black wire. If the light remains on, replace the level indicator module.

WASTE PUMP REPAIR

The pumping tube used in the waste pump should be checked at 500 operational hour intervals for possible tube fatigue. In the case of tube rupture, the following procedure should be used to replace hose:

1. Disconnect battery ground cables. Remove the pump cover by removing the 2 thumb screws which hold the pump cover to the mounting bracket. The pump body and roller assembly will remain attached to the mounting bracket.

2. Holding the roller assembly in position, remove the defective hose. Should the roller assembly release from the pump body, return it to position making sure that the drive key on the motor shaft lines up with the key slot in the end of the roller shaft assembly. This will allow the roller to drop into position.

3. Take the new hose and insert it between the rollers and the pump body. Stretching the hose makes it slide easier into position.

4. Re-assemble the pump. Make sure the cover fits snugly against the pump body. Do not pinch the hose.

5. Tape the two hoses together just below the pump outlet with plastic electrical tape.

6. When placing the pump in the vehicle, make sure that the correct hose is coupled to the line from the holding tank.

7. Connect battery ground cables and check system for proper operation.