

## Hurricane®SCH25 Diesel Hydronic Heating System

### NOTICE

No warranty will be extended to unapproved, unauthorized or improper installations. Use of any materials or equipment unsuited for their intended use will result in a voided warranty for the entire heating system.

This Inspection Check Sheet is intended for use after the ITR heating system has been installed; it should also be used informally to monitor progress during the installation. Only authorized personnel may carry out the inspection and testing. The last page of this Check Sheet, Test Points, provides troubleshooting data for the test points in the control board.

No rewiring of the Hurricane® heater is permitted unless it has been pre-approved by ITR.

### 1. Before Start-up      Hour Meter Reading \_\_\_\_\_

✓	Step	1. Before Start-up
	1	The heater and all components are mounted in appropriate locations according to standards, with required clearances for maintenance. <a href="#">(see manual)</a>
	2	All components, accessories and materials are ITR-manufactured or approved for their intended use.
	3	Length, routing and sizing of coolant hoses, fuel lines, air vents, combustion air intake hose, and exhaust tubing are installed and connected according to the installation guide standards.
	4	Hurricane® Heater is properly exhausted (i.e. no exhaust fumes from unit will infiltrate the living area).
	5	The combustion inlet is drawing 100% outside air and is unrestricted.
	6	No exhaust parts are close to, touching or passing through any combustible material (unless fire-protected).
	7	All exhaust connections and fittings are secure and airtight. Proper clamps are used and no hoses are kinked or pinched.
	8	Fuel supply has a dedicated pickup from main diesel fuel tank.
	9	Fuel lines do not pass through areas of excess heat and are separated from water lines.
	10	Fuel lines are secure with no risk of becoming pinched, kinked, or damaged during normal operation.
	11	All DC wiring connections are correctly secured, sized and installed according to normally-accepted wiring practices and applicable standards (ABYC).
	12	All AC electrical connections are correctly secured and sized to applicable standards.
	13	Fuses are correctly sized and positioned. Total amperage draw of all components are compatible with amperage supply of control board.
	14	Battery connection is secure and direct from control board to house battery bank, with correct polarity.

## Inspection Check sheet

✓	Step	1. Before Start-up
	15	Battery connection is protected with a circuit breaker or heavy-duty fuse that is properly sized to the total system load and is protected from accidental disconnect.
	16	All external electrical connections and the heater case are properly grounded.
	17	Circulation system is full of 50/50 (recommended) mix of antifreeze and water (propylene glycol is strongly recommended).
	18	Circulation lines are properly insulated from cold and protected from solvents where necessary.
	19	Circulation pump jumper is in the unbridged position on the control board. Jumper is removed from TC and T1 terminals.
	20	If the engine waste heat, re-use function is installed, ensure the coolant supply and return ports are correctly located as per the engine manufacturer's recommendations.
	21	If engine pre-heat function is installed ensure that all these connections are tight and correct.
	22	Expansion tank is at the highest point or there is a provision for the elimination of air from the system.
	23	The thru hull must be installed in such a way as to preclude water ingestion into the heater through the combustion fan intake or exhaust pipe due to wave action, the vessels wake or spray.
	24	If the air-intake is attached to the thru hull ensure that it is placed between 10 o'clock and 2 o'clock and goose necked similar to the exhaust to avoid water intake.
	25	The air source for the cabin fans must be supplied from living spaces or outside air only.
	26	Exhaust is goose necked to prevent water ingestion.

Comments: \_\_\_\_\_

Inspection #1 completed by: \_\_\_\_\_  
Print name Signature Date

## 2. Initial Start-up

### ! DANGER

- Never** • operate heater in enclosed area without adequate ventilation
- shut off heater power via an inline battery or master switch while system is running
  - disconnect battery when heater is running
  - disconnect battery when inverter is on
  - leave heater running in bypass mode while unattended
  - let the circulating water pump run dry
  - operate the pump without fluid in the system
  - mix antifreeze from engine with heater's coolant

✓	Step	2. Initial Start-up
	<b>27</b>	The voltage at main power feed at control board is between 11 VDC and 15 VDC.
	<b>28</b>	Turn on the heater at the remote panel and turn up all thermostats. If the furnace does not start, reset system by turning the remote switch off/on. When the heater tries to fire, open the bleeder valve one full turn and wait until the fuel filter is full and all air is purged from the system. Ensure the bleeder valve vents to a container to prevent fuel spillage.
	<b>29</b>	Ensure these signs of normal operation appear immediately: <ul style="list-style-type: none"> <li>• circulating pump runs</li> <li>• green indicator lights on control board light up</li> <li>• combustion air-intake fan runs</li> <li>• igniter glows orange or bright yellow</li> <li>• compressor and fuel pump turn on; fuel solenoid opens</li> <li>• furnace ignites (and igniter shuts off after thirty seconds)</li> <li>• hot air comes out of the exhaust</li> </ul>
	<b>30</b>	Ensure the circulation system is tested and purged of air: <ul style="list-style-type: none"> <li>• fluid outlet on heater becomes warm</li> <li>• supply and return fluid hoses become warm (with a MAX of 30°F [17°C] difference between them)</li> <li>• no bubbling or cavitations is present</li> </ul> <p>If all of these conditions are not met, shut down the heater and check fluid circulation.</p>
	<b>31</b>	Flow rate is checked and verified to be approximately 1 GPM per 10,000 BTU/H
	<b>32</b>	Ensure no leaks are present (check all hosing, connections, etc.).
	<b>33</b>	Ensure the overflow tank is filled to line and top up as necessary.

Comments: \_\_\_\_\_

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Inspection #2 completed by: \_\_\_\_\_

Print name Signature Date

### 3. Normal Operation

✓	Step	3. Normal Operation
	<b>34</b>	Ensure the burner continues to operate until all zones have reached set temperature (Heater should cycle at 170°F with overheat shutdown at 190°F.).
	<b>35</b>	If installed, ensure the domestic hot water system operates effectively. Refer to the manual.
	<b>36</b>	Ensure each interior fan operates effectively. Set Zone 1 thermostat to 10°F above ambient. If there is fan speed switch, set it to high. Furnace should fire and Zone 1 fans should come on immediately if system is at temperature. If system is cold and fans have internal aquastats, they will not turn on until the coolant reaches temperature. Set fan speed to low and confirm that speed reduces. Turn down thermostat and confirm fans shut down. Repeat for each interior zone.
	<b>37</b>	All interior fans operate effectively together (turn up all zone thermostats; total amperage draw of all fans must be 10 Amps or less).
	<b>38</b>	If installed ensure that the freeze protection device functions correctly by finding the Low Temperature Thermostat (normally located on or immediately adjacent to the fresh water tanks) and with the heater enabled hold an ice-cube to the contact surface of the device. The heater should come on and run in less than one minute from the initial contact.
	<b>39</b>	Check to see if the heater shows a Code 7 on flame out by blocking the compressor air intake. Keep the intake blocked after the initial shutdown to confirm that the heater makes two attempts to relight, the fault buzzer sounds at the Remote Panel and Code <b>7</b> appears on the control board display. The digital diagnostic panel should read, " <i>Flame Out, and See Service Book...</i> "
	<b>40</b>	If installed, ensure the engine waste heat recycling function works correctly (start the engine and bring it up to normal operating temperature, turn on the thermostat and check that heat comes out of the vents).
	<b>41</b>	If installed, ensure the engine pre-heat function works correctly (with the heating system at temperature, turn on the pre-heat pump switch; engine temperature should change within 15 minutes).
	<b>42</b>	If the heater cycles off on its own, ensure the combustion fan and the circulating pump continue to operate for another two minutes to purge the burner.

Comments: \_\_\_\_\_

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Inspection #3 completed by: \_\_\_\_\_

Print name

Signature

Date

### 4. Shutdown

✓	Step	4. Shutdown
	<b>43</b>	When the heater is turned off at the remote indicator panel the heater should run through its two minute purge cycle.
	<b>44</b>	With all systems off and no call for heat, the system shuts down completely after purging (two minutes).
	<b>45</b>	Ensure the fluid levels are checked and topped up after cool-down.
	<b>46</b>	When the service switch is turned off (on side of electrical control box) the heater should run through its two minute purge cycle.
	<b>47</b>	If the heater will not be operated in low temperature conditions, drain the domestic water system to avoid freezing.

Hour Meter Reading at completion of check out \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Inspection #4 completed by: \_\_\_\_\_  
Print name Signature Date

Heater Model and Serial No.  
\_\_\_\_\_

Type of Installation  
\_\_\_\_\_

Cubic Volume of Heated Areas  
\_\_\_\_\_

Owners Name / Address / Telephone Numbers  
\_\_\_\_\_  
\_\_\_\_\_

Supervisor and final sign-off:  
Print name Signature Date



## Hurricane®SCH25 Diesel Hydronic Heating System

The test points on the electrical control board allow for testing and troubleshooting of the ITR heater's electrical system. You will need a voltage meter to plug into the test points.

Test Point	Component	Results / Optimal Condition
TP1	Flame Sensor	A voltage meter should show a voltage of 0 to 4 Volts if the flame sensor detects a flame. If not, the voltage will be 0 volts.  An oscilloscope will show a 0 to 5 Volt square wave with a frequency of 20 Hz to 2000 Hz, if the flame sensor is detecting a flame.
TP2	Combustion Fan	The voltage will be between 4 and 5 Volts if the combustion fan is operating correctly; 1 Volt if the combustion fan is not drawing any current (open).
TP3	Combustion Fan Current	The voltage will be between 1 and 5 Volts if the combustion fan is drawing normal current, and 0 Volts if the combustion fan is not drawing current.
TP4	5V Power Supply	The voltage should be between 4.8 and 5 Volts. A lower voltage indicates a problem with the voltage supply to the logic of the control board.
TP5	8V Power Supply	The voltage should be between 7.9 and 8 Volts. A lower voltage indicates a problem with the voltage supply to the logic of the control board.
TP6	Power To Control Board	This is the battery voltage supplied to the control board; it should be between 11 and 15 Volts.
TP7	Power To Flame Sensor	The power to the flame sensor should read between 11 and 15 Volts (same as battery voltage).
TP8	Cycling Aquastat	The voltage will be between 4.8 and 5 Volts if the heater is cycling (cycling aquastat is open), and 0 if the cycling aquastat is closed.
TP9	Overheat Aquastat	The voltage will be 0 Volts if an overheat condition is occurring or has occurred in the past two minutes (overheat aquastat is open). The voltage will be between 4.8 and 5 Volts if the overheat aquastat is closed.
TP10	Voltage Fault	The voltage will be 0 Volts if there is no voltage fault, and between 4.8 and 5 Volts when there is a voltage fault.
TP11	Remote Switch	The voltage will be 0 Volts when the remote switch is off, and between 4.8 and 5 Volts when the switch is on.
TP12	Reset	The voltage will be 0 Volts when the reset button is pressed, and between 4.8 and 5 Volts when the reset button is not engaged.
TP13	Thermostats Or Domestic Water	The voltage will be 0 Volts when the thermostat or domestic water system calls for heat and between 4.8 and 5 Volts when heat is not called for.
TP14	Blown Fuse	Blown fuses for the burner, pump, or cabin fans will show a voltage of between 4.8 and 5 Volts. Good fuses will show 0 Volts.