Webasto
Feel the Drive

Parking Cooler

BlueCool Truck

With Tundra Inverter

Shore Power Installation Supplement

- Improper installation or repair of Webasto heating and cooling systems can cause fire or the leakage of deadly carbon monoxide leading to serious injury or death.
- Installation and repair of Webasto heating and cooling systems requires special Webasto training, technical information, special tools and special equipment.
- NEVER attempt to install or repair a Webasto heating or cooling system unless you have successfully completed the factory training course and have the technical skills, technical information, tools and equipment required to properly complete the necessary procedures.
- ALWAYS carefully follow Webasto installation and repair instructions and heed all WARNINGS.
- Webasto rejects any liability for problems and damage caused by the system being installed by untrained personnel.

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Category: BlueCool Truck

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Description: Optional Shore Power Installation

Shore Power Installation

Overview

Shore Power is a term used by the marine and RV industries to describe the power available from land-based sources that boats and recreational vehicles hook-up to in order to run on-board appliances and HVAC. This power is usually provided at a pedestal at each boat slip or RV lot. This available shore power allows the vehicle / vessel to run "hotel loads" without running an engine.

The Shore Power System is an important component of the Webasto no-idle solution. The system delivers power to run "hotel loads" for the comfort and convenience of the drivers. Virtually any 120VAC device from laptops to microwaves could be used while parked at truck stops, rest areas or even at warehouses and depots that provide shore power receptacles. The system is designed to connect directly to land based power with a 25 foot Extension Cord, rated for up to 20 amps @120-Volts (12 gauge wiring).

How It Works:

When plugged to any conventional plug outlet (land based power 120VAC) the system automatically detects connection to the Shore Power and switches the system into the Shore Power mode. When in Shore Power mode battery charger is turned ON (battery is charged if needed) and 120VAC is available at receptacle to run "hotel load". This applies only when the truck is at rest (not moving). After 30 min control unit will start the charge cycle of the BCT unit if needed, based on the temperature inside the storage core. Power used to run compressor is used from land based power and for the rest of the BCT system (controller, condenser fan, coolant pump and fans in the air handler) directly from the battery. Controller will allow the user to operate unit in discharge mode at the same time the unit is charging. The unit can run in charge/discharge mode as long as connected to the Shore Power (land based power 120VAC).

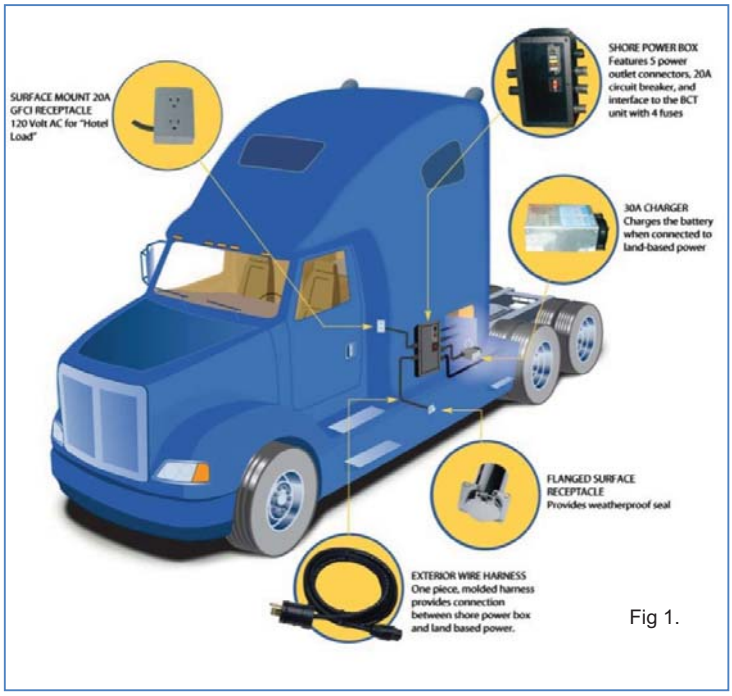


Fig 1.

Shore Power Layout:

Follow the wiring diagram below, the Shore Power system is plug and play and should easily connect as shown below. Make sure to disconnect system power from the vehicle prior to integrating shore power into the system.

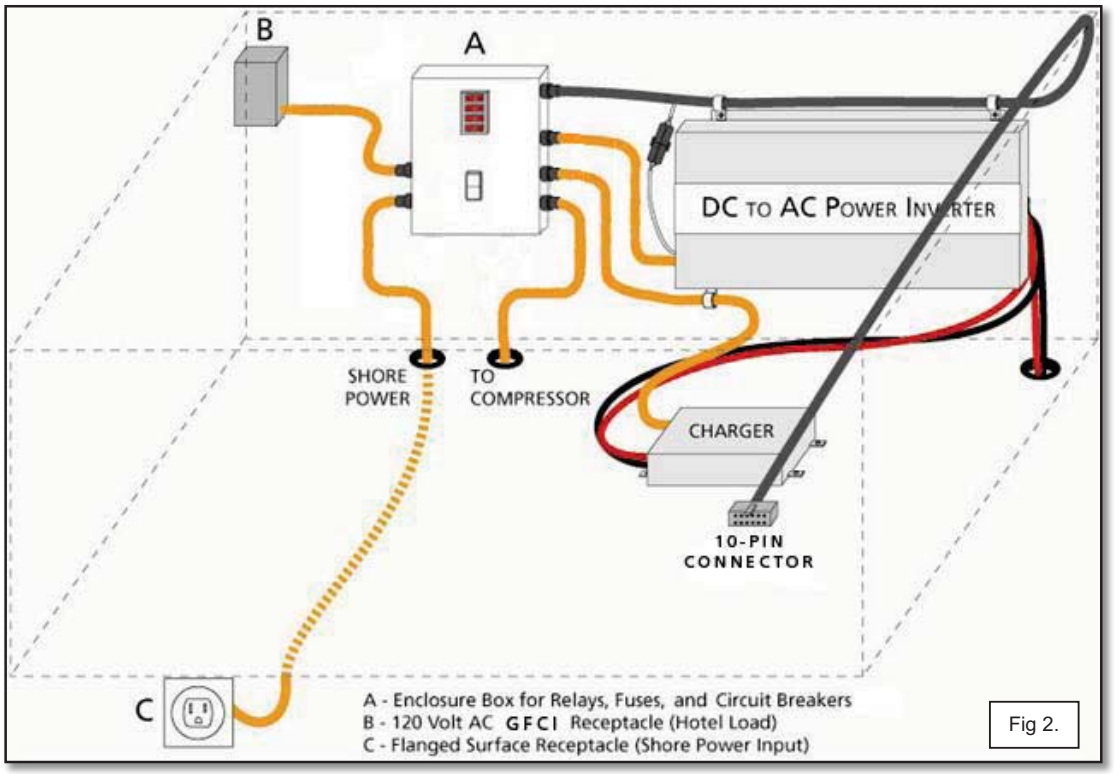


Fig 2.

Shore Power Box Fuse Layout:

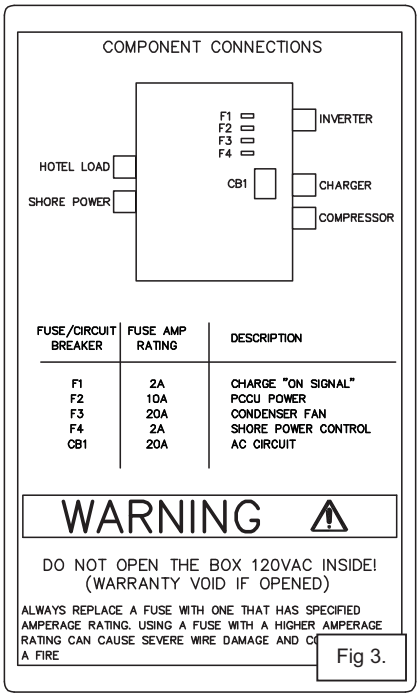


Fig 3.

Installation:

To begin this installation, the physical mounting of the shore power box, charging unit, 120 Volt AC receptacle (Hotel Load), and the flanged surface receptacle (shore power land based power input plug) must be performed. Plan your harness routing according to the components that must be reached, such as the batteries, air handler, power inverter, etc. Ensure a safe and secure means of routing and attachment along frame members and cross members. Also consider the point at which the harness will enter the vehicle's sleeper compartment.

NOTE: Fig 2 assumes the harnesses will be routed from under the bunk, through a hole in the floor of the sleeper and into the left storage compartment. This compartment will house hardware such as the power inverter, DC charger, and Shore Power Box. Your particular application may not follow this example; however the harness and battery cables are of sufficient length to allow for different routing possibilities.

CAUTION: Always make sure that no harnesses are mounted to any moving parts and that anything routed between the frame and the body of the vehicle has ample slack for movement.

Electrical Harness Routing

Plan your harness routing according to the components that must be reached, such as the batteries, air handler, power inverter, charger, etc. Ensure a safe and secure means of routing and attachment along frame members and cross members. Also consider the point at which the harness will enter the vehicle's sleeper compartment. Refer to section 4 of the BCT Installation Manual (BCT010031C) for further routing detail.

NOTE: When routing BCT / AC harness begin at the Storage Core and work forward. This will prevent the harness from being too short when the final connections are made in the cab of the vehicle.

NOTE: When routing both the AC and DC harnesses, make sure that they are separated and routed individually to eliminate noise on the temperature sensor circuit.

Inverter Connections

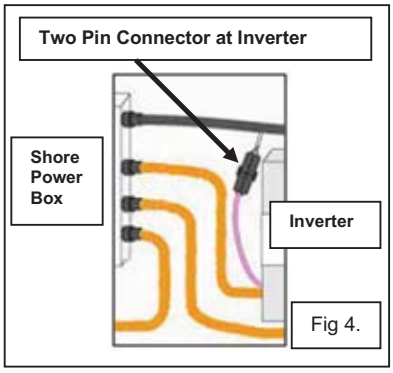


Fig 4.

Fig 5.

Ensure all power has been turned off to the system. Install the Shore Power box near the power inverter allowing ample room for the harness connections. Refer to section 5.3.4 of the BCT Installation Manual (BCT010031C) for additional mounting instructions. See Fig 2 on page 5 of this manual for hardware location examples. Mount the supplied Shore Power charging unit in close proximity of the power inverter.

The connections between the Shore Power box, the charger, and the inverter are all plug and play and are labeled accordingly on the Shore Power box. Make sure to connect the two pin connector between the DC harness (black loom) and the power inverter as shown in fig. 4.

NOTE: Ensure the inverter and charger are properly grounded to the chassis of the vehicle. Refer to section 5.3.5 of the BCT installation manual for additional information.

Plug in the 10 pin connector of the DC harness (black loom) to the BCT Harness. (Fig 5.)

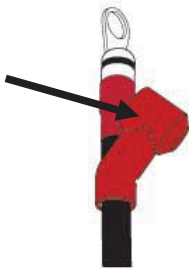


Fig 6.

Install the supplied protective boot(s) (Fig. 6) on both the positive and negative cables and wire loom where necessary.

NOTE: *Some modification to boots may be required to fit over dual cable connections).*

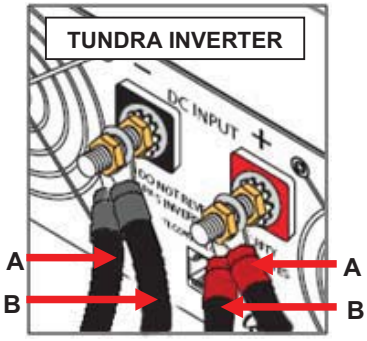


Fig 7.

(A) Connect one end of the positive and negative cables to the DC output terminals of the Iota charger. Route and connect the other end to the DC Input studs on the power inverter. (Picture does not represent correct gauge cable/wire)

NOTE: *Do not tighten the nuts on the input inverter studs at this time as additional connections are needed.*

(B) Connect one end of the supplied positive and negative DC cables directly to the DC input studs on the inverter and tighten nuts. Connect the other ends to the battery bank as described in section 5.3.11 of the BCT Installation Manual (BCT010031C). (Picture does not represent correct gauge cable/wire)
CAUTION: Keep power inverter studs from turning while tightening nuts!

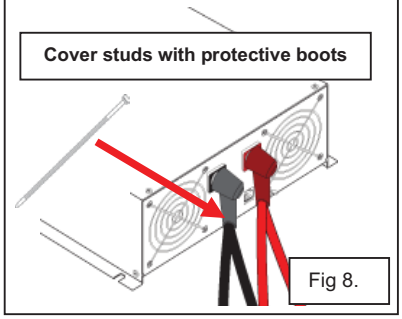


Fig 8.

NOTE: *Make sure to pull protective boot over studs after nuts have been tightened and install a zip tie around each base.*

Fig 9.

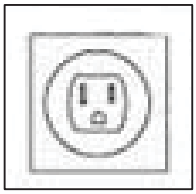
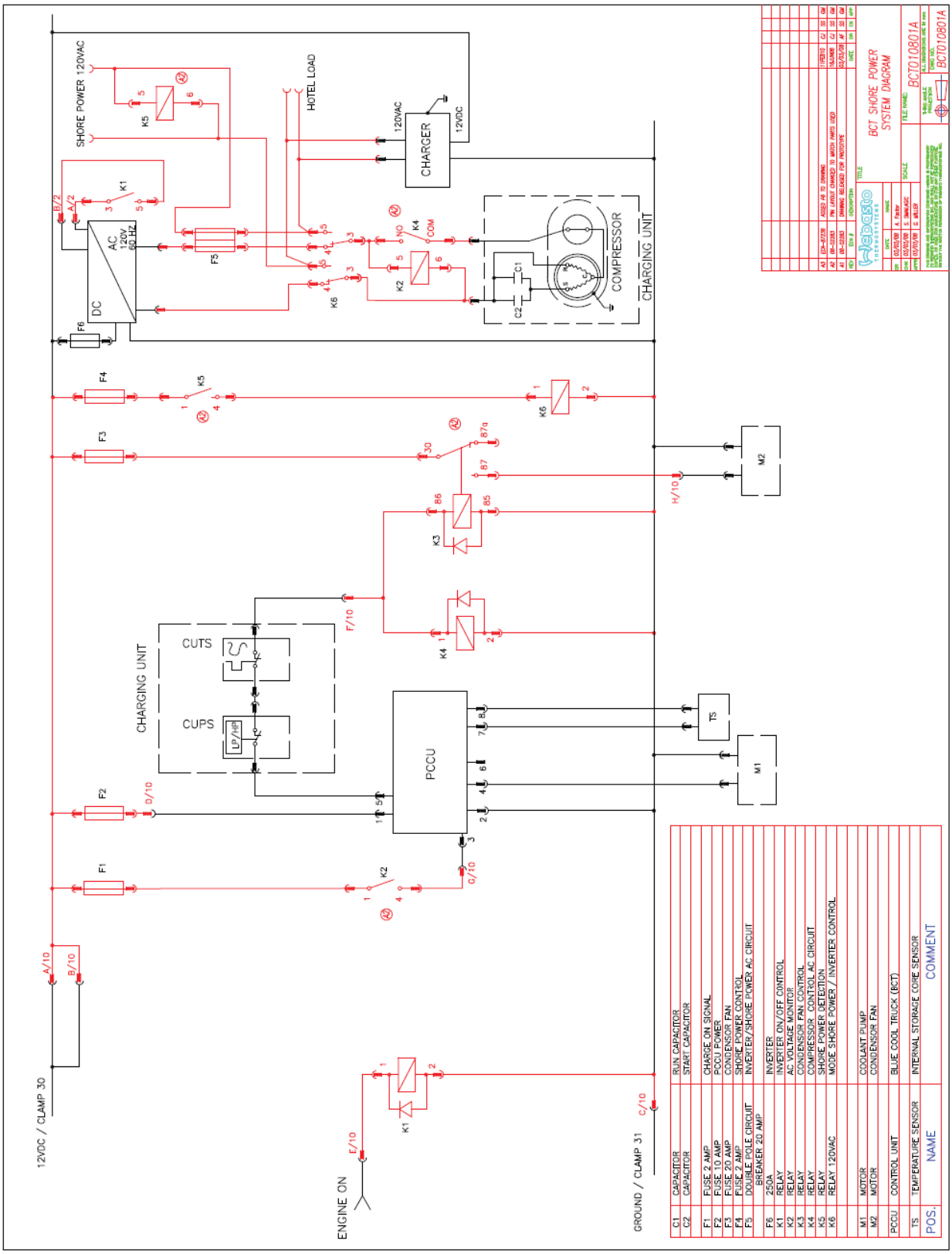


Fig 10.

Locate an acceptable area to mount the exterior flanged surface receptacle. Ensure there is nothing that interferes behind the designated location and drill a 1 3/4"(44mm) hole. Carefully insert and mount the flanged surface receptacle. Route the surface receptacle harness to the shore power box connection labeled "Shore Power".

NOTE: *Install the supplied sticker label near the Shore Power Plug and ensure it is in a visible location.*

Schematics


SHORE POWER 120VAC
HOTEL LOAD
CHARGER
120VAC
12VDC
AC 120V 60 HZ
DC
COMPRESSOR
CHARGING UNIT
CUTS
CUPS
LP/HP
PCCU
12VDC / CLAMP 30
GROUND / CLAMP 31
ENGINE ON
BCT SHORE POWER SYSTEM DIAGRAM
BCT0110801A
BCT0110801A
C1 CAPACITOR RUN CAPACITOR
C2 CAPACITOR START CAPACITOR
F1 FUSE 2 AMP CHARGE ON SIGNAL
F2 FUSE 10 AMP PCCU POWER
F3 FUSE 20 AMP CONDENSOR FAN
F4 FUSE 2 AMP SHORE POWER CONTROL
F5 DOUBLE POLE CIRCUIT BREAKER 20 AMP INVERTER/SHORE POWER AC CIRCUIT
F6 250A INVERTER
K1 RELAY INVERTER ON/OFF CONTROL
K2 RELAY AC VOLTAGE MONITOR
K3 RELAY CONDENSOR FAN CONTROL
K4 RELAY COMPRESSOR CONTROL AC CIRCUIT
K5 RELAY SHORE POWER DETECTION
K6 RELAY 120VAC MODE SHORE POWER / INVERTER CONTROL
M1 MOTOR COOLANT PUMP
M2 MOTOR CONDENSOR FAN
PCCU CONTROL UNIT BLUE COOL TRUCK (BCT)
TS TEMPERATURE SENSOR INTERNAL STORAGE CORE SENSOR
POS. NAME COMMENT

Verify System Operation

1. Perform a final visual inspection of electrical items to ensure ALL connections are completed and secure.
2. Connect a Digital Multi-Meter to the batteries and ensure they are fully charged (desired voltage should be at or greater than 12.5V DC). Connect a battery charger to batteries and recharge if necessary.
3. Turn off battery charger and disconnect from batteries.
4. Check fuses, (4 fuses located on the Shore Power box, 30A main system fuse at the batteries, and 250A inverter fuse at the batteries)
5. Check if the circuit breaker (CB) is in the "ON" position.
6. Check if the inverter switch is in "ON" (I) position.
7. Check Storage Core internal temperature. If temperature is lower than 30°F, the system is already charged and it will not begin another charge cycle until the temperature rises above 30°F.
8. Check if ambient temperature is greater than 60°F. If temperature is lower than 55°F +/- 5°F the system will not charge.
9. Turn vehicle engine on and verify that green LED on inverter is illuminated, if not refer to Malfunctions during system "Charge Mode" section for the diagnosis.
10. After 1/2 hour has elapsed, the A/C compressor and the condenser fan will begin operation.

NOTE: If the compressor fails to start, check the LED indicator on the power inverter. If it has changed to orange, turn inverter OFF and allow batteries to recharge for a short period of time. Ensure ALL battery connections are clean and tight.

11. Run the refrigeration unit for 15 minutes (minimum cycle) or longer before switching the ignition key off.

NOTE: To determine if the system is chilling properly, the condenser fan will be pushing air that is several degrees above ambient temperature. Also, the refrigeration lines at the expansion valve will begin to cool down and over time, become frosty.

12. Facing the air handler, the left control knob (A) controls system activation and the fan speed. By turning the knob clockwise, the system is activated. A green LED (B) will illuminate indicating the system is active. Turning the knob further clockwise increases the fan speed accordingly.
13. The right control knob (C) controls cooling performance. By turning the knob clockwise, the coolant circulating pump begins operation. Turning the knob further clockwise increases cooling performance.

NOTE: If the interior cab temperature is lower than 68°F the coolant pump will not run and chilled air will not be felt coming from the wall mounted air handler.

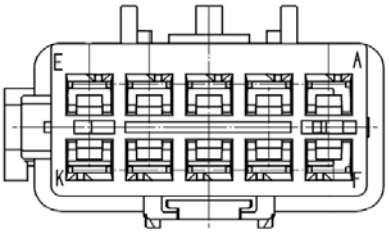
Troubleshooting

In the event of a BlueCool Truck system malfunction (equipped with Shore Power) check / verify the following points before continuing to troubleshooting trees:

- Visually check wiring connections at the batteries, inverter, charger, Shore Power box, the PCCU (Parking Cooler Control Unit) and charge unit.
- Check for blown fuses, (4 fuses located on the Shore Power box, 30A main system fuse at the batteries, and 250A inverter fuse at the batteries)
- Check if the circuit breaker (CB) is in the "ON" position.
- Check if the inverter switch is in "ON" (I) position.
- Check Storage Core internal temperature. If temperature is lower than 30°F, the system is already charged and it will not begin another charge cycle until the temperature rises above 30°F.
- Check if ambient temperature is greater than 60°F. If temperature is lower than 55°F +/- 5°F the system will not charge.
- Turn vehicle engine on and verify that green LED on inverter is illuminated, if not refer to Malfunctions during system "Charge Mode" section for the diagnosis.

Note: During all BCT system testing where it asks to check pin continuity at the PCCU 10-way connector; do not disconnect the connector. Doing so will result in the system delay timer to reset and all testing will be delayed 30 minutes until timer has completed its cycle .

Refer to the diagram below regarding references to the Shore Power 10-way connector throughout the troubleshooting section.



Shore Power 10-way connector pin layout

Pin	*Description*
A	12VDC battery
B	12VDC battery
C	Ground battery
D	12VDC PCCU power input
E	12VDC "Ignition ON" input
F	12VDC PCCU output "Charge Mode ON"
G	12VDC PCCU input "Charge Mode ON"
H	12VDC condenser fan
J	Not used
K	Not used

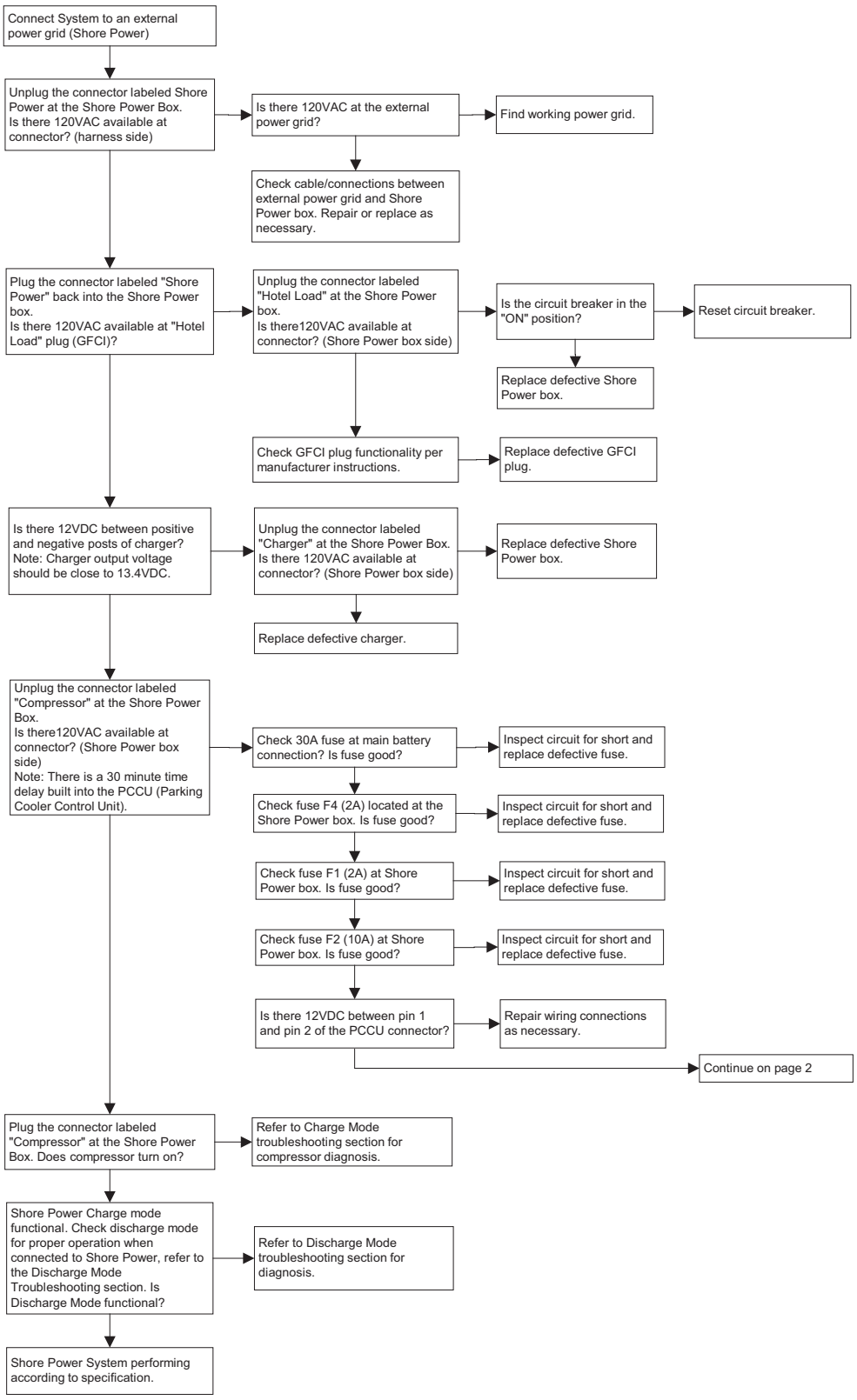
Malfunctions during system "Shore Power"

Additional checks before troubleshooting:

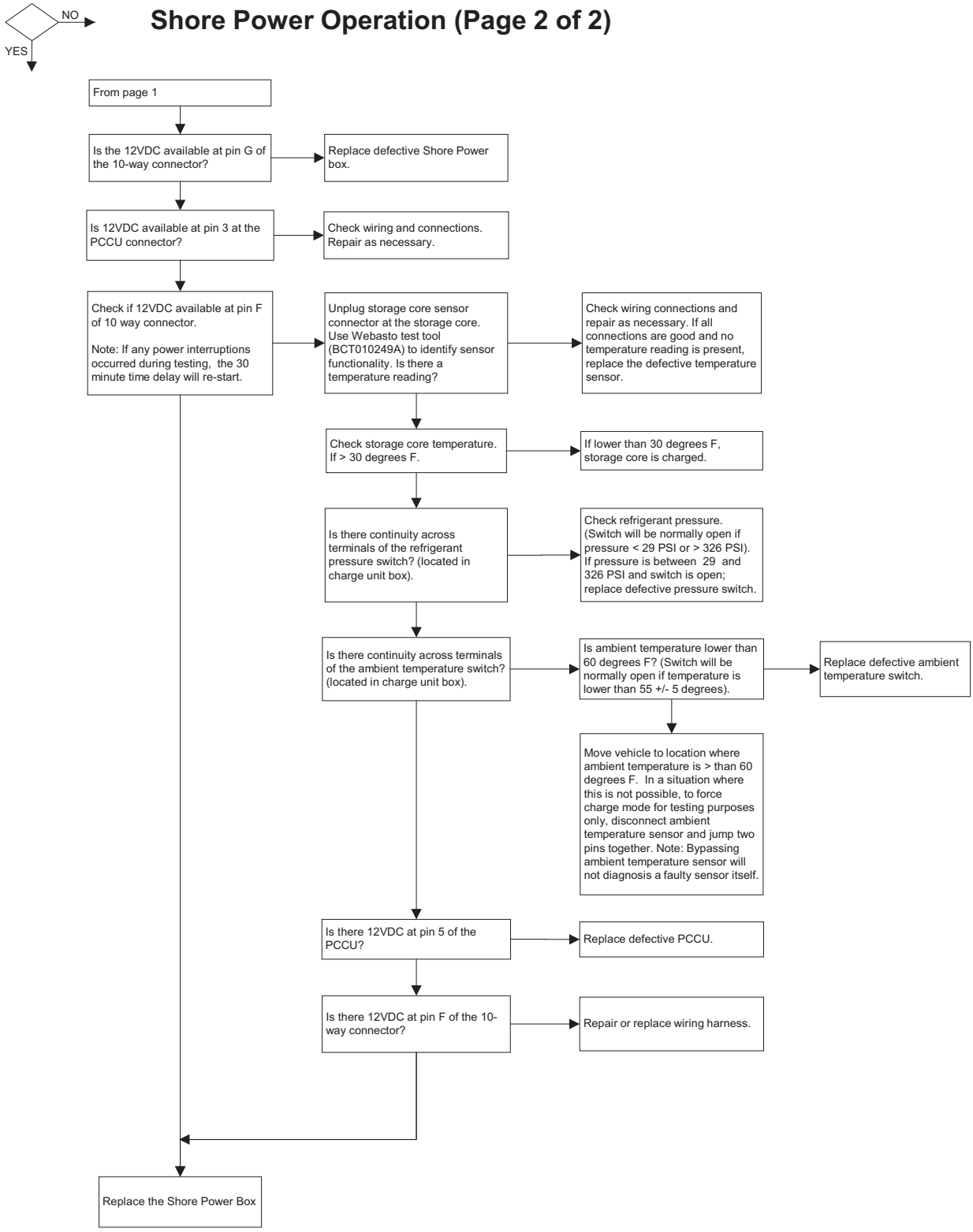
- Verify voltage output is approximately 120VAC at the external power grid.
- Make sure there is no additional load(s) connected to the same power grid. This could trip the circuit breaker during the compressor start.
- Disconnect any "Hotel Load" inside the vehicle that might be connected to the interior GFCI plug.

NO
YES

Shore Power Operation (Page 1 of 2)



Shore Power Operation (Page 2 of 2)



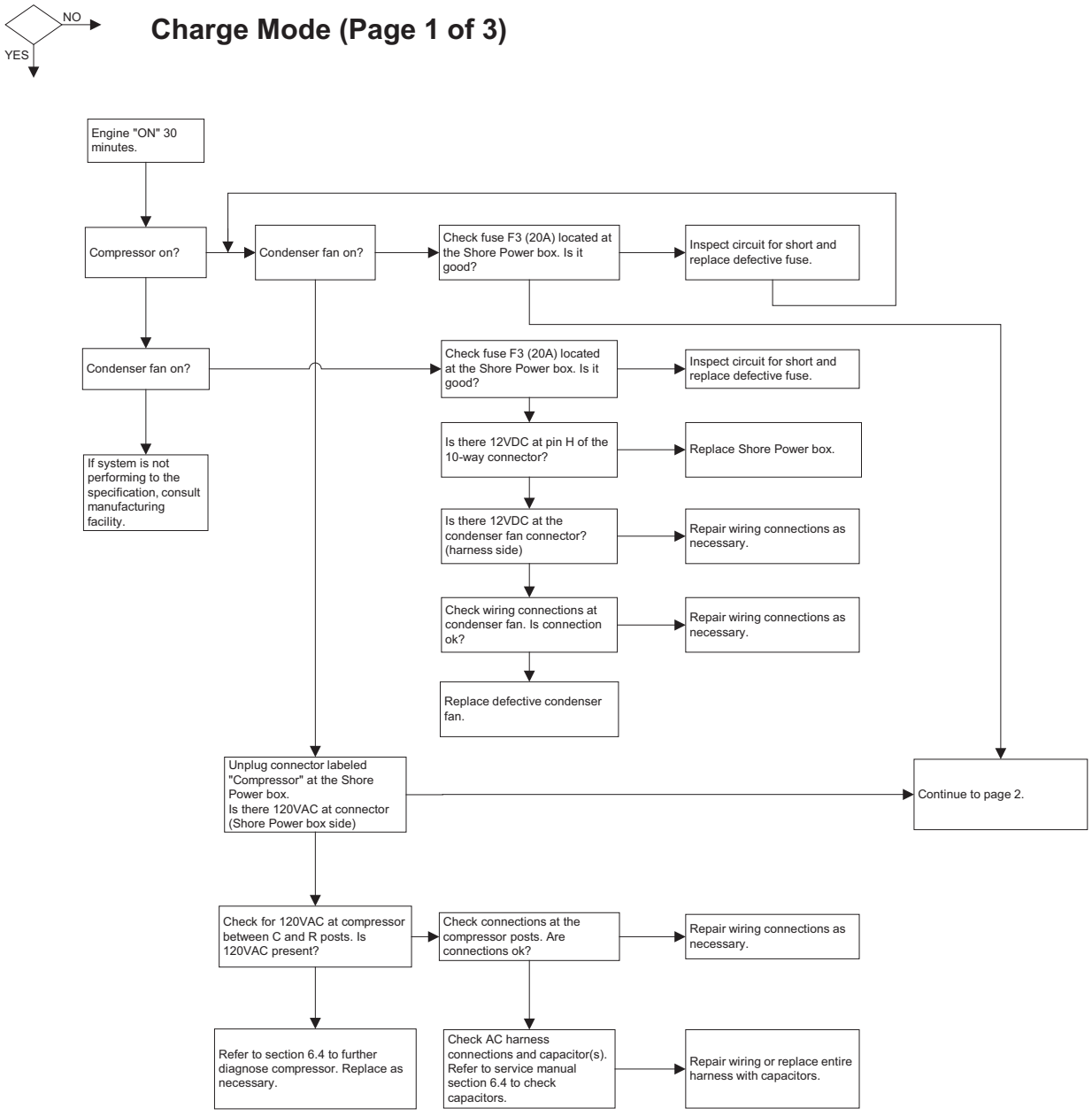
Malfunctions during system "Charge Mode"

The PCCU has a built in delay time operation feature. The engine must run for 30 minutes or the system must be plugged into an external power grid using only the Webasto supplied 25ft extension cord (P/N: 8510429A) before system will begin charge mode operation.

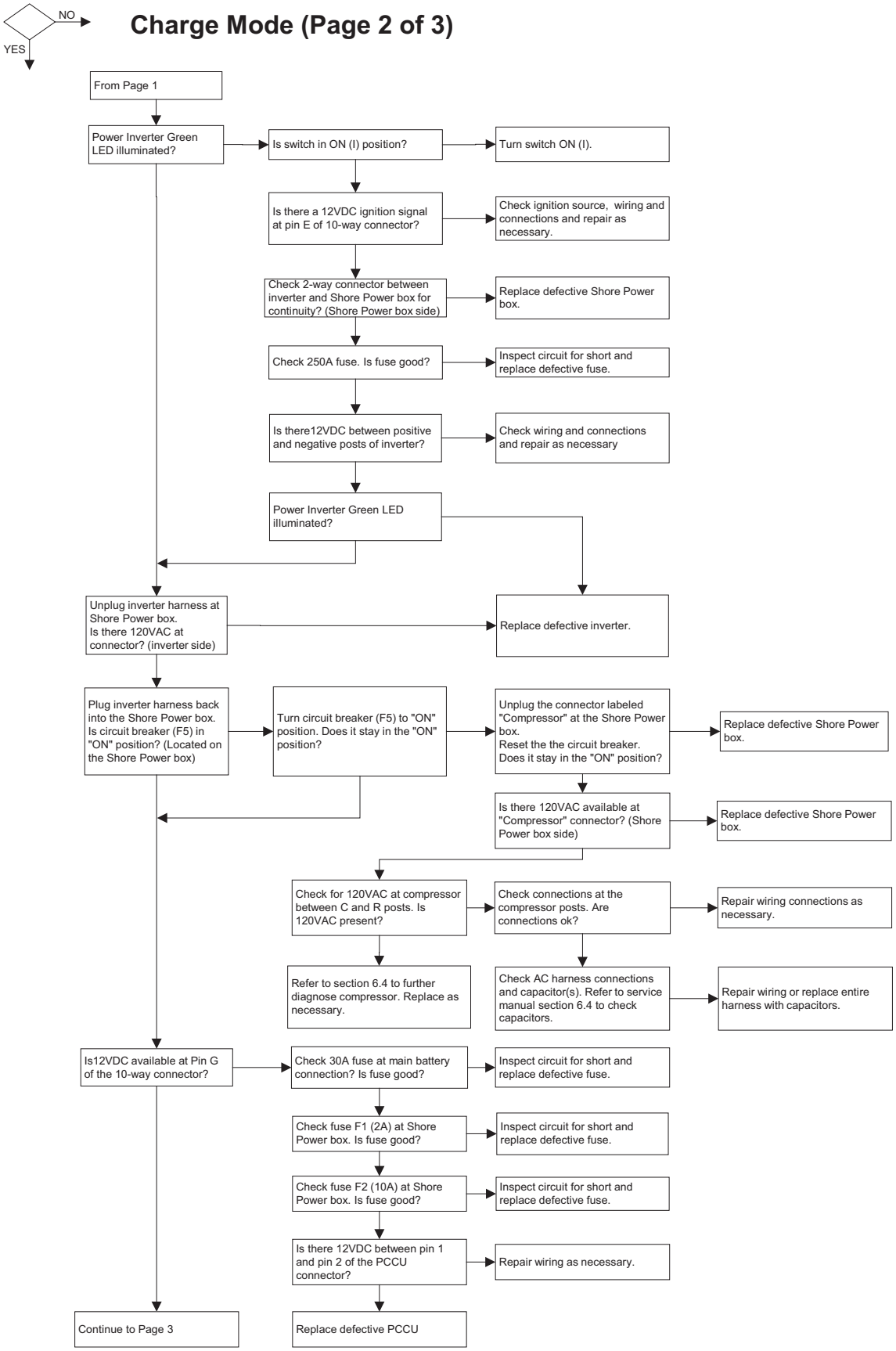
Additional checks before troubleshooting:

- Check continuity across terminals of the ambient temperature switch located at the charge unit. If there is no continuity and ambient temperature is greater than 60°F replace the defective temperature switch.
- Check continuity across terminals of the pressure switch located at the charge unit. The switch will normally open for pressure lower than 29 PSI and greater than 326 PSI. If open and pressure measured is between 29 and 32 PSI, replace the defective pressure switch.

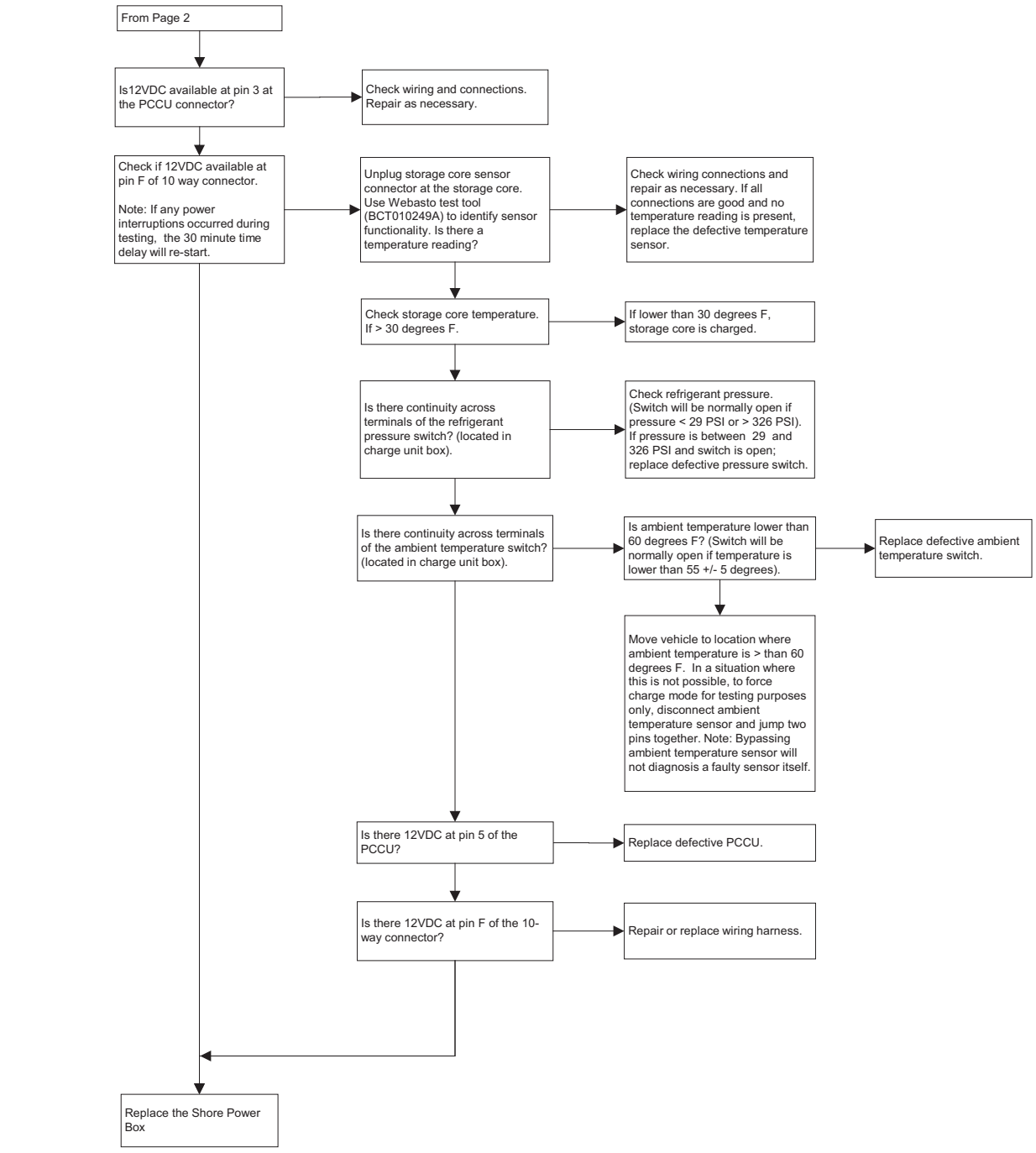
Charge Mode (Page 1 of 3)



Charge Mode (Page 2 of 3)



Charge Mode (Page 3 of 3)

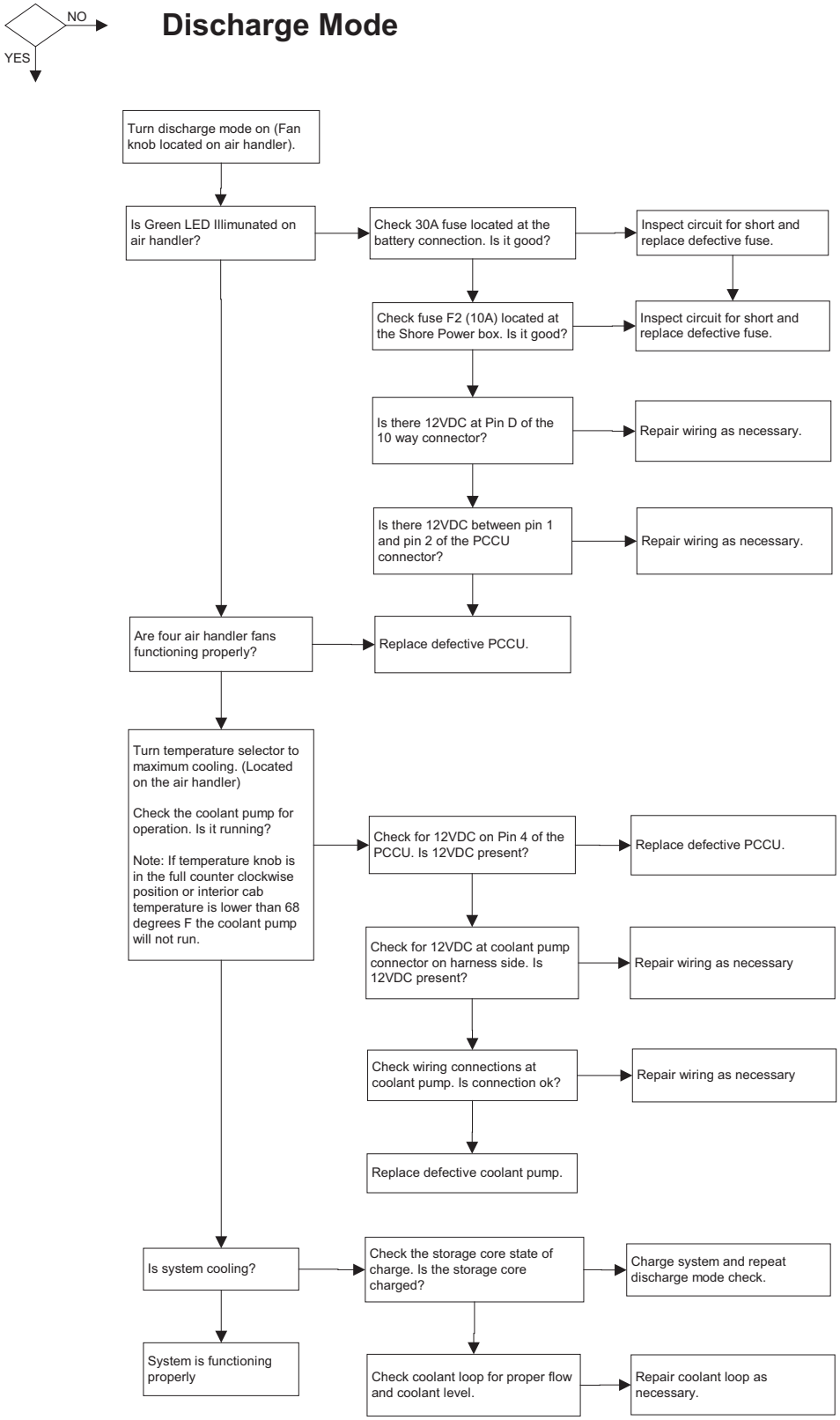


Malfunctions during system "Discharge Mode"

Additional check before troubleshooting:

- Check the vehicles interior temperature. If it is lower than 68°F the coolant pump will not run and chilled air will not be felt coming from the wall mounted air handler.

Discharge Mode



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Webasto

Feel the Drive

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