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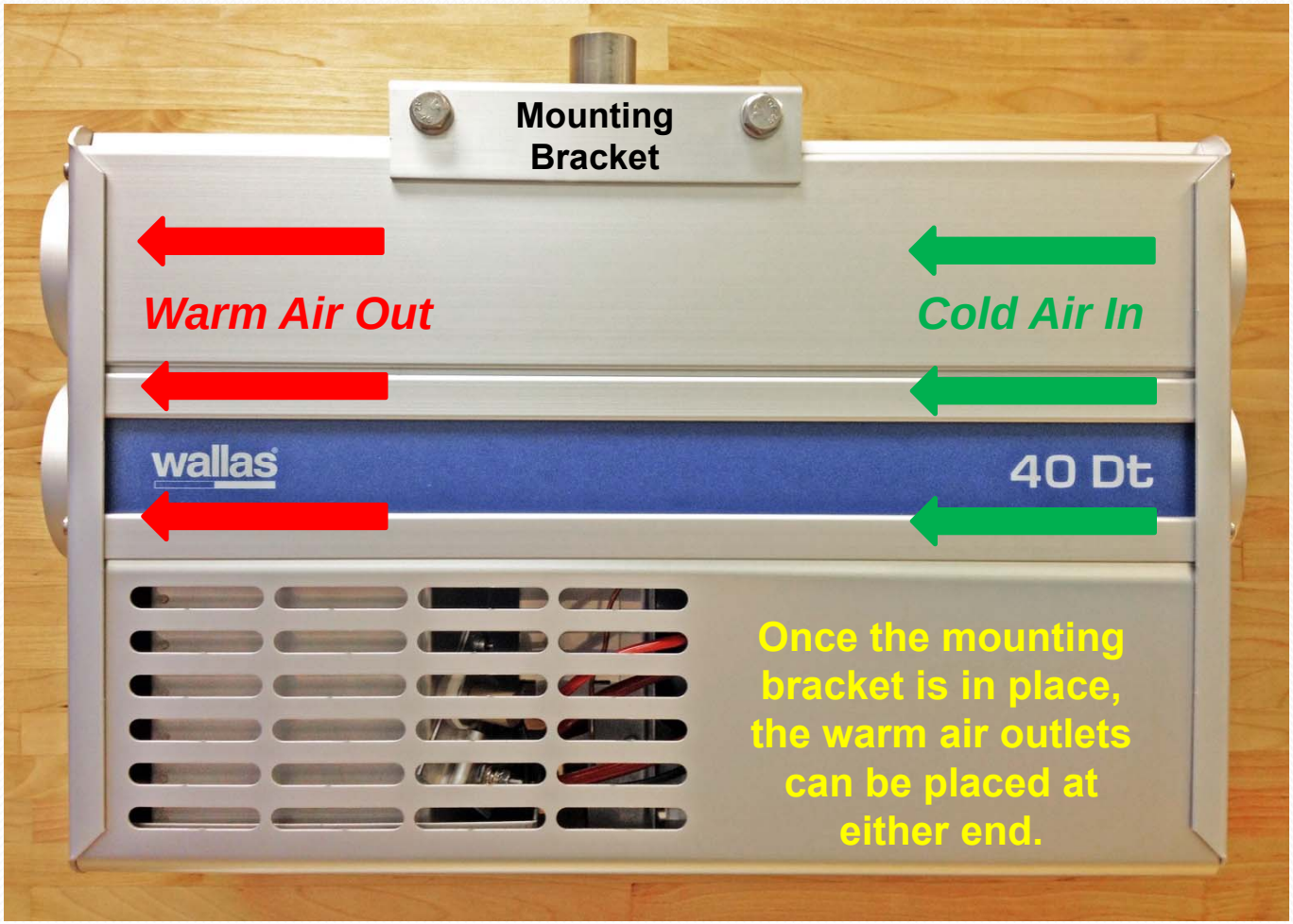
Forced air mobile diesel heating systems.

Installing a Wallas Dt Forced Air Heater:

Section 1: Location

- **Finding a location for the heater:**
  - It should be mounted upright, higher than the fuel, placed to allow duct runs and within heater exhaust run limits. It can be mounted parallel or athwartships.
    1. In the cabin
    2. In a locker/closet within the cabin
    3. In a diesel engine room
    4. In a lazarette or exterior locker
- NEVER in a gasoline engine room!!!

Figure 1: Heater Reference



Power, control harness and fuel connections are located on the bottom of the heater case.

Section 2: Exhaust System

- **Find a place for the exhaust through hull or house.**
  1. Within specific heater exhaust run limits,
  2. Not facing the direction of travel,
  3. Aft of the widest point of the beam,
  4. Not on the back of the house to prevent “station wagon” effect.
  5. Allowing for 12” loop or rise inside the hull or house.
  6. 12” or more above the waterline.

     - See Figures 2 & 2S.

Figure 2: Exhaust outlet locations

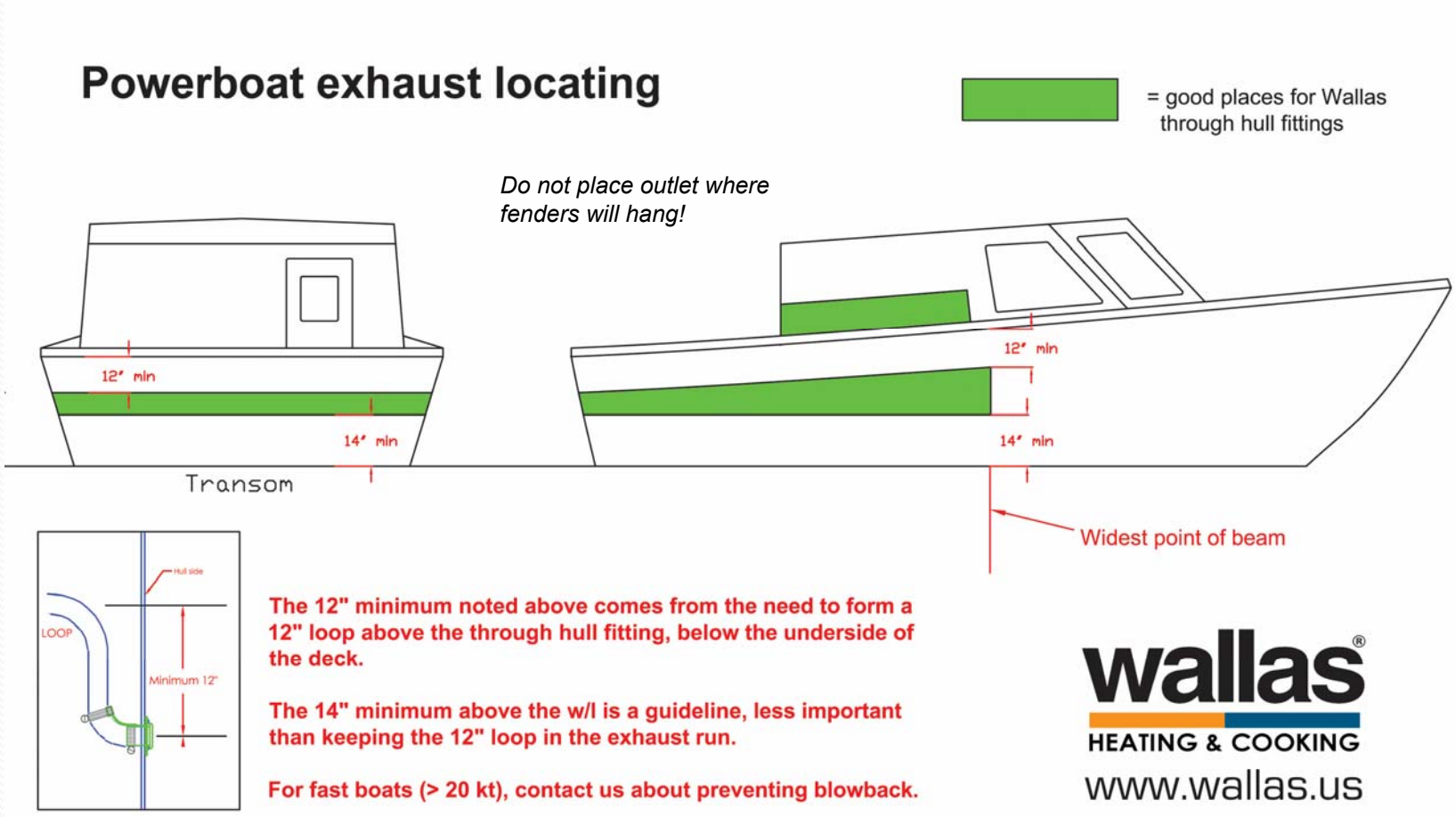
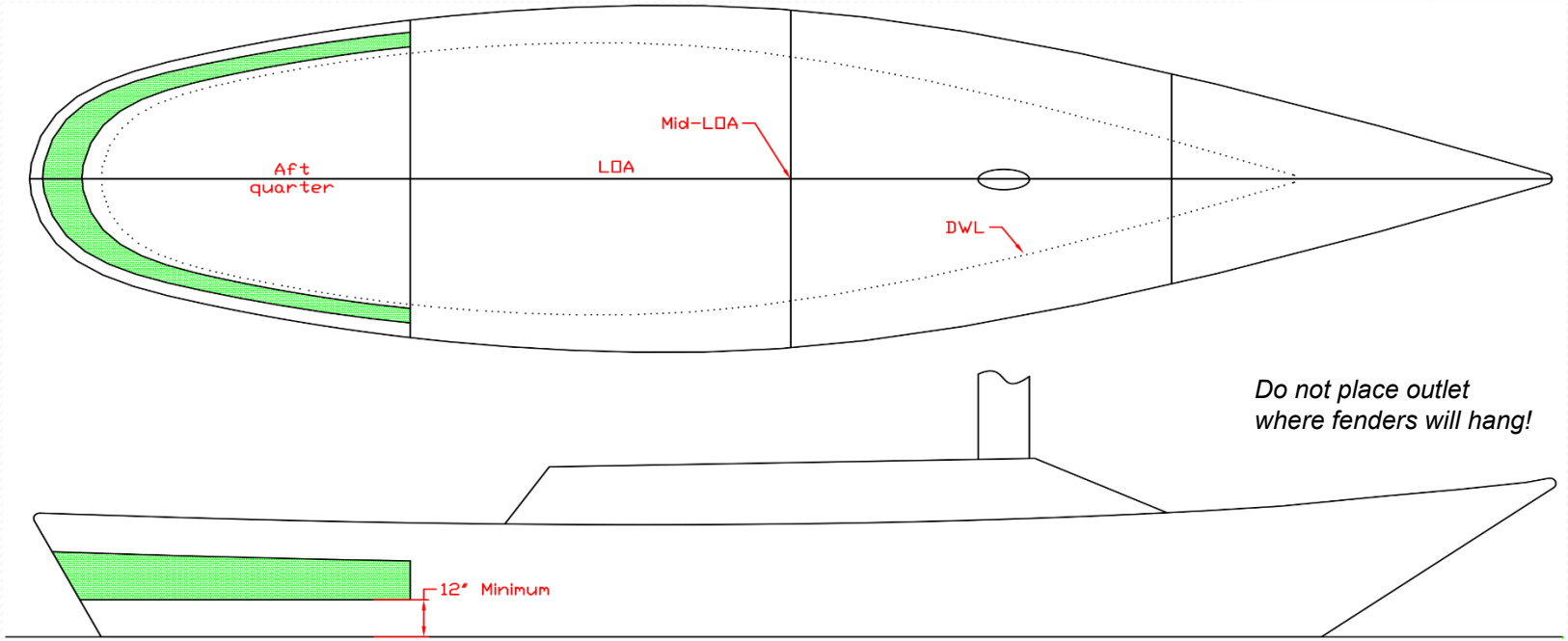


Figure 2S: Sailboat exhaust outlet locations



Green shaded area represents ideal locations for Wallas exhaust through hull fittings on monohull sailboats. Through hull routings must include a 12" vertical drop in the last 14 inches of the flexible exhaust run, to form a preventive loop to eliminate the possibility of water entering the system and becoming entrained.

Exhaust perforation can alternatively be made on top of house, providing a covered or elevated covered fitting is installed.

Section 2: Exhaust System

- Make the exhaust run as necessary. Avoid tight turns and keep away from wiring or plastic objects.

- See the descriptions in figures 3. and 4.

Figure 3: Exhaust routings

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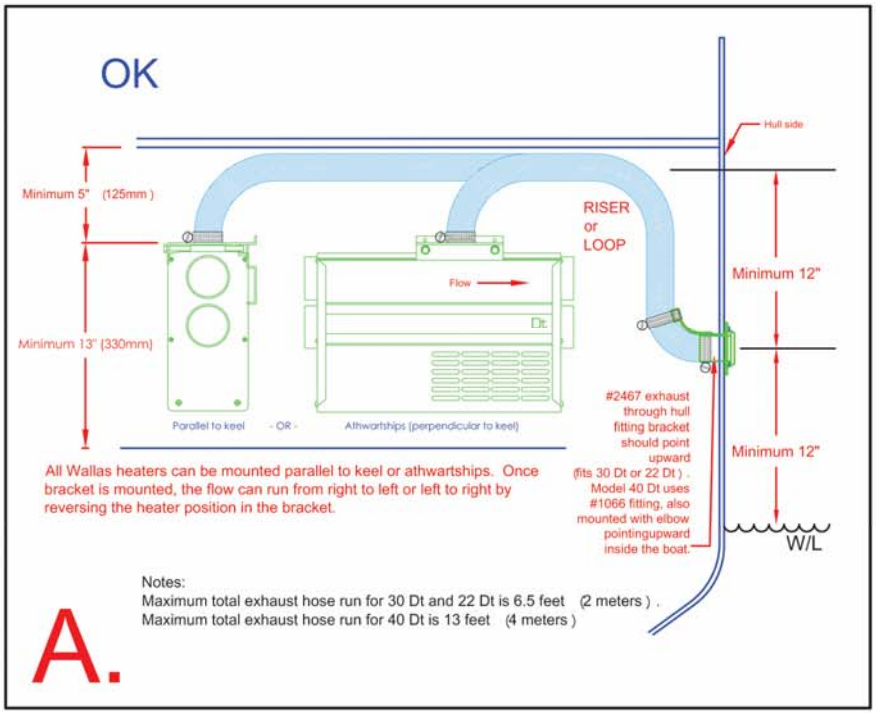
Wallas Furnace Exhaust Routing:

If your Wallas device is to be mounted in a location where the exhaust nipple is lower than 12" above the through hull point, or you can't avoid having "bellies" in the run, use the installation methods shown in examples A. or C. here. The riser or loop shown prevents any water from entering the system.

Exhaust pipe should be covered with fiberglass insulating sock. Configurations will be the same for either single pipe (40 Dt) or duplex exhaust pipe systems (30 Dt & 22 Dt).



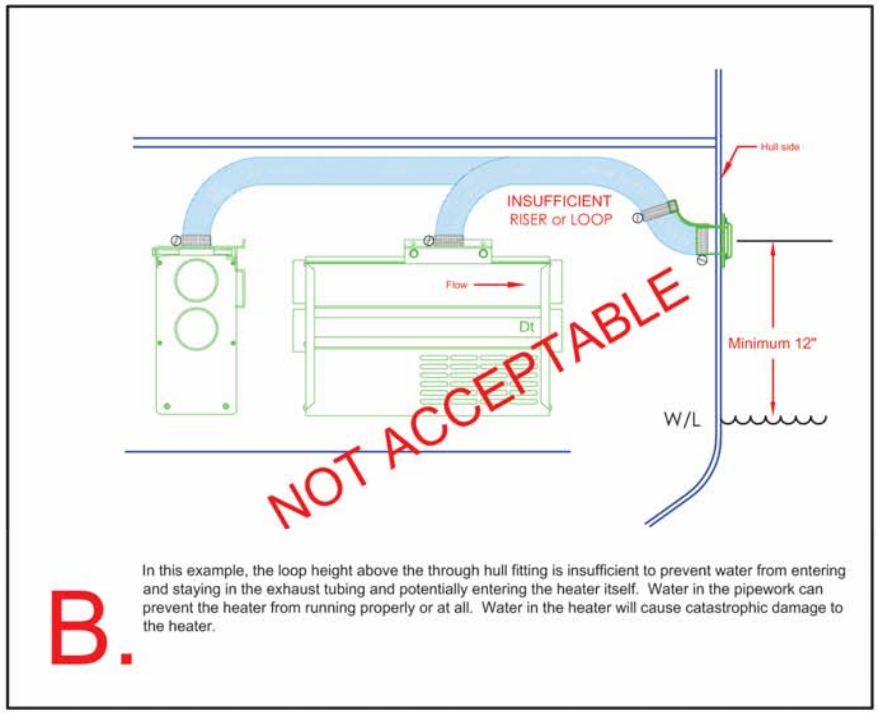


Figure 4: Exhaust routings

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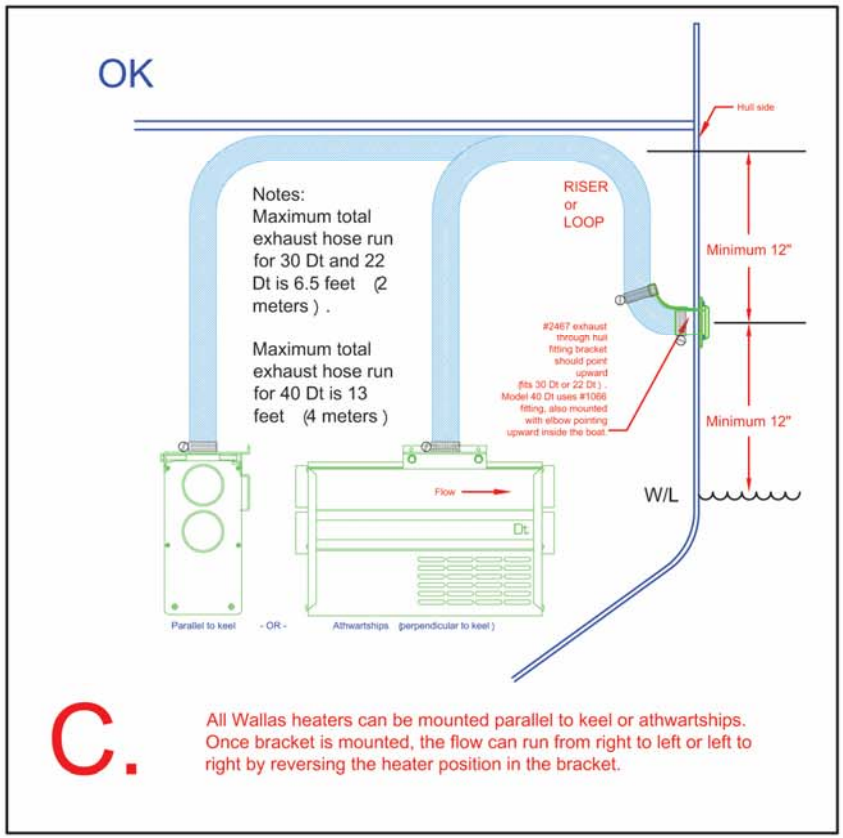
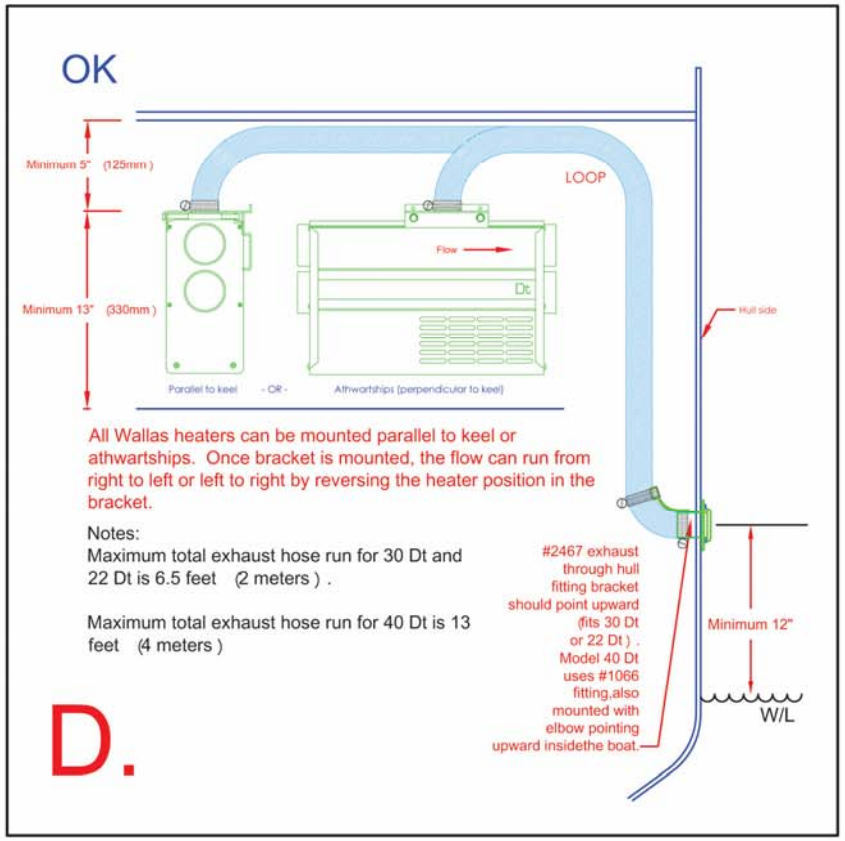
If your Wallas device is to be mounted in a location where the exhaust nipple is more than 12" above the through hull point, simply route the exhaust pipe from the stove to the through hull, without any low points or "bellies" in the run. See example D.





Section 2: Exhaust System

- **Installing duplex exhaust:**

Section 2: Exhaust System

- **Special Note:**
  1. The 40 Dt is different from any other Wallas heater. It uses a single 28mm exhaust pipe without a surrounding combustion pipe. This pipe can be 13' long, much longer than any other Wallas heater. The pipe must always have #1029 fiberglass sock on it for insulation.

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Section 3: Fuel connections

- **Make fuel connection.**
  1. If using a Wallas supplied day tank, just connect the parts, shorten the fuel line from the filter end as appropriate to the installation, and attach the tank appropriately to prevent it moving.
  2. If using a dedicated day tank from other suppliers, verify it is a top of tank pickup, use a Wallas filter and fuel line only. If the tank pickup ends in a ¼" hose barb, this will make connections easy.

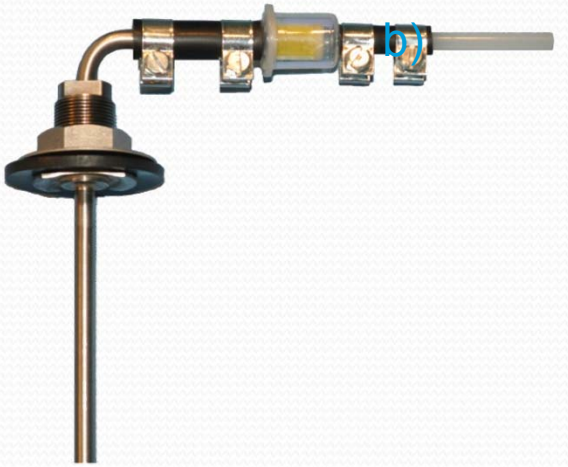
Section 4: Fuel connections

3. If taking fuel from the main tank or a shared tank, assure the Wallas device has its own pickup.

a)

You can use a #50011 custom drop tube to match an existing female fitting, or adapt to a breather fitting,

b)



or use a #30011 drop tube to make a new penetration into the top of the tank.

Section 3: Fuel connections

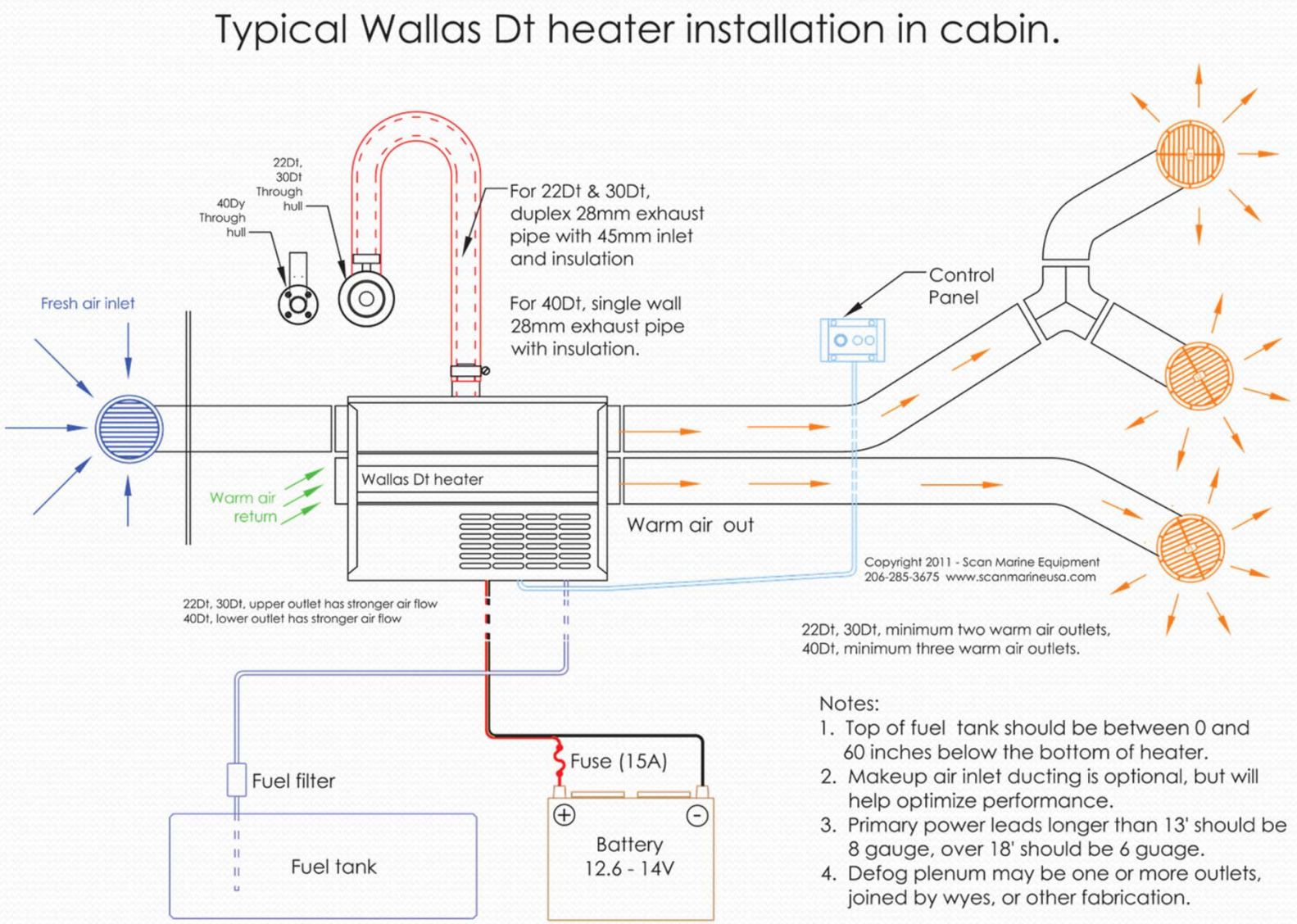
4. When connecting the fuel line to the fuel pump, ALWAYS hold the fuel pump elbow with ViceGrip® or equivalent and use a 12 mm end wrench to tighten the fuel nut to the elbow VERY TIGHT. This will assure no air leaks.

Section 4: INLET duct connections

- A. If mounted in the cabin, you can choose to:
  1. Leave the inlets alone, drawing all inlet air as return air from the cabin.
  2. Draw some air from outside of the cabin to improve drying and adding fresh air to the cabin.
  3. (In either case, adding ducts to the inlets will lower noise level)

(See Figure 6)

Figure 5:



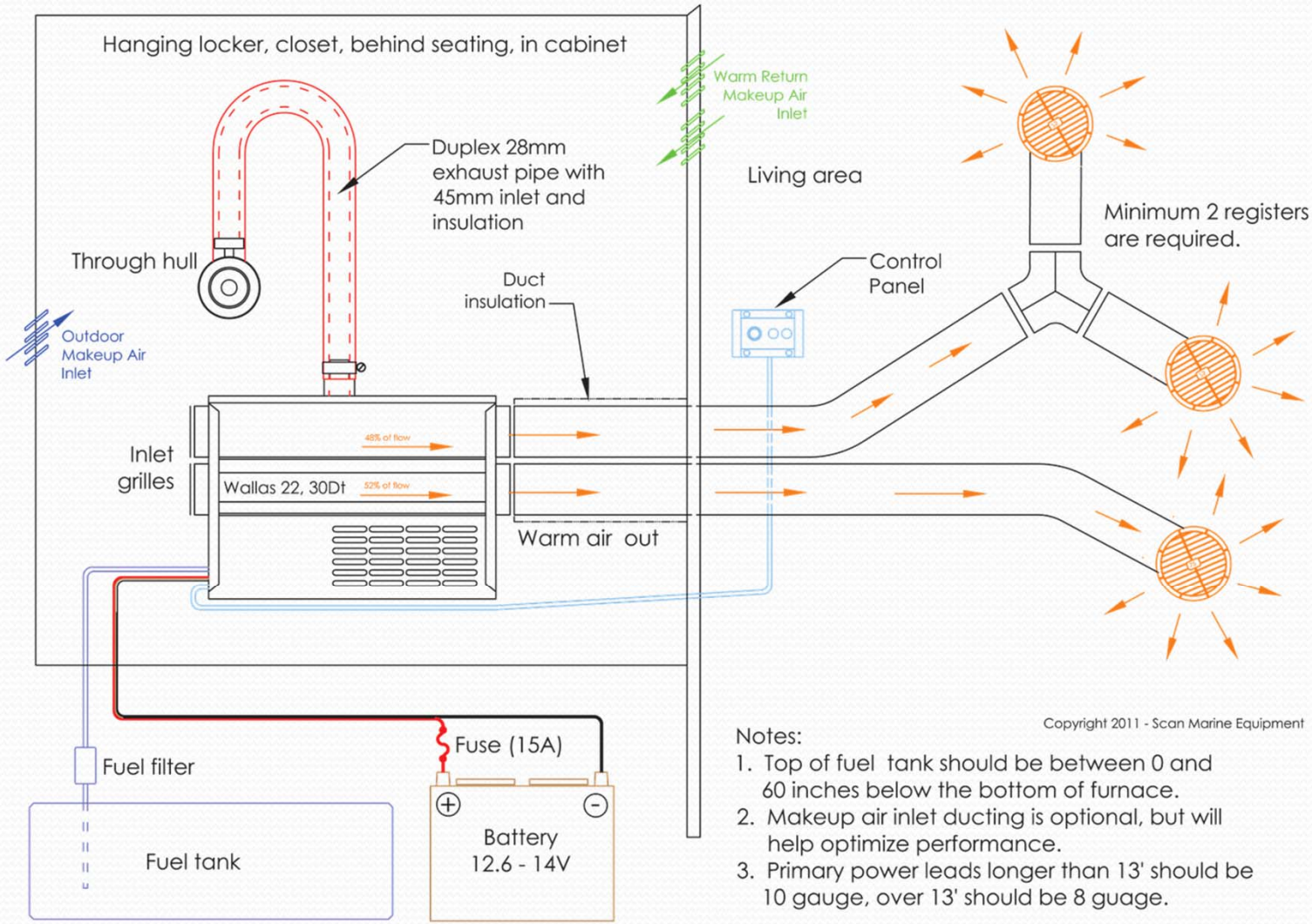
Section 4: INLET duct connections

- B. If mounted in a locker/closet within the cabin, you can choose to:
  1. **Leave the inlets alone, drawing all inlet air from the locker/closet. You must be sure enough makeup air flow into the locker/closet is available, meaning a minimum of 25 square inches. If some air flow into this area can be from outside (fresh air) and some from the cabin (return air). This air flow will act to warm and dry any items in the locker/closet, making it a "plenum" for inbound air.**
  2. **Duct either the return air or fresh air or both into the heater inlets from outside the locker/closet. Remember, if the heater has clear inlet air flow, the outside of the heater itself will only get warm to the touch. If the locker is going to get indiscriminately "stuffed" with goods that might impede air flow, then ducting inlet air is important.**

(See Figure 7)

Figure 6:

Typical Wallas 22Dt or 30Dt installation (closet).

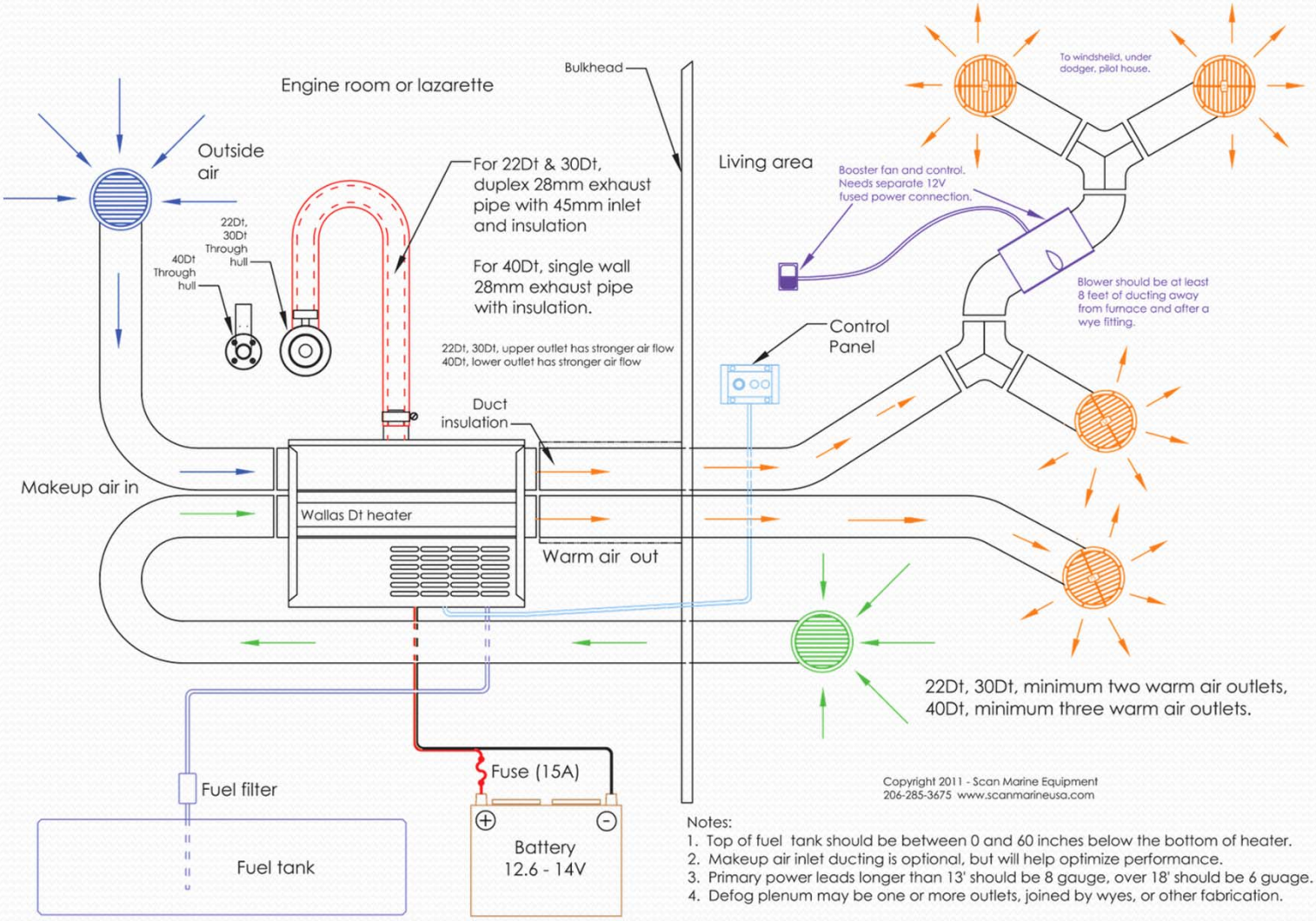


Section 5: INLET duct connections

- C. If mounted in a diesel engine room, the heater ***must draw all makeup air from outside the engine spaces***.
  1. Run a dedicated duct from outside the boat to the upper inlet fitting on the heater. Make sure that water can't directly enter the outside inlet fitting under any circumstances.
  2. Run a dedicated return air duct from the living quarters to the lower inlet fitting on the heater. The inlet fitting inside the cabin should be low & distant from any warm air outlets, and will help to warm the place where it is located.
  3. Both makeup air duct runs should be less than 8 feet long each.

Figure 7:

Typical Wallas Dt heater installation (away space) w/ defog.



Notes:

1. Top of fuel tank should be between 0 and 60 inches below the bottom of heater.
2. Makeup air inlet ducting is optional, but will help optimize performance.
3. Primary power leads longer than 13' should be 8 gauge, over 18' should be 6 guage.
4. Defog plenum may be one or more outlets, joined by wyes, or other fabrication.

Section 4: INLET duct connections

- **D. If mounted in a lazarette or external locker, verify that space is completely separate from the engine spaces.**
  1. Run a dedicated duct from outside the boat to the upper inlet fitting on the heater. Make sure that water can't directly enter the outside inlet fitting under any circumstances.
  2. – or - leave the upper inlet fitting disconnected if the lazarette or external locker has sufficient air flow from outside. This will help dry the area surrounding the heater when it runs.
  3. Run a dedicated return air duct from the living quarters to the lower inlet fitting on the heater. The fitting inside the cabin should be low and distant from any warm air outlets, and will help to warm the place where it is located.

Section 5: OUTLET duct connections

- **A. If mounted in the cabin, outlets can be left bare to blow directly into the area, or: (See Figure 5)**

1. Run ducts to two or more locations, normally low in the boat, since heat will rise naturally.
2. Ducts can all be full sized (3”) or the duct size can be reduced to 60mm when running to small spaces.
3. (OPTION) for defogging windows, a branch to the windows should always be located **after a wye**. In some applications, an in-line blower can be incorporated to boost flow to the windows for short durations.

Section 5: OUTLET duct connections

- **B. If mounted in a locker/closet within the cabin, you can: (See Figure 6)**
  1. Run ducts to two or more locations, normally low in the boat, since heat will rise naturally. Ducts can all be full sized (3”) or the duct size can be reduced to 60mm when running to small spaces.
  2. (OPTION) For defogging windows, a branch to the windows should always be located **after a wye**. In some applications, an in-line blower can be incorporated to boost flow to the windows for short durations.

Section 5: OUTLET duct connections

- **C.** If mounted in an engine room, lazarette or external locker, you can: (See Figure 7)
  1. Run ducts to two or more locations, normally low in the boat, since heat will rise naturally. 40 Dt units need to have three outlets as a minimum, if the outlets are to retain their valve controls.
  2. Ducts can all be full sized (3”) or the duct size can be reduced to 60mm when running to small spaces.
  3. (OPTION) For defogging windows, a branch to the windows should always be located **after a wye**. In some applications, an in-line blower can be incorporated to boost flow to the windows for short durations.
  4. Insulate any ducting exposed in non-heated areas to reduce heat losses.

Section 5: Outlet duct connections

- **D. Adding duct outlets beyond the two or three normally required for these heaters can add a lot of expense and labor. Sometimes it is worth the extra cost and work, but sometimes not. Excessive numbers of outlets can reduce apparent performance by slowing the time to heat cabin air due to losses into the ductwork & the surrounding structures. Heating the air first means you will heat the occupants more quickly. Less outlets leads to more aggressive stirring of the air, heating the air more quickly.**

Section 6: Electrical connections

- **The Wallas power supply should be fuse or breaker protected to 15 amps.**
  1. **The system will arrive with 13’ of 11 GA wire. If this is long enough to reach the battery or main bus, it should be large enough to carry the starting amperage to start the heater.**
  2. **Longer wire runs WILL require larger wire gauge.**
  3. **When testing the heater, a flashing yellow panel light may indicate low voltage, possibly power lead drop due to undersized or too long power leads.**
  4. ***The heater should always be shut off using the control panel. Do not cut the power supply while the heater is running.***

Section 7: Mounting the control panel

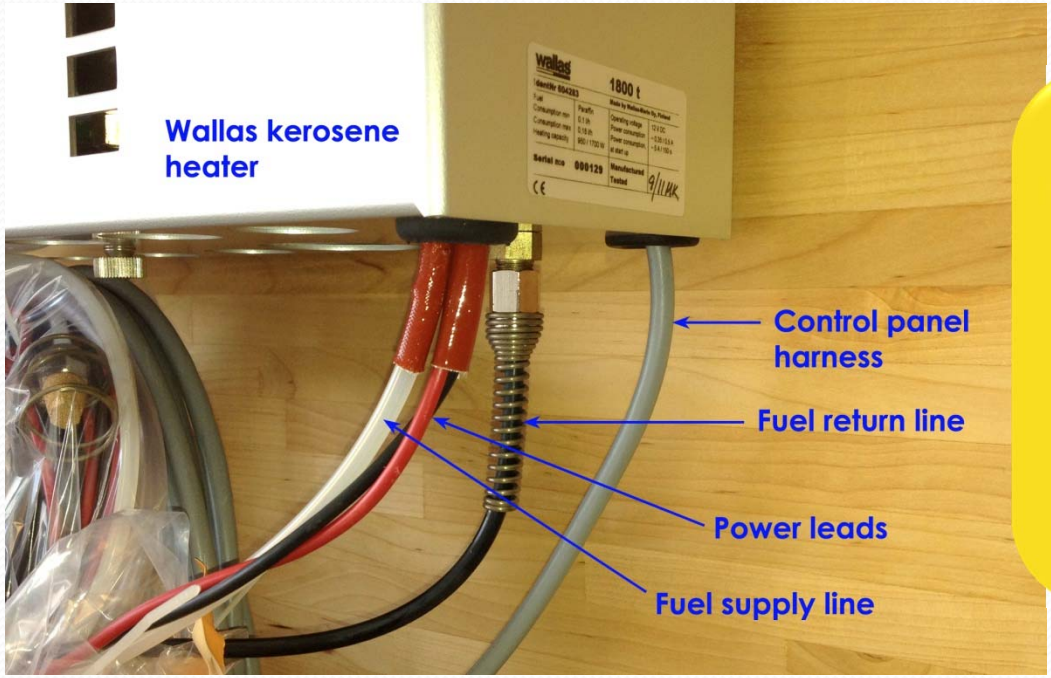
- **The Wallas Dt heater control panel comes fitted with a 20’ wire harness.**
  1. **The panel can be mounted with or without the supplied bezel. Thermo control function will work either way.**
  2. **Mount the panel in a good location for thermo control operation.**
     a) ***Away from outside walls.***
     b) ***At or about 4’ from the floor***
     c) ***Where sunlight will not hit it directly***
     d) ***Away from heat or cold generating sources***

Section 8: Lockout feature.

- **The Wallas Dt heater has a lockout feature that locks the system up if it has failed to start on two consecutive tries. On the third try, yellow, red and green panel lights will all flash rapidly.**
  - **To clear lockout:**
    1. **Leave panel on, all three lights must be flashing.**
    2. **Kill power to the unit:**
       - **Pull the plug, remove the fuse or turn off breaker.**
    3. **Return power to the unit:**
       - **Reconnect the plug, replace the fuse or turn on breaker.**
    4. **Push power button for two seconds, yellow light will glow briefly.**
    5. ***Heater is ready to start again, but before you do, investigate the system to figure out why it has not been starting successfully: fuel, power, glow plug failure, etc.***
    6. **When you are ready, push the power button once again for two seconds to start the system.**

- **Special addendum for kerosene fired products:**

Unlike diesel heaters and stoves, Wallas kerosene fired products have a fuel fuel tank when running.



In every case, the return line must make a steady, downhill run back to the fuel tank, with no low points or "bellies" in the run. This requirement will force the fuel tank to be located somewhere under and near the heater or stove.

Thank you!