Last updated: February 15, 2007

NOTICE: We sell these with complete wiring packs, and with just the Vegtherm tube itself plus the relay, wiring plug for relay, and circuit breaker. There are two different wiring plug wire colours for these two versions. The basic wiring (wiring by the numbers) is the same, since they are both plugging into a standard relay, **but the wire colors are different than what is described and shown in the photograph further into this document.**

If you have purchased the package **WITHOUT** the wiring pack, here is the information you need that **is different from the information further along in this document**…..

Number on bottom of relay:	**Wire color:**	**Connects to:**
87	GREEN	Circuit Breaker
86	RED	“Signal”
85	WHITE	Ground
87A	BLUE	Not used, snip off.
30	BLACK	Vegtherm RED wire

ALSO note that if you bought the package WITHOUT the wiring pack, not all the parts listed and described below are included and you will need to obtain them locally. The 3-way connector is the only thing that you may not be able to find locally. If that is the case, simply splice the wires together.

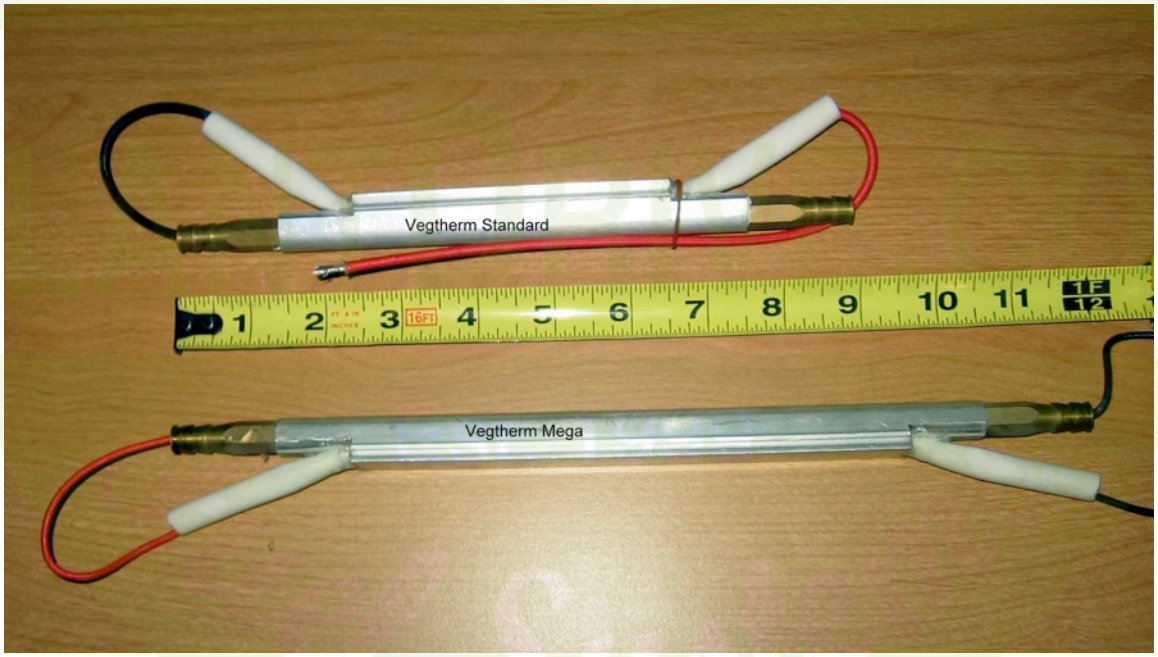
Installation and Troubleshooting Guide for:

Vegtherm“Standard” and Vegtherm “Mega”:

12V vegetable oil / biodiesel heaters

1 - Vegtherm Standard (max. 20A@12V) or Vegtherm Mega (max. 32A@12V) heating tube.

(Here is a picture of them side by side. Make sure you have the one you ordered before starting):



(cont….)

1- Bosch relay

1 - circuit breaker (one terminal marked as “bat”, copper colored, connects to battery. Other terminal marked as “Aux” connects to relay. Details below. Install circuit breaker as close to battery as possible.

2 - ring connectors (large, to connect to battery)

5 - butt connectors to extend wires as needed.

2 -silicone P clips to fasten the heater to something solid

5 -self-tapping screws

12' - red wire

6' - black wire

VEGETABLE OIL or BIODIESEL only.

NOTES:

Disconnect battery while installing.

Switch off or disconnect the heater if diesel fuel is being used.

This heater is designed to maintain vegetable oil at approx. 70C (158F). Results vary depending on fuel flow rate and other heating devices present in the system (e.g. Hotfox, Hotplate, etc.), and ambient temperature.

The heater is most often used as a “boost” heater, just before (as close as possible to) the injection pump, in systems that use engine coolant to help heat the vegetable oil. It is used in both single-tank and two-tank systems.

Vegtherm Mega: Overall Length 12”

Usual operation, amperage draw is anywhere in the range of 15-32 amps, most often in the 20 amp range. The charging system (alternator, etc.) must be capable of supplying the required current, allowing for other loads such as headlights, fans, etc. that may be in use at the same time. Minimum suggested alternator rating is 60 Amps

Vegtherm “Standard”: Overall Length 9”

This heater was designed as a shorter overall length tube and lower amperage draw (16-22 amps), and heating capacity is correspondingly reduced. Minimum suggested alternator rating is 40 Amps

CAUTION: Surface of either model will get VERY HOT when the heater is operating. This will occur within seconds of the unit being switched on.

Do not insulate other than a loose wrap of suitable heat resistant insulation left open at the ends, if you insulate at all. It is counterproductive. The heater must be able to “shed” some of it’s heat to the surrounding air to work properly. Isolate from contact with other items that could be damaged by heat. Mount solidly to a non-combustible surface by slipping the included orange and stainless Silicone-cushioned P-clamps over the body of the Vegtherm, then using two of the included sheetmetal screws to fasten the P-clamps to something solid.

On most Mercedes, we suggest mounting the Vegtherm to the injector hardlines as they radiate out from the injection pump to the injectors, using machine bolts/ screws and nuts to fasten the P-clamps to the hardlines.

Mount where heater will not be inadvertently contacted by people servicing the engine, changing a fuel filter, checking the oil, etc. (flat side down if possible).

Tools needed:

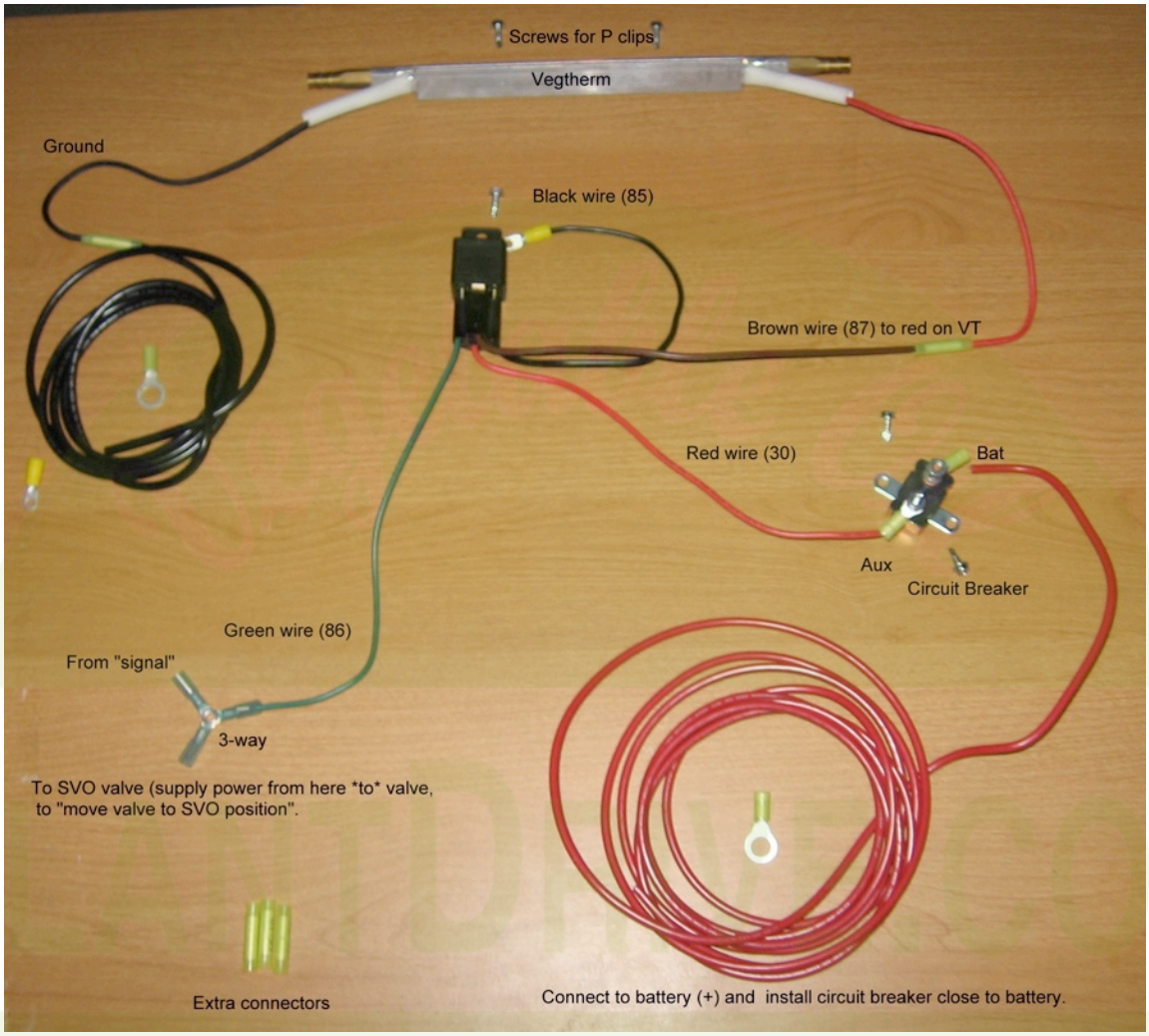
Wire cutters/crimper

Misc. common wiring connectors. Everything you’ll need should be included in the package if you purchased the complete kit.

Drill and bit to pre-drill for sheetmetal screws to attach the
Bosch relay, circuit breaker and Vegtherm clamps to engine bay sheetmetal.

Testlight (see “Troubleshooting” at the end of this installation guide for what this is and where to buy one, and how to use it).

Wiring is as follows: See photo and text that follows on next page:



(There are numbers on the Bosch relay next to each terminal, you can see these before you push on the wiring pigtail).

30 – Red wire on wiring pigtail – This is the main power in FROM 12 volt power supply (from battery, via circuit breaker that has been mounted as close as possible to the battery.)

Use red wire for this power-from-the-battery circuit.

85 - to Chassis ground (earth.) Black wire. Can be connected by installing a small round connector and using the same self drilling screw that is used to mount the relay, provided this is being installed to part of the car's sheetmetal (inner fender, firewall, etc.) so that a good ground is obtained.

86 - “signal” or “trigger”, low amperage side FROM a switched power source. Green wire. This is connected differently for a “SingleTank” installation than it is for a “Two-Tank” SVO installation.

Connecting #86 for SINGLE TANK: Switched power means something that's only on when the key is on and preferably a circuit that’s only on when the key is in the “Energize Glowplugs” position or something that’s only on when the car’s running. If you connect the signal wire of the Vegtherm to something that’s on with the key in the Accessory position, and sit in your can with the radio or CD player on, the Vegtherm could run down your battery (and the same thing can happen if you sit in your car with the key in the “Energize Glowplug” position – hence the preference for a circuit that’s only on with the car running.

Connecting #86 for TWO-TANK: Since the Vegtherm heats up so quickly and since you do not want it operating when running on diesel, it is simplest to use the 3-way wiring connector that is provided and connect the wire from #86 to one side of this connector, and then connect the other side to the “signal” or “trigger” and connect the SVO valve to the third connection, such that when a toggle switch or controller is providing current to switch a valve to SVO, that same source is used to turn on the Vegtherm.

So, if you are using a Pollak motor drive valve, the current would flow from the SVO position of the toggle switch, perhaps to some other thermoswitch or controller (or directly from some controller if no toggle switch is used), then to our 3-way connector, then to wire “D” or “E” on the Pollak valve wiring connector (whichever one has been identified as being “live” when the valve is in the position which will allow SVO to flow to the engine). See APPENDIX “A” if you need further information on installing the Pollak valve and determining how to wire it so it’s wiring is shared with the Vegtherm so that when the SVO is selected, the Vegtherm also is turned on.

If you are using two 3-port solenoid valves instead of a 6-port Pollak motor drive valve, it is simply going to connect from our 3-way connector to the wire or terminal of the valve that, when energized, moves the valve to the SVO position (and holds it in that position for as long as power is supplied). The effect, either way, is that when SVO is selected, the Vegtherm is switched on, because the relay “closes” and current from the battery’s positive post is then allowed past the relay, and flows, via #30, then #87, from battery to Vegtherm.

87 - out to Vegtherm. This is the brown wire.

Route all wires a safe distance from anything that gets very hot – like the exhaust manifold and the Vegtherm - and anything that rotates -like the cooling fan at the radiator, the alternator, the air conditioning compressor and the like, and away

from the belt or belts connected to these rotating items. Use zip-ties to securely fasten the wires to handy stationary items - existing wiring looms are often a good choice.

Troubleshooting the Vegtherm Wiring:

1. After completing the wiring and mounting of the Vegtherm, energize it (aka "turn it on") by turning the ignition key to the " Energize the glowplugs position" or the “Run” position (depending on what you’ve hooked the signal wire for the Bosch relay to) then flipping the switch to the Pollack 6-port fuel selector valve to the WVO position, if your vehicle has a TwoTank system.

2. Now, with the key and/or key and switch still on:

Check - VERY CAREFULLY - the Vegtherm by touching it. (The surface of the Vegtherm will reach 250F or hotter within a minute or two of being energized - so touch it like you would when testing a hot iron - thoroughly wet the tip of your finger (saliva is fine) and touch the Vegtherm very quickly.)

An even safer method is to just put a dab of saliva or water on the heater while it is cold and **then** turn on the power to the Vegtherm.

If the Vegtherm has been installed correctly, it should be too hot to comfortably touch for more than a millisecond within 30 seconds of being energized. If this is the case: congratulations, you've done it right!

3. If it's not any warmer than that part of the vehicle to which it's attached, there's something wrong. Recheck all your wiring, per the installation guide. (A very common mistake is not properly grounding one end of the Vegtherm.)

4. Using a Test Light:

To check for a good ground and for power, you'll need an icepick-style test light - any auto parts store will have one, as will OSH and Home Depot, or the Snap-On or Mac Tool guy. It looks like a screwdriver with a pointed end instead of a blade, and it has a wire attached to the handle end, with an alligator clip on the end of the wire, and a light that lights when you've touched the pointy end to something "hot" - carrying 12V current - while the alligator clip is clipped onto a good ground.

If you've never used one, familiarize yourself with the elegant simplicity of the thing by clipping the alligator clip to the end of the bolt on the negative battery cable - the negative cable is usually black, and the post on the battery to which it attaches is usually marked with a large minus sign (while the positive cable is

usually red, with a large plus sign next to the post, and the positive post is usually larger than the negative cable.

So, attach the alligator clip to the negative cable's bolt (there's a nut and bolt on the clamp portion of each of the battery cables - unless you have a side-terminal type battery, in which case there will just be a bolt head on the side of the batter to which each cable attaches.

Then touch the pointy end of the test light to the positive cable - the light should light up. If it doesn't, you're either got a dead battery, a burned out test light bulb, a defective test light, or you've not followed the above instructions correctly.

Let's assume the test light lights up:

You now can test all of the connections on the Vegtherm, the circuit breaker, the 75A Bosch relay, the connections at the battery, and wherever you found power to energize the relay when you turn on the key - for SingleTank - or, if two-tank, on the switch of the Pollack 6-port valve and at the positive connection on the Vegtherm.

You'll be leaving the alligator clip attached to the negative cable of the battery, and testing for 12V power at various connections. Some of these connections may be too far from the battery for the test-light to reach. If this is the case, you can clip the alligator clip to a good chassis or engine ground - something metal, like a bolt-head. Most of the metal parts of the engine are grounded, since the engine is connected to the (metal) frame or unibody structure of the vehicle via a ground strap.

To test for a good point to which to ground your test light: clip the alligator clip to it, then touch the pointed end of the tester to the battery positive cable clamp or the positive cable itself. If the test light lights, you've got a good ground.

You'll use this same technique to test those connections of the Vegtherm and/or Vegtherm circuit that are supposed to be grounded - you'll hook the alligator clip to those connections, then touch the pointy end of the tester to the battery positive or to some part of the Vegtherm circuit that should be "hot" - carrying 12V current, and seeing if the test light lights.

Worst-case, of course, in the scenario in the last paragraph, you'll be attempting to find a good ground by touching the pointy end to a connection on the Vegtherm circuit and you'll get a "false negative" - that is, the test light won't light up, leading you to suspect a faulty ground, when the cause could in fact be that there's no 12V current to the allegedly hot connection you're touching the pointy end to. This is why using the battery positive cable is better, if the wire of the test light will reach that far - it's a known good source of 12V current (once again,

assuming the battery isn't dead - and assuming that the batteries cables are in good shape and connected well.

You can add to the length of the wire of the test light, of course. You can also find something in the vehicle's stock electrical system that's hot when the key's in the "Start/energize glowplug circuit" - the fuel shutoff solenoid is good spot, located on the injection pump of most diesel vehicles (with Mercedes being a notable exception - they use vacuum to shut off the flow of fuel. The Mercedes fuse box is a good source of 12V power, and it's conveniently located on the opposite side of the engine compartment from the battery.)

(The glowplugs themselves might seem like a likely candidate - but they only remain on for a minute or so after you first turn on the key.)

5. Testing your connections:

The first thing to do is to simply test all connections for tightness. If they're all tight, you'll need to test for current flow and good grounds.

I'd start with the ground connections, since, once again, not grounding the Vegtherm at the Vegtherm seems to be the most frequent source of a "dead" Vegtherm.

To test the Vegtherm's grounding at the Vegtherm: clip the alligator clip of the test light to the end of the black wire you've spliced onto the black wire of the Vegtherm and connected to what you'd hoped was a good ground.

Touch the pointy end of the test light to the battery's positive cable end or positive post (and the key does not have to be on for this, nor does the Pollack's switch need to be flipped to "WVO") or to a known source of current that you've determined to be hot with the key off.

The test light should light up. If it doesn't (and, once again, we're assuming that you've got a good battery and a working test light) then you need to redo the ground for the Vegtherm. Find a good grounding point per the method in paragraph 4, then reattach your black ground wire - or a new longer one - to that.

Once you've got a good ground at the Vegtherm you can proceed to test the ground connection to the Bosch relay, in the same way as you've just tested the ground to the Vegtherm. If the ground side of the Vegtherm is fine, and you've still got no heat at the Vegtherm, you can proceed to the positive side of things.

Testing the positive side of the Vegtherm:

You can start by testing the 12V power as it runs from the battery positive post to the circuit breaker, and from there to the

Bosch relay. You'll need to pierce the clear waterproofing on the circuit breaker to test for current - but you should have 12V current flowing to the breaker and of it. If you do, then check the other end of the wire from the circuit breaker to the Bosch relay. If this is all good, you can proceed to the 12V connections that need to be testing with the key on:

With the key in the "Start/energize glowplugs" position and with the switch for the Pollack valve - if you have a two-tank system - thrown to the WVO position, and with the alligator clip on the negative cable of the battery or to a known good ground (that is, tested to be good via the previous long-and-boring text) you can now test all the Vegtherm connections.

APPENDIX "A"

Pollak Motor Drive Valve….*here is further information on identifying which ports are which, testing the valve, and finally then knowing which wire, D or E, you need to connect to the 3-way connector mentioned above:*

(If installing a 6-port Pollak fuel switching valve, as part of our TwoTank system, connect to D or E wire at valve, whichever one is positive when the valve is in the "SVO" position. To determine this, use the following method.

There are four ports (to connect the fuel lines to the valve) on one side of the valve. The larger diameter ports are the inlets (fuel from tank). Select the one you wish to be your "SVO" (vegetable oil) port. Blow into the valve. If you can blow thru it easily, the valve is already in the correct position for SVO. Now, take the valve to the battery.

Locate wires D and E (marked on plastic connector) These are the only wires you will use. Hold one onto the battery "+" post and one on the "-" post. If the valve actuated (you WILL hear it), it has moved to the "Diesel" position and the wire that is on the "+" post is supplying current to the valve. If the valve did not actuate, it is in the "SVO" position (to be sure, reverse the wires, touch them to the battery…if the valve actuates, you know it works for sure…reverse the wires again, and the valve is back to the "SVO" position.

Now, for example, if the wire "D" is positive when you determine that the valve is in your designated "SVO" side, then this is the wire you connect the green wire (the one to relay terminal 86) to. If all is correct, your valve will move to the "SVO" position, AND the Vegtherm will be on, both from the same "signal".