

Engine OFF Hydraulic Fluid / Engine Coolant / Cab Warmer

Caterpillar 950K

INSTALLATION MANUAL



DRAFT

CONTENTS

1. INTRODUCTION	4
1.1. Scope	4
1.2. Applicability of Manual	4
1.3. Meaning of Warnings, Cautions and Notes	4
1.4. Safety	4
1.5. Legal Provisions for Installation	4
2. PARTS LIST	5
3. PREPARATION.....	6
3.1. Heater Preparation.....	6
3.2. Hydra Liner Preparation	7
4. INSTALLATION.....	8
4.1. General References.....	8
4.2. Heater	8
4.2.1. <i>Mounting</i>	8
4.2.2. <i>Electrical</i>	9
4.2.3. <i>Fuel</i>	11
4.2.4. <i>Exhaust</i>	12
4.2.5. <i>Intake</i>	12
4.2.6. <i>Coolant</i>	13
4.3. Hydra liner (Hydraulic Fluid Warmer).....	13
4.4. Various Plumbing Configurations.....	16
5. INITIAL START-UP.....	17
6. MOUNTING BRACKET DRAWINGS.....	18
7. LIMITED WARRANTY	19

1. INTRODUCTION

1.1. *Scope*

These non-binding installation instructions are intended to support authorized Webasto trained distributors, dealers and personnel in the installation of the Webasto Thermo 50 Series heater. Provided these instructions are followed properly and all options are installed listed in the parts breakdown, this system will provide Engine OFF Hydraulic Fluid, Engine Coolant, and Cab Heating.

1.2. *Applicability of Manual*

These non-binding installation instructions apply to the make / model machine listed on the front cover of this installation manual. Technical modifications that differ from the instructions set forth exclude all liability claims. Acknowledged engineering conventions must be observed for the installation work. Additional information is contained in the heater installation manual in your kit. Carefully read all documentation prior to installation.

CAUTION

Location of the Webasto provided components, wiring and control devices are important for proper operation. Failure to comply with the installation instructions provided may result in poor operation or damage to the heater, machine, or machine components.

Non-compliance with the installation instructions and information contained therein will void warranty. The same applies for repairs performed by untrained personnel and repairs not using original equipment spare parts.

1.3. *Meaning of Warnings, Cautions and Notes*

WARNING

This heading is used to highlight that non-compliance with instructions or procedures may cause injuries or lethal accidents to personnel.

CAUTION

This heading is used to highlight that non-compliance with instructions or procedures may cause damage to equipment.

NOTE

This heading is used to highlight and draw specific attention to information.

1.4. *Safety*

All relevant state and provincial regulations if any, governing the installation and use of non-idling devices must be observed! The general safety regulations for the prevention of accidents and the relevant operating safety instructions must be observed at all times.

1.5. *Legal Provisions for Installation*

Machine operation must not be impaired due to any Webasto installed components. All power circuits must be fused with appropriate fuse or circuit breaker.

2. PARTS LIST

Machine

Make	Model
Caterpillar	950K (CUSTOM)

Included in Box

Item	Product #	Description	Source	Qty.
1	50000010	Thermo 50 Off Hwy Kit 24V Diesel	Webasto	1

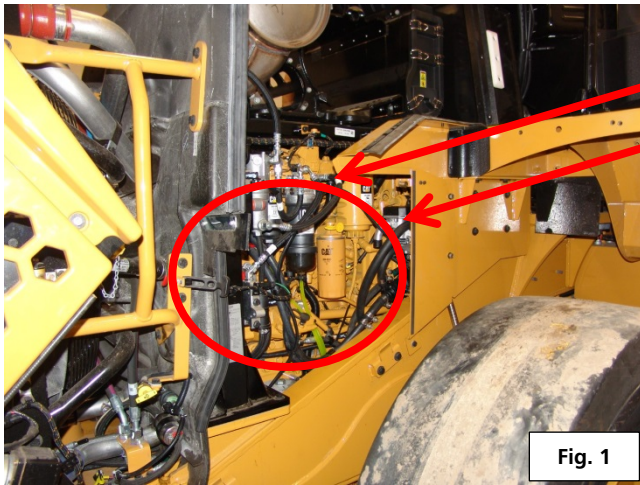
Optional Add-on Accessories

Hydraulic Heating				
Item	Product #	Description	Source	Qty.
1	H4000-8	Hydra Liner (Hydraulic Fluid Warmer)	Webasto	1
2	A-3228HD	Weld-on Adapter Coupler (2" NPT)	Arctic Fox	1
3	8T6356	Tee Fitting ORFC (O-Ring Face Seal) Male – 12 ORFC (O-Ring Face Seal) Male – 16 STOR (Straight Thread O-Ring) – 12	Caterpillar	1
4	6V9854	90° Fitting ORFC (O-Ring Face Seal) Male ORFC (O-Ring Face Seal) Female Swivel Elbow	Caterpillar	1
5	50901549A	3/4" NPT Straight Barb Fitting	Webasto	2
6	5010813A	5/8" x 5/8" x 3/4" Y Fitting	Webasto	2
7	N/A	30 1/2" High Pressure Hydraulic Line with 45° and 90° ends. (Suction Side – Bottom Side of Hydraulic Tank)	N/A	1
8	N/A	21" High Pressure Hydraulic Line with 45° and 90° ends. (Return Side – Front Access Cover of Hydraulic Tank)	N/A	1
9	6V8637	3/4" #12 weld-on fitting. (Return Line to Hydraulic Tank and custom made Hydra Liner Housing Inlet / Outlet)	Caterpillar	3

3. PREPARATION

- Verify and identify all contents of kit.

3.1. Heater Preparation



Remove Access Door and side panel.
Heater Mounting Location (Right side of machine)



Remove seat, right side and rear interior panels shown.



IMPORTANT

The CAT 950K Series is designed with a negative (Ground) master disconnect switch. Make sure to turn this switch to the "OFF" position before proceeding with any electrical installation steps.

3.2. *Hydra Liner Preparation*



Drain the hydraulic tank per the manufacturer's recommendations.

NOTE

This section is only necessary when installing a Hydra Liner Unit. If not pre-heating the hydraulic fluid, skip this section and proceed to section 4.


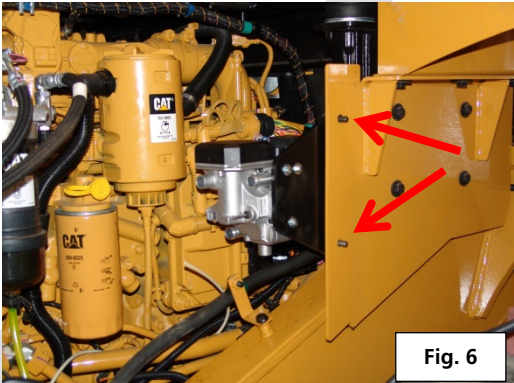
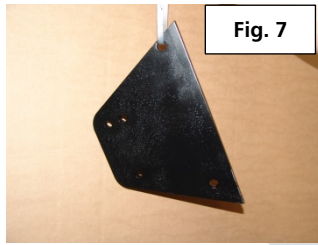
4. INSTALLATION

4.1. General References

- Bare body parts, for example around any drilled holes must be treated with anti-corrosive coating.
- Secure hoses, cables and wiring harnesses with cable ties and clamps provided. Fit protective hoses around any chaffing points.

4.2. Heater

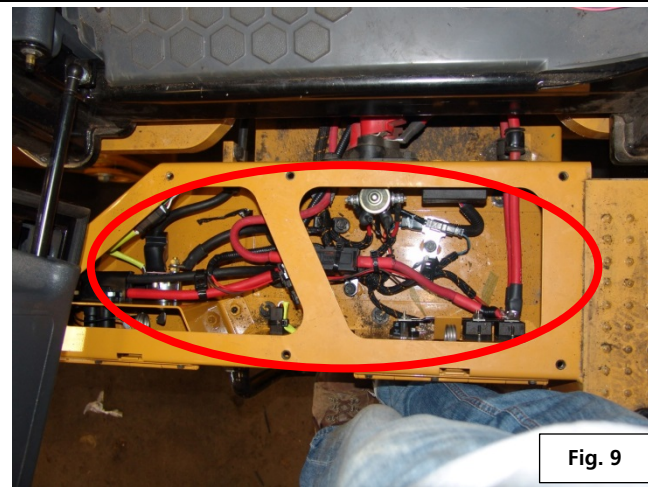
4.2.1. Mounting

Right Side Engine Access	Heater Mounting Location & Fixation Point
 <p data-bbox="548 898 662 949">Fig. 5</p>	 <p data-bbox="1084 898 1205 949">Fig. 6</p>
 <p data-bbox="354 968 467 1010">Fig. 7</p>	<p data-bbox="548 989 1344 1052">The heater is installed on the right side of the machine to the catwalk bracket assembly using existing mounting points as shown in figure 6.</p> <p data-bbox="548 1083 1385 1146">A mounting bracket must be fabricated by the installer. Refer to section 6 for mounting bracket example.</p>

4.2.2. Electrical



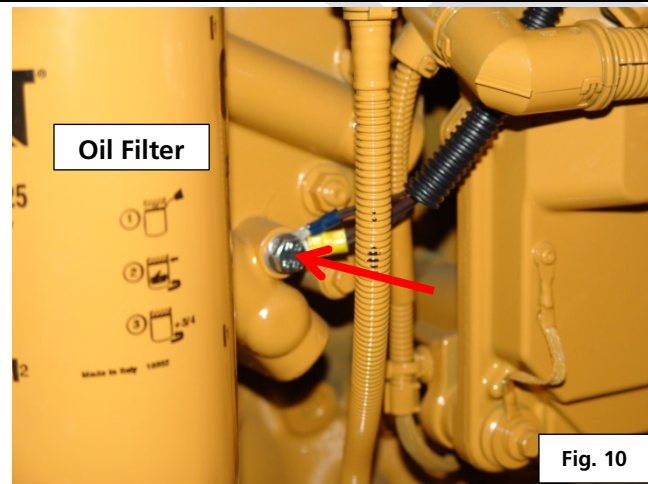
Route the Webasto power harness (Red and Brown 10 gauge wires) from the heater towards the front of the machine and around the back side of the engine. The power connections are made in the power distribution box located under the catwalk on the left side of the machine (near operators entrance door).



WARNING

Make sure to turn off master disconnect switch before performing this step!

In the power distribution box make your positive and negative connections.



Route the Webasto heater harness grounds (ring terminals) to engine block just behind the oil filter. Use the empty threaded hole to affix the terminals. An M8 x 1" bolt was used.

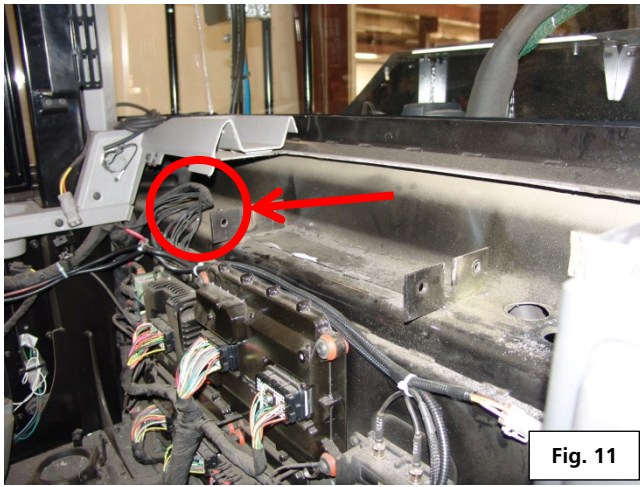


Fig. 11

To enter the cab with the Webasto controller harness; locate the rear most shelf (under rear window) and drill the necessary size holes to route harness. Make sure to grommet holes before permanent harness routing.



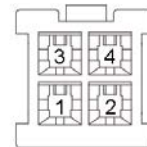
Fig. 12

Mount the SmarTemp Control fx as shown in fig. 24.

Route controller harness to SmarTemp Control fx and connect using the pin-out chart below.

SmarTemp Connector Pin-out

Pin Number	Description	Wire Color
1	+12 / 24V	Red
2	GND	Brown
3	Heater ON/OFF Signal	Black or Gray
4	*Diagnostic Blink Code	Green

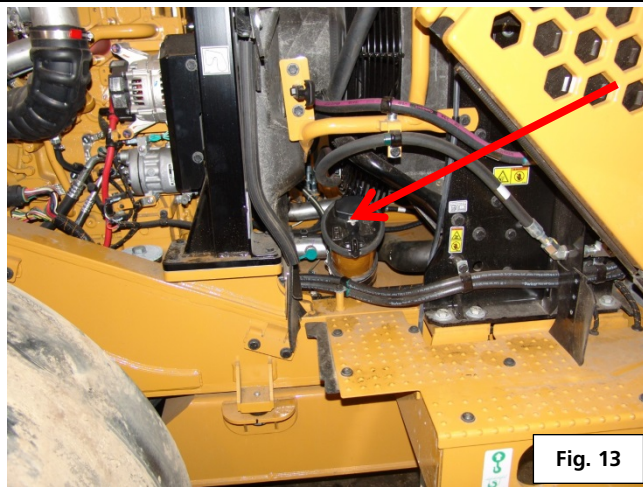


**TERMINAL INSERT
SIDE OF CONNECTOR**

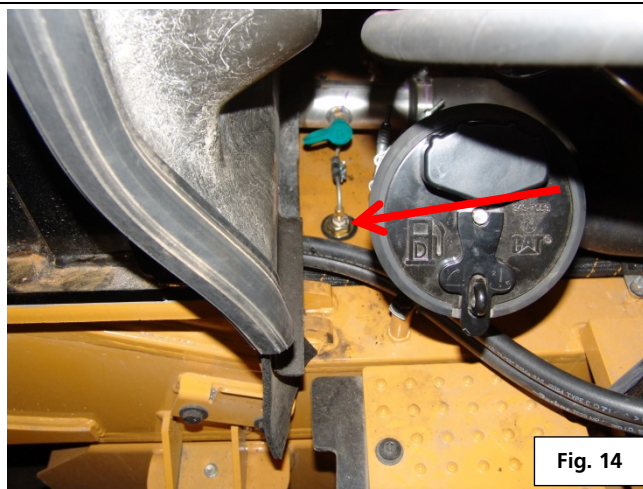
WARNING
This vehicle is equipped with a FUEL OPERATED HEATER that STARTS AUTOMATICALLY when the Liner is set. Be sure the heater is turned OFF when this vehicle is in ENCLOSED SPACES and during RE-FUELING. Failure to do so could result in serious or fatal injury.

IMPORTANT
Make sure to position the Warning sticker near the SmarTemp Control fx or in a clear visibility location of the operator.

4.2.3. Fuel



Remove the fuel filler neck located above fuel tank on at the left rear area of the machine.

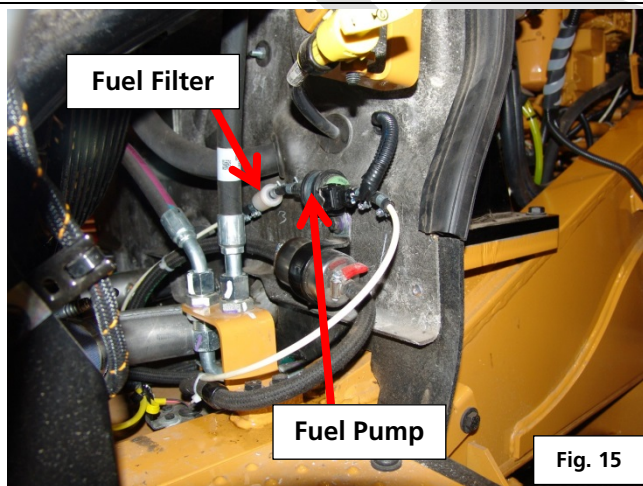


Thoroughly clean all debris from the top side of the fuel tank.

Cut 16" off the standard 32.6" standpipe ensuring there is approximately 1-2" clearance from the bottom of the fuel tank. This ensures the heater will NOT drain the tank completely empty.

Drill a 1" hole for the installation of the standpipe and install into fuel tank using the supplied assembly hardware.

Reinstall the fuel tank filler neck.



Route the fuel line from the standpipe towards the right rear of the machine.

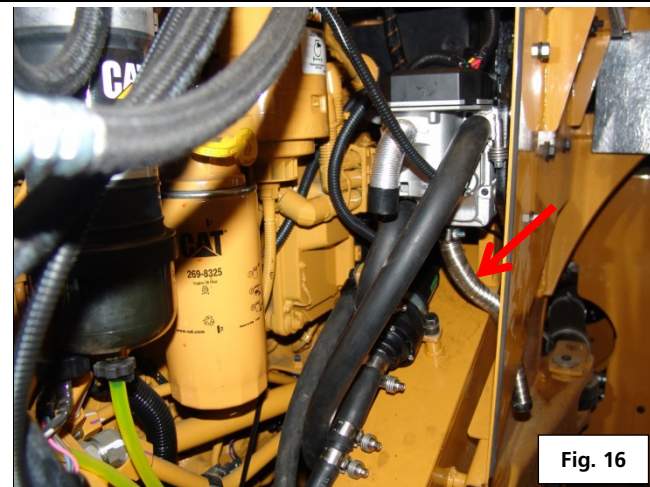
Install the supplied fuel filter, fuel pump, and fuel line as shown. A P-clip was used to mount the fuel pump to an existing mounting stud.

Route the fuel line towards the front of the machine to the heater mounting location.

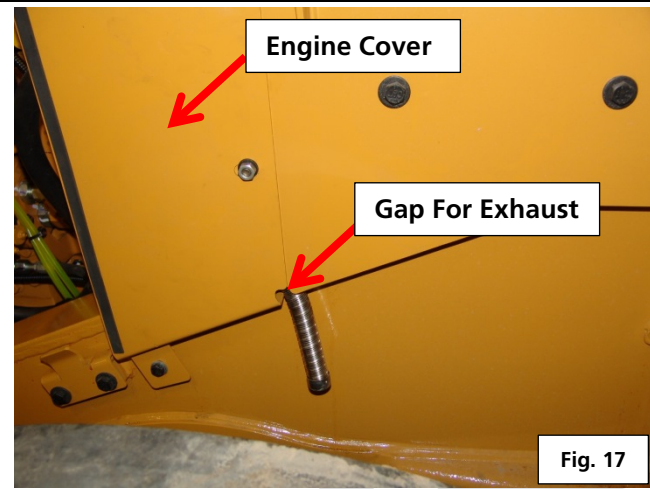
NOTE:

Install the supplied protective loom over the fuel line and route along the existing wires harnesses securing it with cable ties where necessary.

4.2.4. Exhaust

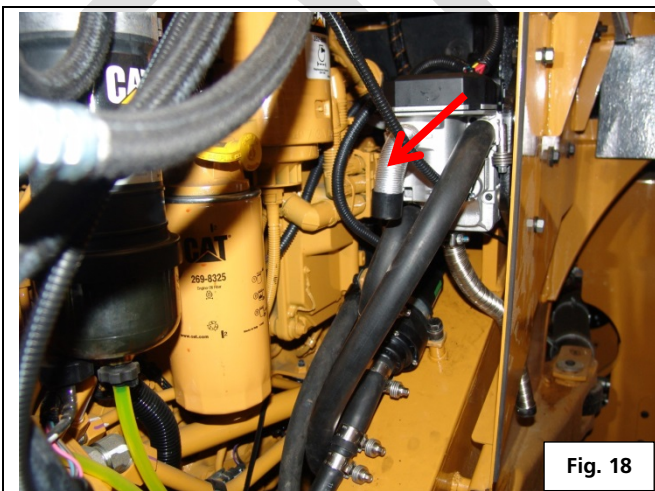


Exhaust pipe was plumbed straight down from heater location and cut to 14".



The exhaust end was set in place and the side engine cover was reinstalled. Notice the gap at the bottom where the exhaust pipe fits through.

4.2.5. Intake

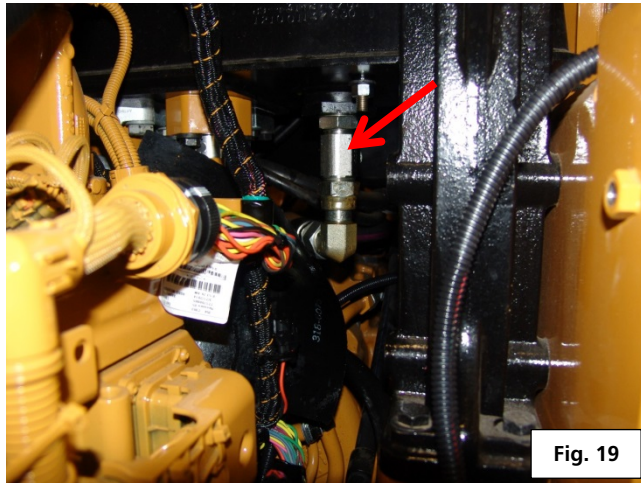


Cut the Air Intake Tube to 5". Using a supplied clamp, affix the Air Intake Tube to the heater and bend downwards making a 90° bend downwards.

4.2.6. Coolant

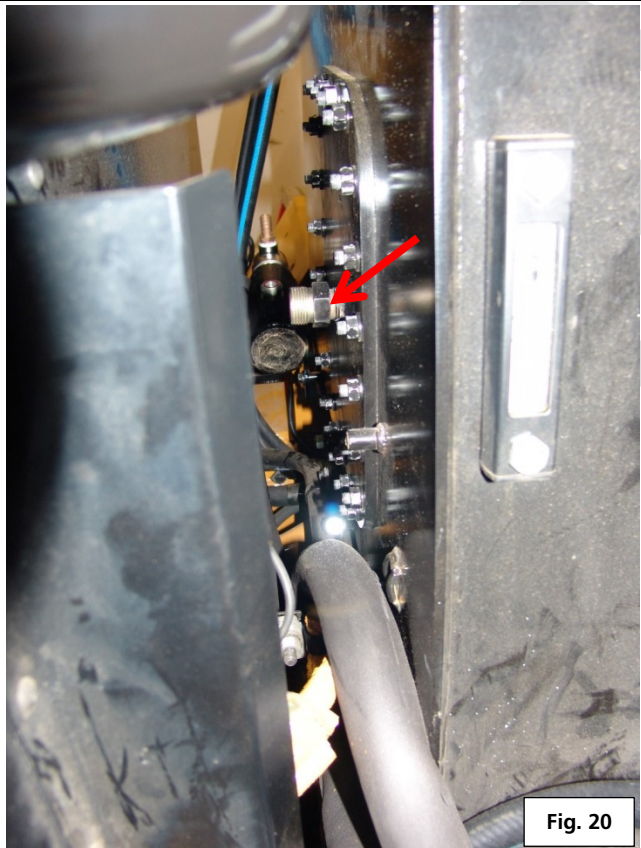
Based on the variety of options available when an Off-Highway installation is performed, refer to the “Various Plumbing Configurations” section to determine the option that best fits your installation requirements.

4.3. Hydra Liner (Hydraulic Fluid Warmer)



Refer to the “Optional Add-on Accessories” section 2 for parts information. Install the tee fitting and 90° fitting as shown. Reinstall the O.E. hydraulic Hose to the 90° fitting. Connect the Hydra Liner hose to the tee fitting.

Route the Hydra Liner hose to the front side of the Hydraulic Tank.



Remove the Hydraulic Tank access panel. This can be done without removing the hydraulic tank from the machine.

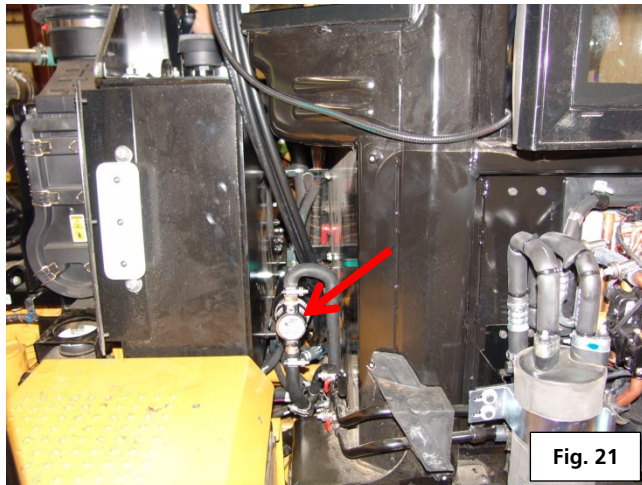
Refer to the “Optional Add-on Accessories” section 2 for parts information. Locate an acceptable location where this fitting will not interfere with anything from the outside of the tank as well as the inside. Drill a “?” hole through the access cover and install the “?” fitting as shown.

Reinstall access cover per manufacturer’s recommendations.

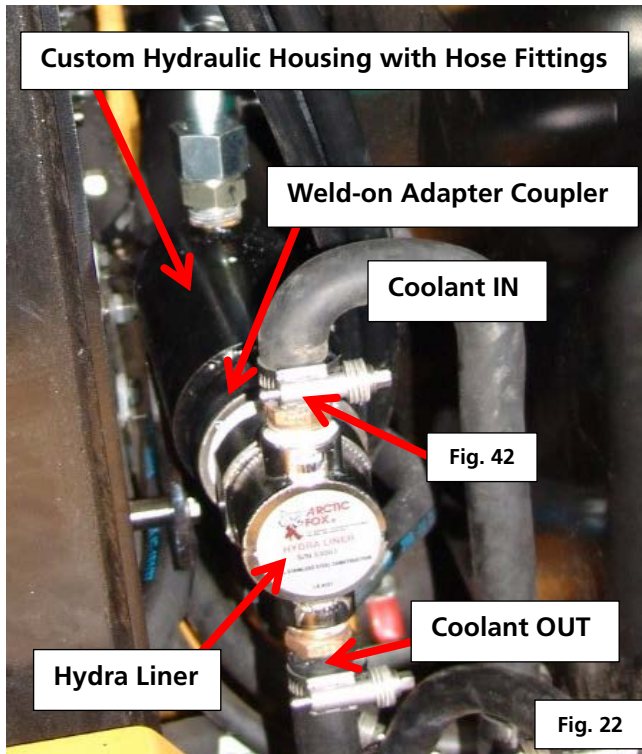
IMPORTANT

Never re-use the access cover gasket. Be sure to have the correct gasket on hand when removing this access panel.

Install the 90° Hydra Liner hose (21” in length) towards the right side of the machine.

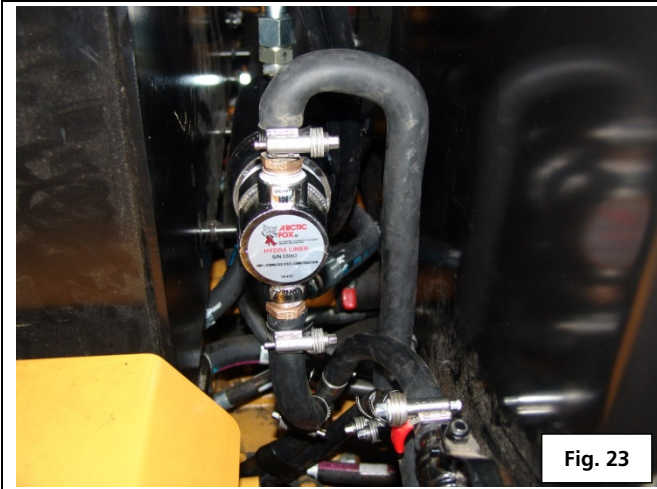


Make the necessary Hydraulic Hose Connections after the Hydra Liner has been mounting in place.



A custom hydraulic fluid housing was made to retain the Hydra Liner. The Weld-on coupler (Section 2) was welded to this housing to retain the Hydra Liner to the housing. ?? fittings were also installed for connections to the Hydraulic system.

A mounting bracket was installed on the side of this housing for mounting to the Hydraulic Tank.



Refer to the Coolant plumbing schematics in section 4.4 for proper connections to the Webasto Thermo 50 Heater.

DRAFT

4.4. Various Plumbing Configurations

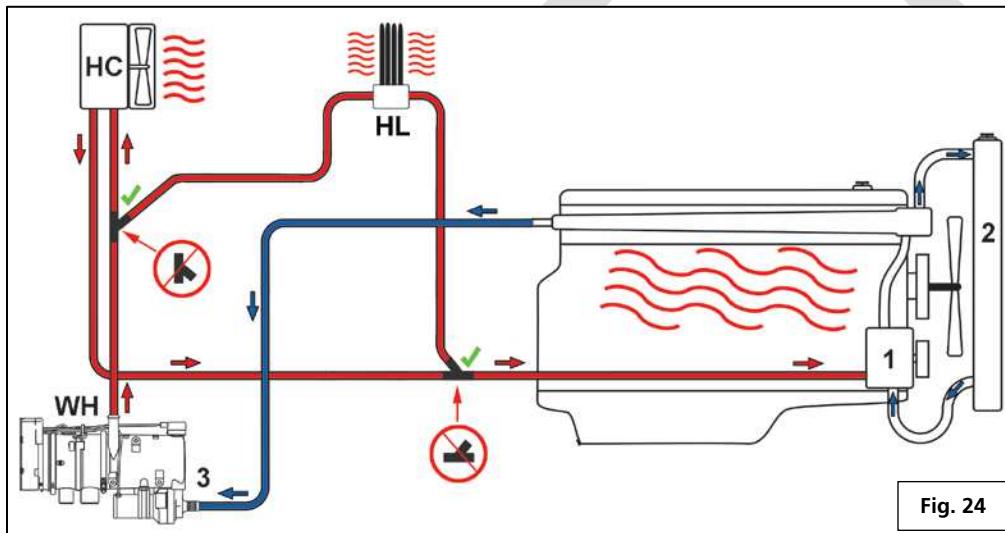
Coolant plumbing is dependent on the options that are installed. When routing always make sure to fully tighten all hose clamps and secure in a manner that's prevent hose chaffing.

CAUTION

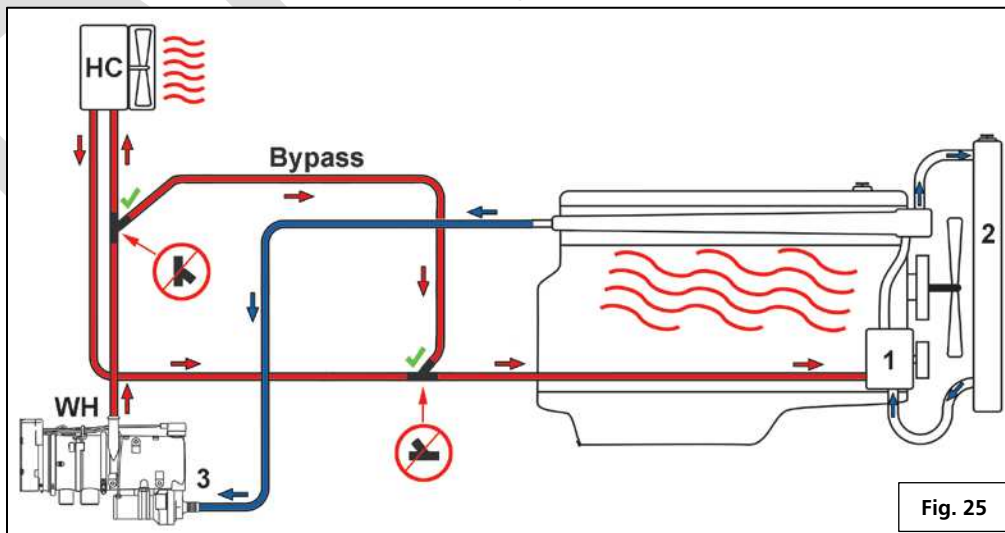
Never secure hoses to any moving parts!

Legend

Abbreviation	Description
HC	O.E. Heater Core (Heater Exchanger)
HL	Hydra Liner
WH	Webasto Heater
Bypass	Heater Core bypass when a Hydra Liner is not used.
1	O.E. Water Pump
2	Radiator
3	Webasto Water Pump



With Hydra Liner



Without Hydra Liner

5. INITIAL START-UP

IMPORTANT

Refer to the safety instructions in the operating and maintenance instructions supplied with the heater kit. The operating and maintenance instructions must be read thoroughly before starting the heater.

After you have installed the heater, bleed the water system and the fuel supply system carefully. Follow the instructions supplied by the vehicle manufacturer for this purpose.

NOTE

As a result of the low fuel consumption the heater must be switched on several times to fill the fuel line and prime the system.

When starting the heater for the first time, make sure to check all the water and fuel connections for leaks and to ensure that they are secure. If the heater suffers a fault during operation, the fault must be located and remedied. Refer to the troubleshooting section in the Installation manual supplied with the heater kit for further diagnosis of faults.

DRAFT

6. MOUNTING BRACKET DRAWINGS

PLACE HOLDER

Fig. 26

DRAFT

7. LIMITED WARRANTY

Webasto warrants their heaters and heater kits against defects in material and workmanship for two (2) years or 2000 operating hours, effective at the time of installation or vehicle registration date for Original Equipment installations (OE). This warranty period may not exceed three (3) years from the original date of sale by Webasto. This warranty period may be superseded by a contractual agreement.

Limitations:

Webasto specifically excludes and limits warranty from the following:

- Damage to product in transit. All claims must be filed with carrier.
- Improper installation, which is not in accordance with valid, supplied installation instructions.
- Deterioration due to normal wear, corrosion, abuse, damage, accident, improper storage or operation.
- Modification of product by alteration, use of non-genuine parts or repair by unauthorized personnel.
- Economic loss for expenses related to travel, vehicle disability, personal injury or other incidental or consequential damages arising from any breach of this expressed warranty.

Owner's Responsibilities:

- Improper or incorrectly performed maintenance or repair voids this warranty.
- A Warranty Registration Card is included with the sale of each system. It is the owner's responsibility to complete this card and return it to Webasto for registration. The owner may also complete product registration by visiting <http://www.techwebasto.com>.

THIS WARRANTY IS NON-TRANSFERABLE.

IMPLIED WARRANTIES INCLUDING THAT OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY LIMITED TO THE DURATION OF THIS WARRANTY. WEBASTO DISCLAIMS ANY LIABILITY FOR SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES.

THE LIMITATION AND EXCLUSIONS VARY AMONG STATES AND CANADIAN PROVINCES AND MAY NOT APPLY TO YOU. YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY AMONG STATES AND CANADIAN PROVINCES.

Information concerning all warranties may be obtained by calling (800) 860-7866.

DRAFT



Feel the Drive

Webasto Thermo & Comfort N.A., Inc.

15083 North Road

Fenton, MI 48430 USA

Phone: 810-593-6000

Fax: 810-593-6001

Email: info-us@webasto.com

Internet: <http://www.webasto.us>

<http://www.techwebasto.com>

Org. 8/2014 Rev. N/A P/N: ???????