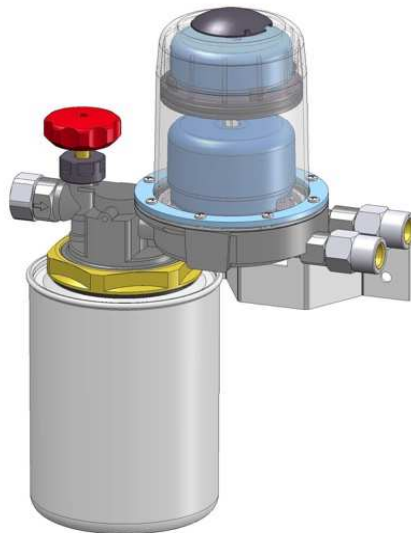


# Installation, Operation and Service Manual

# OptiFuel

Automatic fuel oil de-aerator and combustion optimizer with  
integrated filter

Series E710  
Series E721



**INSTALLATIONS MUST MEET ALL LOCAL AND FEDERAL  
CODES THAT MAY DIFFER FROM THIS MANUAL**

*Please read the manual in its entirety before beginning installation. This manual must be kept with the oil de-aerator for future reference. For maintenance or question, please refer to your installer – contractor directly.*

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# 1 ABOUT THIS INSTRUCTION MANUAL

This instruction manual is part of the product.

- Read this manual before using the product.
- Keep this manual during the entire service life of the product and always have it readily available for reference.
- Always hand this manual over to future owners or users of the product.

## 1.1 Structure of warning

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**WARNING TERM** The type and source of danger is shown here.



- Precautions to take to avoid the danger are shown here.
- 

There are three different levels of warning:

Warning term	Meaning
<b>DANGER</b>	Imminent danger! Failure to observe the information will result in death or serious injuries.
<b>WARNING</b>	Possible imminent danger! Failure to observe the information may result in death or serious injuries.
<b>CAUTION</b>	Dangerous situation! Failure to observe the information may result in minor or serious injuries as well as damage to property.

## 2 SAFETY

### 2.1 Intended use

The automatic fuel oil de-aerator Series E710 and E721 safety version, with integrated filter and fusible link shut-off valve may only be used in single-pipe systems with return pipe connection to the de-aerator, for continuous de-aeration of the following liquids in oil fired systems:

- Not heavier than # 2 Home Heating Oil according to ASTM D396
- Biodiesel according to ASTM D6751
- Bio-fuel 0-20 % Biodiesel fuel oil blends according to ASTM D6751 and ASTM D396

Any use other than the use explicitly stated in this instruction manual is not permitted.

## **2.2 Predictable incorrect application**

The automatic fuel oil de-aerators Series E710 and E721 must never be used in the following:

- Use with undissolved additives, alcohols and acids

## **2.3 Safe handling**

These products represent state-of-the-art technology and are manufactured in accordance with the pertinent safety regulations. Each unit is subjected to a function and safety test prior to packaging.

- Operate the product only when it is in perfect condition. Always observe the instruction manual, all pertinent local and national directives and guidelines as well as health and safety regulations and directives regarding the prevention of accidents.

## **2.4 Qualification of personnel**

The product may only be installed, commissioned, operated, maintained, shut down and disposed of by qualified, specially trained personnel.

Law or building codes may require an annual inspection by local or federal authorities.

## **2.5 Modifications to the product**

Changes or modifications made to the product by unauthorized personnel may lead to malfunctions and are prohibited for safety reasons.

## **2.6 Use of spare parts and accessories**

Use of unsuitable spare parts and accessories may cause damage to the product.

- Use only the manufacturer's genuine spare parts and accessories.

## **2.7 Liability information**

The manufacturer shall not be liable for any direct or consequential damage resulting from failure to observe the technical instructions, guidelines and recommendations.

The manufacturer and their sales representatives shall not be liable for costs or damages incurred by the user or by third parties in the use or application of these devices, particularly in case of improper use of the devices, misuse or malfunction of the connection, malfunction of the devices or of connected devices. The manufacturer or their sales representatives shall not be liable for damages resulting from any use other than the use explicitly stated in this instruction manual.

The manufacturer shall not be liable for misprints.

### 3 PRODUCTION DESCRIPTION

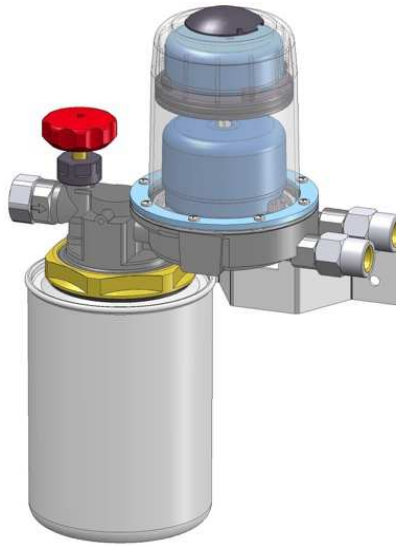


Fig. 1: Series E710 and E721

Granby Series E710 and E721 automatic oil de-aerators consists of a die cast zinc housing with female  $\frac{1}{4}$ " NPT threaded connections at the tank side and  $\frac{1}{4}$ " NPT connections for connections to the burner lines and features two separate float chambers. The lower float chamber contains the operating float; the upper float chamber contains the safety float. The upper float chamber keeps oil foam from escaping via the vent opening (e.g. during commissioning/filter exchange) and indicates malfunctions of the vent valve.

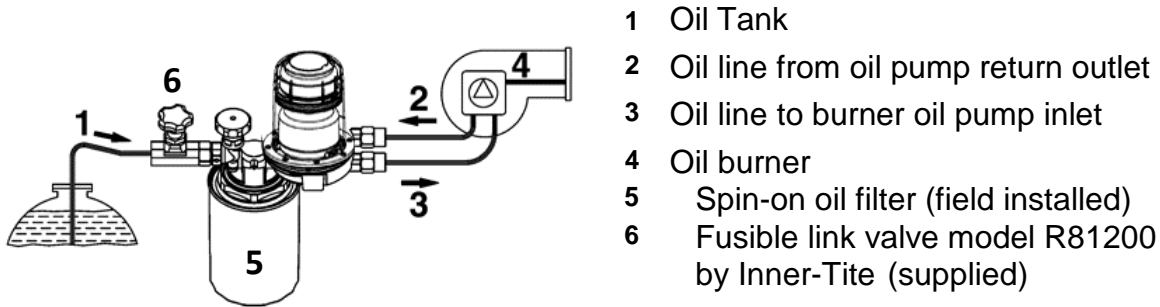
Series E710 and E721 automatic oil de-aerators are supplied with a fusible link oil valve (not shown) are equipped with an adaptor for the installation of a replaceable spin-on filter cartridge.

#### 3.1 Function

The burner pump draws the fuel oil from the tank via the filter and the check valve installed in the oil de-aerator and delivers it to the nozzle. The excess oil (i.e. the oil exceeding the nozzle capacity) is pumped via the return line into the float chamber. While the liquid level gradually increases in the float chamber, the oil is de-aerated by the de-aeration valve. When the oil reaches a level of approx.  $1\text{-}3/16$ " above the bottom, the floats begin to operate and actuate the bypass valve, thus delivering the de-aerated return oil to the suction pipe. This way, the system only draws the amount of oil from the tank via the filter which is needed for combustion. This considerably prolongs the filter service life.

The oil that now flows to the pump consists of de-aerated fuel oil and a small portion of fuel oil from the tank which may still contain air.

Fig. 2: Granby Series E710 or E721 oil de-aerator with fusible link oil valve and spin-on oil filter



- 1 Oil Tank
- 2 Oil line from oil pump return outlet
- 3 Oil line to burner oil pump inlet
- 4 Oil burner
- 5 Spin-on oil filter (field installed)
- 6 Fusible link valve model R81200 by Inner-Tite (supplied)

## 4 SPECIFICATIONS

Table 1: Specifications

Parameter	Value
<b>General</b>	
Dimensions (W x H x D)	Without bracket: 7.58" x 11.35" x 3.74" With bracket: 7.58" x 11.35" x 4.84"
Burner connection	¼" NPT inner thread
Tank connection	¼" NPT inner thread
Nozzle capacity	Max. 26 gph
Return flow	Max. 37 gph
Oil flow	Max. 58 gph
Separation capacity air/gas	Over 4 quarts
Mounting position	Float housing vertical to the top
Operating overpressure	Max. 5 psi (corresponds to a static oil column of approx. 13.5 ft.)
Suction vacuum	Max. 14.25" Hg
Test pressure	Max. 85 psi
Spin-on fuel filter E710	Granby EX10-999U or equivalent
E721	Granby EX21-999 or equivalent
Operating temperature	Max. 100 °F (38 °C)

### 4.1 Approvals, tests and conformities

Granby model E710 and E721 oil de-aerators are tested to meet UL requirements, file MH62597.

## 5 INSTALLATION AND COMMISSIONING

- The oil de-aerator must be installed in accordance with these instructions and in accordance with NFPA-31, Standard for the Installation of Oil-Burner Fuels and Other combustible Liquids and in compliance with any applicable local codes or regulations.
- The oil de-aerator shall be installed indoor.
- Install Series E710 and E721 upstream of the burner. The unit may be installed above or below the tank level.
- Install Series E710 and E721 between the burner and the oil safety valve, close to the oil burner.
- Never use Series E710 and E721 in ambient temperatures greater than 100°F. Do not mount the product near uninsulated burners, over burner opening flaps or next to chimney flues.
- Mount the float chamber vertically, pointing to the top, so it fits securely and cannot come loose.
- Use oil lines and hoses as per local codes for connection to the oil pump.
- Ensure that the pump is set for two-pipe operation when mounting the product. Bypass plug must be installed.
- A 3/8" pipe is sufficient for most installations. In larger systems requiring 1/2" pipes (if the oil used is less than 5 1/4 gph), all parts of the pipes leading upwards should be calculated as suction height. If the suction pipes are larger than 1/2", this should be taken into consideration as well (even if the usage amounts to more than 5 1/4 gph). Large pipes with low flow rates may cause gas accumulations, resulting in insufficient suction in the downward sections.
- Mount Series E710 and E721 as shown in fig. 2, page 6.
- Remove all check valves between Series E710 and E721 and tank except for OSV (Oil safety valve if required) and fusible link oil valves.
- Never install a shut-off valve or other device, which can impede flow in the lines between the oil de-aerator and the oil pump.
- All pipe work must be installed according to local codes and tested during installation.
- Never use Series E710 and E721 oil de-aerators with pump pressure (booster pump) between the tank and Series E710 and E721 oil de-aerators.
- Test the completed installation for correct function and fire security before starting.



**CAUTION** Damage to the pump or Series E710 and E721 due to incorrect connection of supply and return connections.

- Do not confuse the supply and return connections (not even during commissioning for a short period of time).

**CAUTION** Damage to the product due to improper transport.

- Do not throw or drop the product

**CAUTION** Damage to the product due to improper storage.

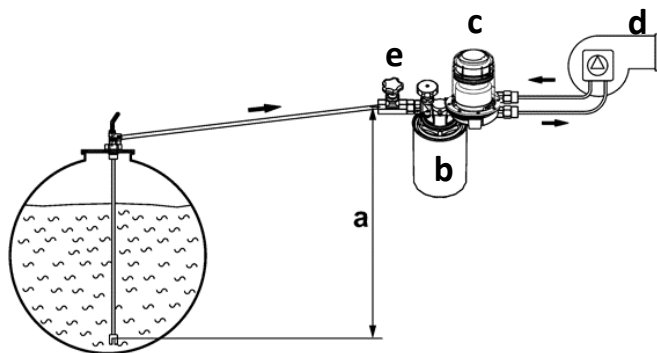
- Protect the product from shock when storing it
-

## 5.1 Right dimension of the suction tube

Table 2: Standard values for tube dimensioning

Volume flow in the	Tubing size copper
0-13 gph	5/16"
8-24 gph	3/8"
18-37 gph	1/2"

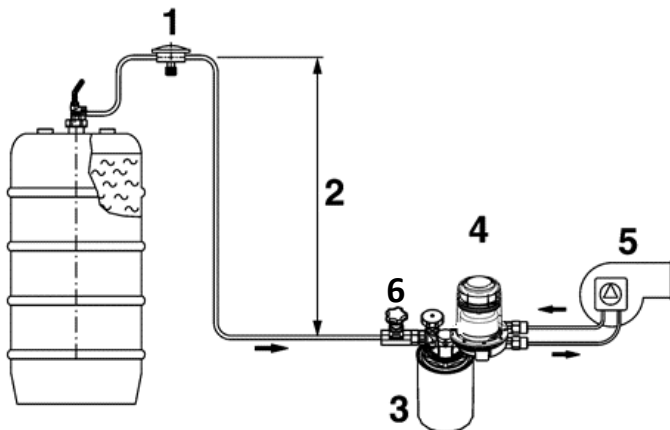
## 5.2 Installation above the tank top



- a Suction height Max. 15 feet
- b Granby Filter EX10-999U and EX21-999 or equivalent (field supplied)
- c Series E710 and E721 oil de-aerator
- d Burner
- e Fusible link valve model R81200 by Inner-Tite (supplied)

Fig. 3: Installation of Granby model E710 or E721 oil de-aerator above the tank level with self-securing suction pipe (steady gradient to the tank). Check valves must not be used anywhere on the oil line to the oil tank with de-aerator. Installed foot valve must also be removed. All oil lines must be installed as per code requirements.

## 5.3 Installation below the tank top



- 1 Diaphragm type (OSV) anti-siphon valve (optional)
- 2 Static pre-pressure to the oil de-aerator  
Max: 5 PSI or 13.5 ft
- 3 Granby Filter EX10-999U and EX21-999 or equivalent (field supplied)
- 4 Series E710 and E721 oil de-aerator
- 5 Burner
- 6 Fusible link valve model R81200 by Inner-Tite (supplied)

Fig. 4: Installation of Series E710 and E721 below the tank level. We recommend installing an anti-siphon valve (OSV) to prevent fuel oil from escaping in the case of a defective suction line with a higher oil level in the tank. *In case of fire, the valve will prevent oil from running out and intensifying the fire.*

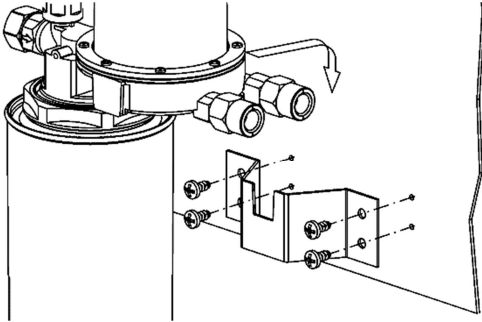
Note: All oil lines must be done according to local code.



## 5.4 Installing the device

- The permissible ambient temperature must not be exceeded. This means that you must not mount the Series E710 and E721 on top of or next to a non-insulated boiler part, above opening dampers at furnaces or to the flue gas pipe.
- The float housing must point vertically to the top.
- Mount Series E710 and E721 to the boiler casing using the enclosed bracket 4 self-tapping screws.

You can use the bracket as a template when screwing in the screws (↑ pointing to up).



1. Mount the oil line from oil tank to the fusible link oil valve to the female ¼"NPT threads of the housing. Use a non-hardening thread sealing compound on the threads
2. Mount the suction and burner oil lines to the female ¼"NPT threads of the housing. Use a non-hardening thread sealing compound on the threads.
3. Mount oil lines to the burner.

Make sure the sealing surfaces are clean and not damaged.



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### **CAUTION** Damage to the pump or to Series E710 and E721 if the flow and return lines are not properly connected

- Do not confuse the supply and return connections, not even during commissioning for a short period of time.
- 

## 5.5 Pressure test

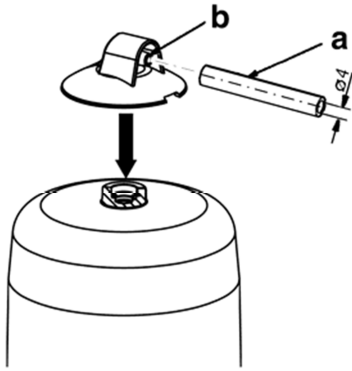
When subjecting the suction pipe to a pressure test, the pressure connection must not be made at the Series E710 and E721 unit since the integrated check valve in the device does not allow the pressure to be applied to the suction pipe.

- Do not include the check valve in the pressure test.

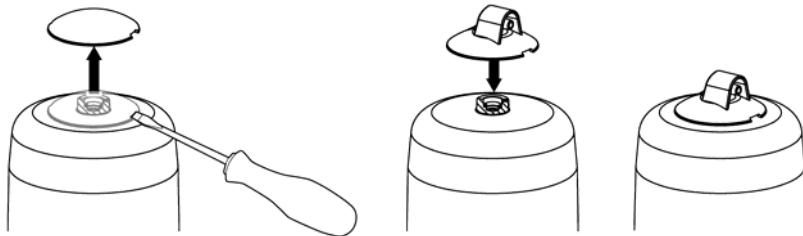
## 5.6 Connecting the vent hose

To prevent odors from the separated air, e.g. if the unit is installed in living quarters.

Fig. 5: Vent hose



- a Vent hose
- b Hose connection with O-ring



1. Remove the cover using a screwdriver. Mount the enclosed hose connection.
2. Push the vent hose onto the hose connection and route it to the tank next to the suction line.
3. Fixate the vent hose with cable ties.
4. Mount the other end of the vent hose to the de-aeration line or the return connection of the withdrawal fitting at the tank to prevent clogging.
5. Use the enclosed hose connector for connection to the return connection of the withdrawal fitting.

## 6 OPERATION

### 6.1 Oil level in the float housing

The oil level depends on the operating conditions of the facility and amounts to approx.  $\frac{3}{4}$ " – 2" in suction mode. If the oil level is higher, the float housing may be fully filled with oil if the suction pipe is tight. This is caused by the absorption of the air through the fuel oil. Over time, this results in a reduction of the air cushion. When the operating conditions change, e.g. decreasing oil level in the tank, the air cushion is formed again in the float housing.

## 6.2 Pressure mode

Since in pressure mode with an oil pump there is no gas formation caused by suction, it is not meaningful to use Series E710 and E721 in this mode.

## 7 TROUBLESHOOTING

Repair work may only be carried out by qualified, specially trained personnel.

*Table 4: Troubleshooting*

Problem	Possible reason	Remedy
Heavy oil foam in the float chamber due to excessive amounts of air sucked in (more than the possible separation capacity of 1 gph).	Leak in the suction pipe.	Perform a tightness test of the suction line (vacuum test or pressure test).
	Suction line rating too great.	Use the right dimension of the suction tube as per chapter 5.1, page 8.
Burner switches off at irregular intervals due to malfunctions.	Air accumulations in the suction line because pipe cross section is too great. When the anti-siphon valve opens after the pre-aeration time of the burner, a greater bubble may pass through which causes the burner to switch off.	Use the right dimension of the suction tube as per chapter 5.1, page 8.
Oil cannot be sucked in or steady flow keeps being interrupted.	Small leaks at the pipe connections between the withdrawal fitting at the tank and the burner allow air to get into the suction line. This is also the case during idle times until the vacuum no longer exists. This generates an air cushion	Use thread sealing compound and re-tighten all connections.
	Burner pump does not generate a sufficient vacuum.	Perform a vacuum test at the pump.
Other malfunction.	–	Return the device to the manufacturer.

Problem	Possible reason	Remedy
Series E710 and E721 is fully filled with oil.	Pressure in the feed line (tank higher than burner). This won't affect the function of the pump.	Install an oil safety valve on the feed line from the tank. The oil level will resume its normal level in the Series E710 and E721.

## 8 DECOMMISSIONING, DISPOSAL



1. Dismount Series E710 and E721.
2. To protect the environment, this product must **not** be disposed of together with the normal household waste. Dispose of the product according to local directives and guidelines.

This product consists of materials that can be reused by recycling firms.

## 9 WARRANTY

The Granby model E710 and E720 oil de-aerator are warranted against manufacturing defects for a period of 12 months from date of purchase. This warranty applies to all countries in which this product is sold by the manufacturer or its authorised representatives.

The Series E710 and E721 is factory tested and sealed. Tampering will void Warranty.

## 10 Copyright

The manufacturer holds the copyright to this manual. This manual may only be reprinted, translated, copied in part or in whole with the prior written consent of the manufacturer.

We reserve the right to modify any specifications or alter any illustrations in this manual without prior notice.

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