



# Automatic Grease Removal Unit

INSTALLATION, OPERATIONS  
AND MAINTENANCE MANUAL

Models D1, D1H, D2, D2H, D3, D4, D5

## MARINE VERSION



MANUFACTURED BY FM ENVIRONMENTAL

[www.greaseguardian.com](http://www.greaseguardian.com)



# CONTENTS

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Product Overview .....	2	<b>APPENDICES</b>	
How it Works .....	3	1. D1 to D4 wiring diagram (230V)...	20
Dimensions & Specifications .....	4	2. D1 to D4 wiring diagram (110V)...	21
Installation .....	5	3. D5 wiring diagram .....	22
Health, Safety and Efficiency .....	6		
Time Control Setting .....	7		
Engineer Settings:			
Commissioning and Service .....	12		
User Maintenance.....	14		
Tri-Monthly Servicing.....	15		
Troubleshooting .....	16		
Warranty .....	18		

## THE GREASE GUARDIAN D1-D5 SERIES

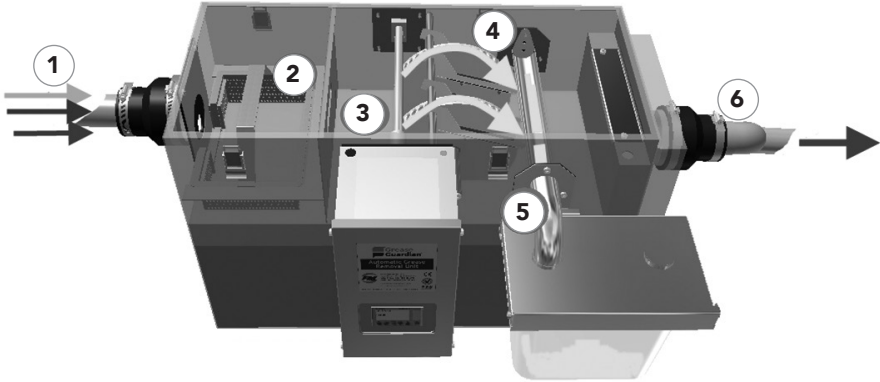
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The FM Environmental Grease Guardian series automatic grease removal unit (GRU) is a totally engineered system for separating free floating grease and oils from drain water flows. The separated grease and oils are trapped within the stainless steel tank and are automatically recovered by the system. Only the “cleaned” water is allowed to pass through the system into the drain lines. Each unit also separates solid food waste into a removable basket. The Grease Guardian can be used in a wide variety of applications from restaurants and food processing operations to many types of industrial operations. Appliances that can be directly connected include utensils sinks, pre-rinse sinks, combination ovens, and wok cookers.

Use of the Grease Guardian assures that costly sewer surcharges and fines are minimised or eliminated through efficient separation and removal of the grease and oil. In addition, rapidly escalating pumping and disposal costs, which are associated with conventional grease traps or interceptors are also reduced or eliminated. When properly operated the recovered grease and oils are virtually water free so they can be collected by a local rendering Company or recycler.

# HOW IT WORKS

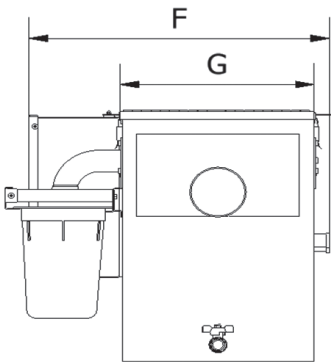
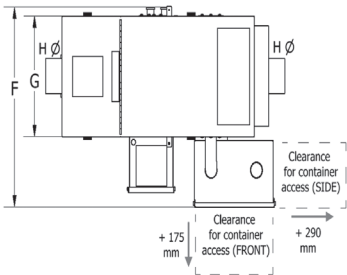
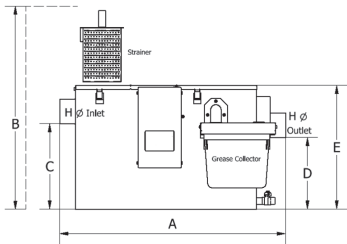
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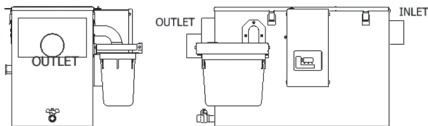
- ① Grease, solids and wastewater from the kitchen enters the Grease Guardian.
- ② Solid food waste is caught in a removable strainer.
- ③ The grease passes into the middle chamber through slots in the baffle wall where it remains trapped. With the assistance of a heater the grease separates from the wastewater and rises to the surface.
- ④ The liquefied grease adheres to the rotating skimming wheels/drum.
- ⑤ The grease passes down a scraper blade into a collection container where it can be removed and disposed hygienically.
- ⑥ The treated water exits under a baffle wall and through the outlet to drain.

# PRODUCT DIMENSIONS & SPECIFICATION (240V)

Refer to official drawing for the Marine range since some measurements may vary



Right/Left Flow Optional.  
All dimensions to be mirrored



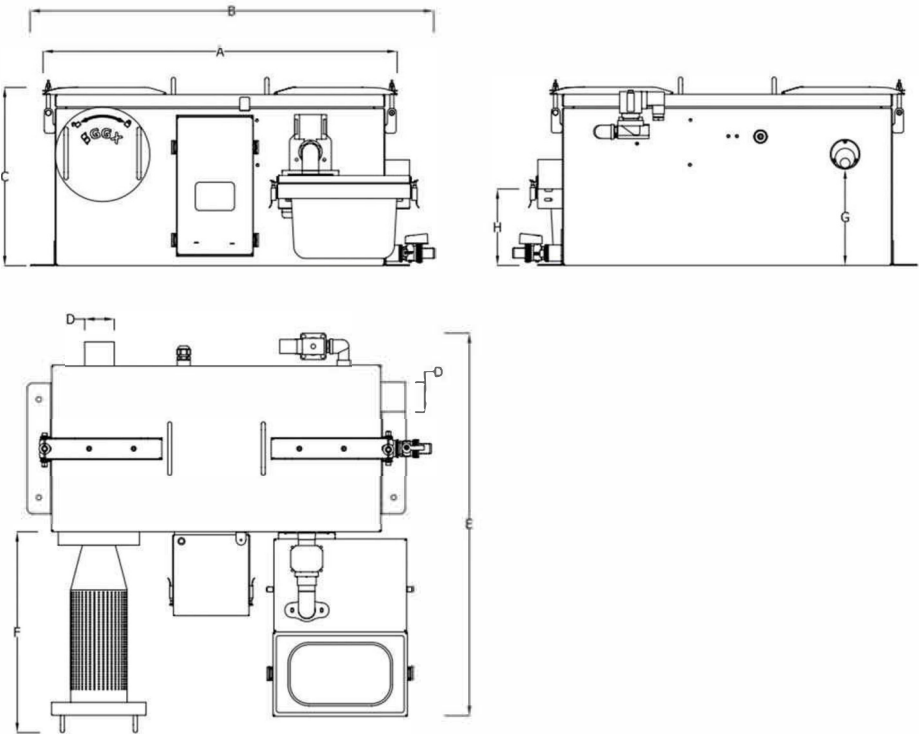
Model	(mm)							
	A	B	C	D	E	F	G	H
D1	640	500	150	150	330	520	310	60
D2	720	620	225	210	410	520	310	60
D3	840	705	310	260	450	520	310	90
D4	922	710	295	230	450	520	310	115

Model	D1	D2	D3	D4
Hydraulic Flow l/second	0.75	1.25	1.75	2.25
Strainer Capacity, litres	3	4	8	10
Grease Collector Capacity, litres	3.5	4.5	4.5	4.5
Skimming Rate, l/hr Basic model	2	2	4	4
Max Skimming Rate, l/hr Upgraded (3 skimmers)	6	6	6	6

	240V / 50-60Hz Variant	110V / 60Hz Variant
Casing Material (all units)	16 Gauge; 316 stainless steel; bright finish	
Motor (all units)	25 Watt, 240V, 50 Hz 1.3µF capacitor	25 Watt, 110V, 60 Hz 4.5µF capacitor
Heater D1, D2	600 Watt, Thermal cut-out inc.	
Heater D3, D4	1000 Watt, Thermal cut-out inc.	600 Watt, Thermal cut-out inc.
Heater D5	2000 Watt, Thermal cut-out inc.	1200 Watt, Thermal cut-out inc.
Controller (all units)	Programmable Logic Controller, Backlit display, Inputs: 110V-240V AC Outputs: 110V-240V AC Battery back up	

# PRODUCT DIMENSIONS & SPECIFICATION (240V)

Refer to official drawing for the Marine range since some measurements may vary

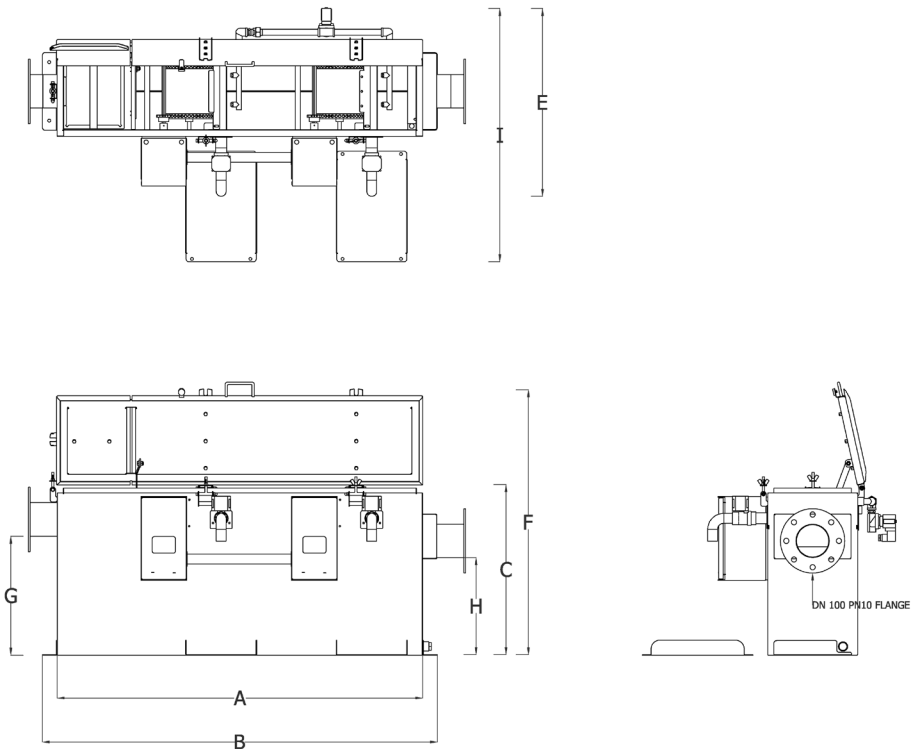


Model	(mm)							
	A	B	C	D	E	F	G	H
D1H	720	820	360	60	778	405	196	155
D2H	750	900	470	60	778	405	284	220

Model	D1H	D2H
Hydraulic Flow L/s	1.00	1.50
Strainer Capacity L	2.8	2.8
Grease Collector Capacity, L	3.5	4.5
Skimming Rate l/hour (Basic Model)	2	2
Max Skimming Rate l/hour (Upgraded)	6	6

	240 V / 50-60 Hz Variant	110 V / 60 Hz Variant
Casing Material (all units)	16 Gauge; 316 stainless steel; bright finish	
Motor (all units)	25 W, 240 V / 50-60 Hz 1.3 µF cap.	25 W, 110 V / 60 Hz 4.5 µF cap.
Heater D1H	600 W Thermal cut-out inc.	600 W Thermal cut-out inc.
Heater D2H	1000 W Thermal cut-out inc.	600 W Thermal cut-out inc.
Controller (all units)	Programmable Logic controller, Backlit display, Inputs: 110 V - 240 V AC, Outputs: 110 V – 240 V AC, Battery Backup.	

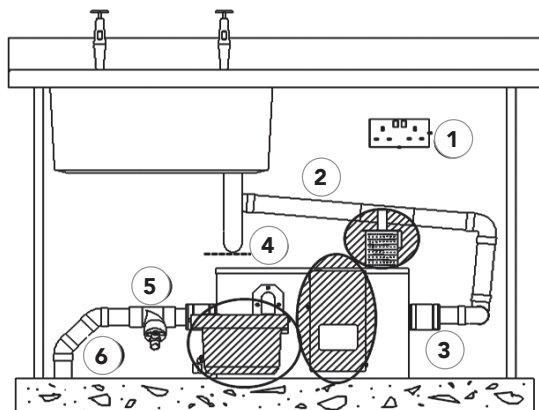
# PRODUCT DIMENSIONS & SPECIFICATION D5



Model	D5	mm	mm
Hydraulic Flow <i>l/second</i>	3.5	A 1250	E 642
Strainer Capacity, litres	14	B 1351	F 905
Grease Collector Capacity, litres	11	C 581	G 407
Skimming Rate, l/hr Basic model	12	<b>Casing Material</b> 16 Gauge; 316 stainless steel; (all units) bright finish	
Max Skimming Rate, l/hr Upgraded (3 skimmers)	12	<b>Motor</b> (all units) 25 Watt, 240V, 50 Hz, 1.3µF capacitor	
		<b>Heater D5</b> 2000 Watt, 240V, Thermal cut-out inc.	
		<b>Controller</b> (all units) Programmable Logic Controller, Backlit display, Inputs 240V AC Outputs 240V AC, Battery back up	

# INSTALLATION

## Part I: Undersink Example



Appliances that can be directly connected include utensil sinks, pre-rinse sinks, combination ovens, wok cookers.



Daily access required, do not obstruct

- ① To be positioned within 2 metres (6.5 feet) of Grease Guardian unit
- ② Pipework between fixture and Grease Guardian to be minimally 1:40cm gravity fall ( $\frac{1}{3}$  inch per foot)
- ③ Connect Grease Guardian inlet and outlet to piping using 2 x rubber clamp couplers as supplied
- ④ P trap to remain in place at sink. 40mm (1.5 inch) clearance to be observed between unit cover and P trap
- ⑤ Sample valve (where applicable) on outlet pipe, 45 degree spout position
- ⑥ Piping after Grease Guardian:
  - 50mm (2 inch) diameter minimal
  - 1:40 gravity fall to waste
  - no more than 3 metres (10 feet) distance
  - contain less than 3 x 90 degree bends

***When under-appliance installation is not possible the Grease Guardian can be positioned next to the appliance, observing electrical and piping requirements above***

## Part 2: Pre Start Up Checks

1. Ensure unit is positioned on a level surface only and is plumbed in securely.
2. Ensure electrical outlet is waterproof and is fitted with or supported by a dedicated Residual Current Device or a properly grounded fault circuit breaker.

**Points 3 and 4 below should normally be carried out by your market representative as part of unit commissioning:**

3. Prior to mains switch-on ensure the unit is filled with water to the correct settlement level which occurs when the inflowing water stabilises at the base of the skimming wheel/drum.
4. Set the controller time of day and appropriate cycle programme in accordance with timer setting instructions detailed in this manual. Observe all maintenance requirements detailed in this manual.

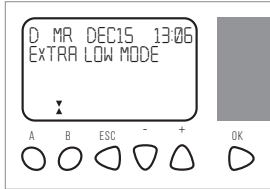
### HEALTH, SAFETY AND EFFICIENCY

- Never turn unit on before filling with water as instructed above.
- Disconnect unit from mains before accessing any electrical components
- Unit will lose efficiency if not Maintained.
- The unit is designed to trap and remove free floating grease oils and fats only
- The internal solids strainer provided protects the unit from coarse solid food waste build up. To help ensure the highest efficiency and reduce finer solid food-waste please install primary strainers in sinks and ensure food waste is scraped to bin before washing utensils
- Do not use Hazardous detergents to clean unit
- Do not install unit externally unless IP65 weather proof cover is used
- Do not connect a macerator or similar device upstream from the Grease Guardian
- Ensure unit is level and installed flat on the ground or frame where specified
- Remove blockages and grease build up from drains before installing the Grease Guardian
- If the supply cord is damaged it must be relaced by the manufacturer or authorised distributor
- Operation of the unit must be performed by trained personnel only



# GREASE GUARDIAN CONTROLLER

## 1. Menus accessed by pressing "OK" & "A":

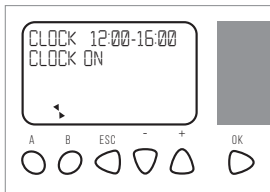


### HOME SCREEN/START SCREEN

Home Screen is shown on Left.

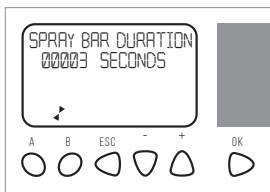
The following notifications are permanently displayed in the Home Screen:

- PLC program version on top left.
- Time of Day on the top right.
- Adjustable cycle mode: "EXTRA LOW", "LOW", "MEDIUM", "HIGH MODE". Press and HOLD "-" OR "+" to make the required adjustment.



### CLOCK SCREENS

Press "A" AND "OK" to access the daily Cycle CLOCK Screens from the Home screen. Scroll through CLOCK options 800-1200; 1200-1600; 1600-2000; 2000-0000 by pressing "A". To set any CLOCK display press "B": The message "CLOCK ON" will then display to confirm setting.

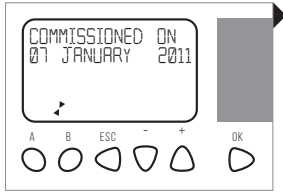


### SPRAY BAR SREEN

From Home Screen press "A " AND "OK" . Press "A" until the Spray Bar Duration screen displays. To adjust the value first press "OK". Use "-" OR "+" to change the value. The selectable range is 0-60 seconds. The spraying will only occur at the end of any 4 hr CLOCK cycle that is set to CLOCK ON. (See previous instruction).

*The above screens can be exited by pressing "ESC" or by waiting 1 minute, in which case the controller will return to the Home screen automatically.*

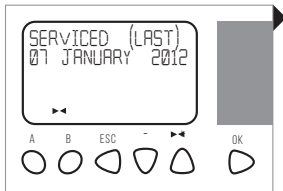
## 2. Menus accessed by pressing "OK" & "B":



### COMMISSIONED ON (DATE) SCREEN

Press "OK" and "B" together from the Home screen. The COMMISSIONED ON display should show. If an alternative menu shows, then re-press key "B" only until the screen left is called up.

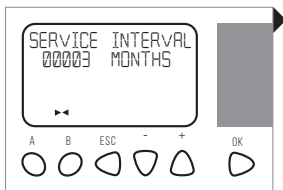
*The "COMMISSIONED ON" display simply logs the commissioning date for the Grease Guardian for general reference. To set this at commissioning, use "-" or "+" to navigate to the day, month, or year value as required. Then press "OK" to lock on to the value. Next use "-" or "+" again to increase or decrease the value. Confirm the setting by pressing "OK" again in each case, before moving to the next value. Confirm settings with "OK" before returning to Home Screen by pressing "ESC"*



### LAST SERVICED ON (DATE) SCREEN

Press "OK" AND "B" together from the Home screen. Re-press key "B" only until the screen left is called up.

*The "SERVICED LAST" display simply logs the last service of the Grease Guardian for future reference. To adjust, use "-" or "+" to navigate to the day, month, or year value as required. Then press "OK" to lock on to the value. Next use "-" or "+" again to increase or decrease the value. Confirm the setting by pressing "OK" again in each case, before moving to the next value. Confirm settings with "OK" before returning to Home Screen by pressing "ESC"*

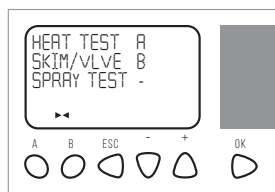


### SERVICE INTERVAL REMINDER SCREEN

The "SERVICE INTERVAL" display is a control menu that sets the interval in months for the "service due" reminder. For full safety compliance the recommended setting is 3 months

*To access press "OK" AND "B" together from the Home screen. Re-press key "B" only until the screen left is called up. The options that can be set range from 0-12 months. To adjust press "OK" to lock on to the flashing month value. Next use "-" or "+" again to increase or decrease the value. Confirm the setting by pressing "OK" before returning to Home Screen by pressing "ESC"*

### 3. Additional Control Menus



#### TEST OF COMPONENTS

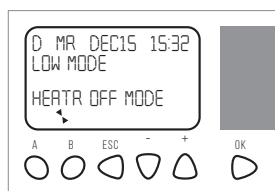
A Test of main components can be carried out. To access TEST screen press "-" AND "+" when in Home Screen. To activate components momentarily:

Press "A" for Heater test.

Press "B" for skimmer test.

Press "-" for Spray test.

Return to Home Screen by pressing "ESC"

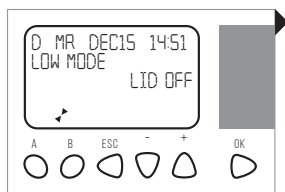


#### HEATER OFF MODE

For applications where water temp. entering the Grease Guardian is sufficiently hot (50 C +) the heating element can be switched off permanently during normal daily operation.

To do so press and HOLD "B" for 10 seconds when in Home Screen. The message will show status "Heater Off". To reactivate heater at any later date repress "B" for 10 seconds until the message

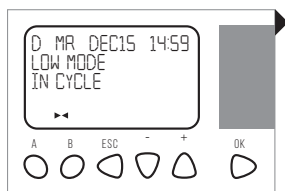
## 4. User Alerts



### LID OFF ALERT

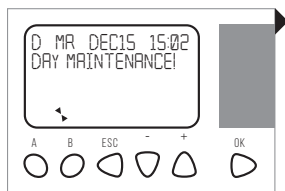
The display flashes a LID OFF alert if the main Grease Guardian tank lid is removed.

Additionally if the unit is in a cycle, the heater and motor components are shut down to allow safe access inside the tank if required.



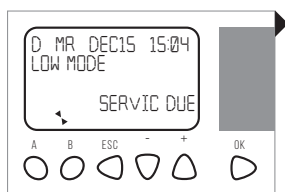
### IN CYCLE ALERT

This message flashes at all stages of an active cycle including the pause periods within a cycle. The message terminates only after the CYCLE steps have completed.



### DAY MAINTENANCE ALERT

This message flashes on all D series Grease Guardian units whereby daily removal of the lid is required for maintenance checks. The message is cancelled and re-set on lid replacement, thus verifying maintenance has been completed.



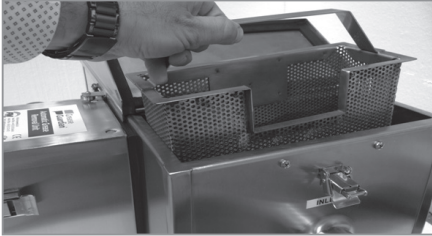
### SERVICE DUE ALERT/CANCEL & RESET ALERT

If a general service visit is not carried out on the date due this message will flash to indicate that a service is required. While the unit's daily operation is unaffected the message still require cancellation after the service . This is done usually by an engineer. If the unit has been recently serviced and the message still shows, it can be cancelled by entering the "SERVICE INTERVAL" display described in Menus et B, then press and hold the "A" key for 5 seconds before pressing ESC to return to the home screen.

# GENERAL HOUSEKEEPING

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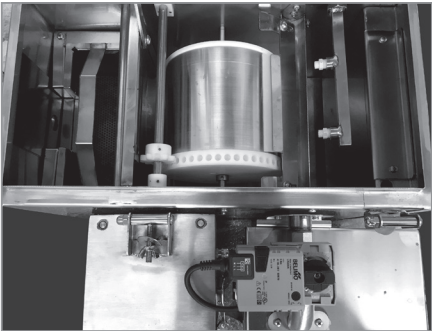
## Daily



Remove lid and empty strainer basket into bin. Replace basket and secure lid.



Empty collection container into barrel. This can then be taken away by a local rendering company for recycling.



Open lid, if needed clean wiper blades. Use a brush to clear grease deposits from the internal channel if needed and external pipe bend above the grease container.



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## Weekly



Fill sinks with clean water and empty to flush through unit. This keeps freshwater in tank. Always ensure water level is reaching wheels/drum.

# TRI-MONTHLY MAINTENANCE

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## External Service Partner

### ATTENTION!

In addition to the daily and weekly housekeeping, all Grease Guardian units must receive one service inspection **every 3 months to be completed by an approved FM Environmental service provider only**. Failure to implement this service could result in impairment of unit performance or system failure.

The service will consist minimally of the following steps:

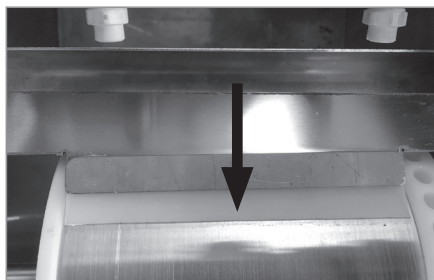
### Unit pump out:

To remove both settled and suspended solids. A thorough inspection and cleaning of the heating element will also be carried out each time



### Inspection of all wear and tear parts

Including Wiper rubber, flow restrictor rubber and lid seal gasket. Replacement of parts if necessary



### Electrical checks

Including controller, heater and motor checks. Optimisation of components will be made if necessary.



# TROUBLESHOOTING

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## **PROBLEM: Not skimming**

### **Is the power on?**

Check the power is on and the time control is set correctly. Check mains connection. If power is being supplied and there is still no display check fuses or contact your supplier.

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### **Are removable parts cleaned?**

Remove the lid and clean away any build-up that may be present in the wiper blades, collection channel or outlet hose. Ensure that the wiper blades are clipped properly in place on the skimmer wheels. Replace wiper blades when worn.

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### **Check the skimming and heating cycles**

The Grease Guardian heating and skimming cycles should be set to remove grease that is trapped. Make sure the cycles have been correctly set as per instructions.

(Heater) the tank should heat (25 mins approx). If the tank does not heat the heater may need inspecting. Contact your local service engineer to check.

(Wheel) after heating for 25 minutes, check to make sure that the noise of the skimmer wheel turning is heard. If the motor can be heard but the wheels are not turning then check the axles and drive couplings that link the motor to the wheel. If the skimmer motor does not come “on”, the motor must be checked by qualified engineers for possible replacement.

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### **Make sure wiper blade assembly is secure**

Position wiper blade assembly over the wheel and secure to shaft. If rubber blades brittle over time, replace.

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### **Check the magnet & switch**

A safety magnetic switch is found on the control panel whilst the magnet itself is attached to the main lid of the Grease Guardian. Make sure that the lid magnet has not been damaged. Ensure the distance between magnet and control panel is not more than 10mm for proper contact.

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### **Check the lid**

The unit will not operate when the lid is removed or incorrectly positioned.

## **PROBLEM: Excessive water is observed in the grease collection container**

### **Check Timer Cycle Settings**

Check the timer cycle settings for excessive "ON" time. Decrease the cycle length as advised in the timer settings of this manual. The unit should not run extensively after the grease and oils have been skimmed.

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### **Check water flow**

Surge water may overspill into the container. Ensure that the water flow to the unit does not exceed the rated flow and that there are no drain line blockages downstream from the unit.

## **PROBLEM: Excess steam comes out of unit**

### **Siphoning**

This results in a reduced level in the unit caused by the effect of "siphoning". This occurs in particular installations where the downstream piping of the unit is not properly installed. If this occurs, turn off the unit immediately and consult the plumber or the distributor for more advice.

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## **PROBLEM: Water overflows from the unit**

### **Has the strainer basket been maintained?**

If water overflows from the inlet chamber the basket may need emptying. Remove, clean and re-install. Ensure that the water flow to the unit does not exceed the rated flow and that there are no drain line blockages downstream from the unit.

### **Does the inlet gasket need replacing?**

General overflowing can also result from a worn inlet gasket or a blocked outlet pipe. Replace gasket and clean all possible blockages downstream of the unit.

### **Has sediment been allowed to build up over time?**

Over time, sludge could have built up at the bottom of the unit and is blocking the path of the flow underneath the outlet baffle. Ensure the unit is pumped out as per maintenance instructions.

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## **PROBLEM: Odour Reported**

### **Has maintenance been carried out?**

Ensure housekeeping is carried out as detailed in this manual  
Ensure the unit is pumped out as per maintenance instructions.



# Standard Warranty

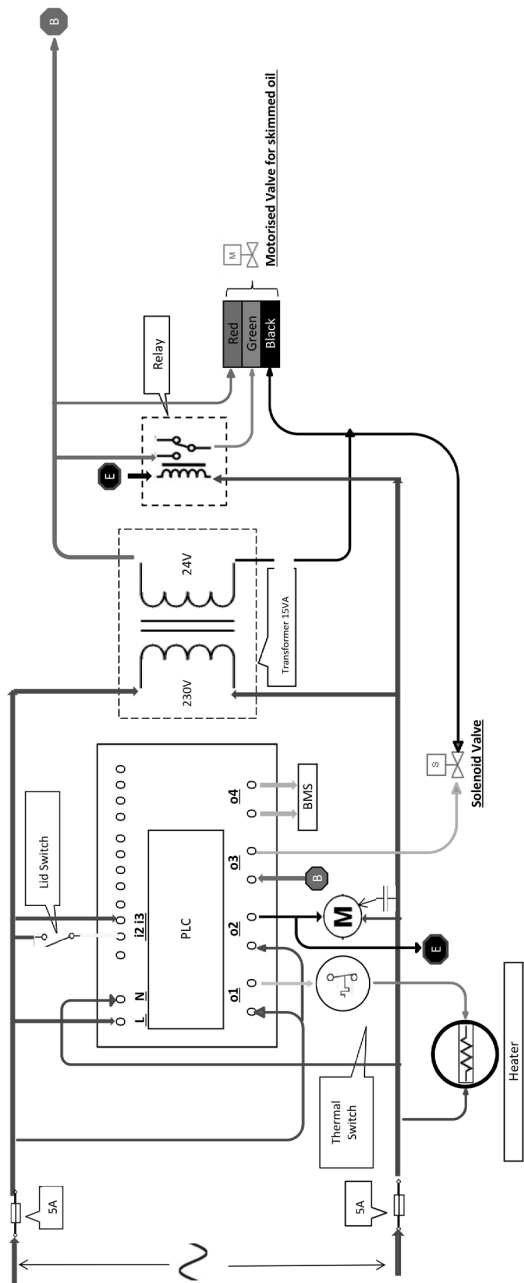
FM Environmental warrants, to the original user, that those products supplied by it and used in the service and in the manner for which they are intended shall be free from defects in materials and workmanship for a period of 1 YEAR.

- a) The warranty period commences from the date goods are dispatched to original user or from the date unit is commissioned provided that commissioning form or other receipt is supplied with claim and that commissioning is carried out within three months of equipment being dispatched.
- b) All warranty claims must be processed through the Dealer from whom the equipment was purchased. The Dealer will co-operate with the purchaser throughout the warranty claims procedure and will arrange any necessary repairs using genuine Grease Guardian parts.
- c) If the original Dealer is no longer able to fulfill their obligations please contact FM Environmental Limited with full details of the claim and proof of purchase or commissioning so that this may be processed without delay.
- d) Any warranty claim can only relate to a specific part that is proven to be at fault and for which a replacement will be supplied but cannot be extended to constitute a claim against the complete appliance.
- e) FM Environmental Ltd will supply the Dealer with any warranty parts required subject to the claim being validated after return of the faulty items.
- f) All replacement parts have a 60 day replacement warranty. Clean defective parts shall be returned, within the warranty period, with proof of purchase, to FM Environmental, transportation charges prepaid, for warranty evaluation. At FM Environmental option, based on the determination of the warranty evaluation, FM Environmental may repair or supply a replacement part from its factory. Any and all items which may be returned shall include the serial number of the unit from which the item was removed, and a return goods authorization number issued by FM Environmental.
- g) This warranty is void if the product has been damaged by its customer prior to acceptance or as a result of unreasonable use, neglect, flooding, alteration, improper installation, improper tri-monthly (4 times yearly) service, maintenance neglect, improper electrical service, installation and/or operation without timer controls, or other causes not arising out of defects in material or workmanship. Equipment must be installed according to manufacturer's guidelines. This warranty is void if equipment is used in excess of rated flow. FM Environmental products are intended to remove only free floating oils and grease. FM Environmental products do not remove emulsified fats and oils. FM Environmental shall not be responsible for damage to equipment which results from vault flooding, sewer line back-up, pumping or lift station failure, ambient water flow or other sources of water damage. This warranty is void if the serial number on the product has been altered or defaced. FM Environmental will not replace electrical parts which have been installed in under-ground vaults. This warranty is void should use, installation and application be contrary to a written agreement between FM Environmental and the user,
- h) FM Environmental does not make any other representations or warranties, express or implied, including, but not limited to, any implied warranty or merchantability and any implied warranty of fitness or performance for a particular purpose.
- i) The sole and exclusive remedy with respect to the above limited warranty or with respect to any other claim relating to defects or any other condition or use of the product supplied by FM Environmental, however caused, and whether such claim is based upon warranty, contract, negligence, strict liability or any other theory, is LIMITED to the repair or replacement of the part or product, excluding labour or any other cost to remove or install said part or product or, at FM Environmental option, to repayment of the purchase price. Notice of any such claim must be given in writing to FM Environmental within 15 months after the fault installation and / or use of the product
- j) In no event shall FM Environmental be liable for special, direct, indirect, incidental, personal, property or consequential damages, including but not limited to, loss of use or profits or to interruption of business activity. FM Environmental neither assumes nor authorizes any representative or any other person to assume any liability in connection with the sale of its products. FM Environmental makes no warranties, express or implied, with respect to parts, accessories, components or other goods not in FM Environmental scope of supply. Alteration and/or substitution of FM Environmental parts, assemblies, accessories including electrical and/or mechanical components voids FM Environmental warranty.

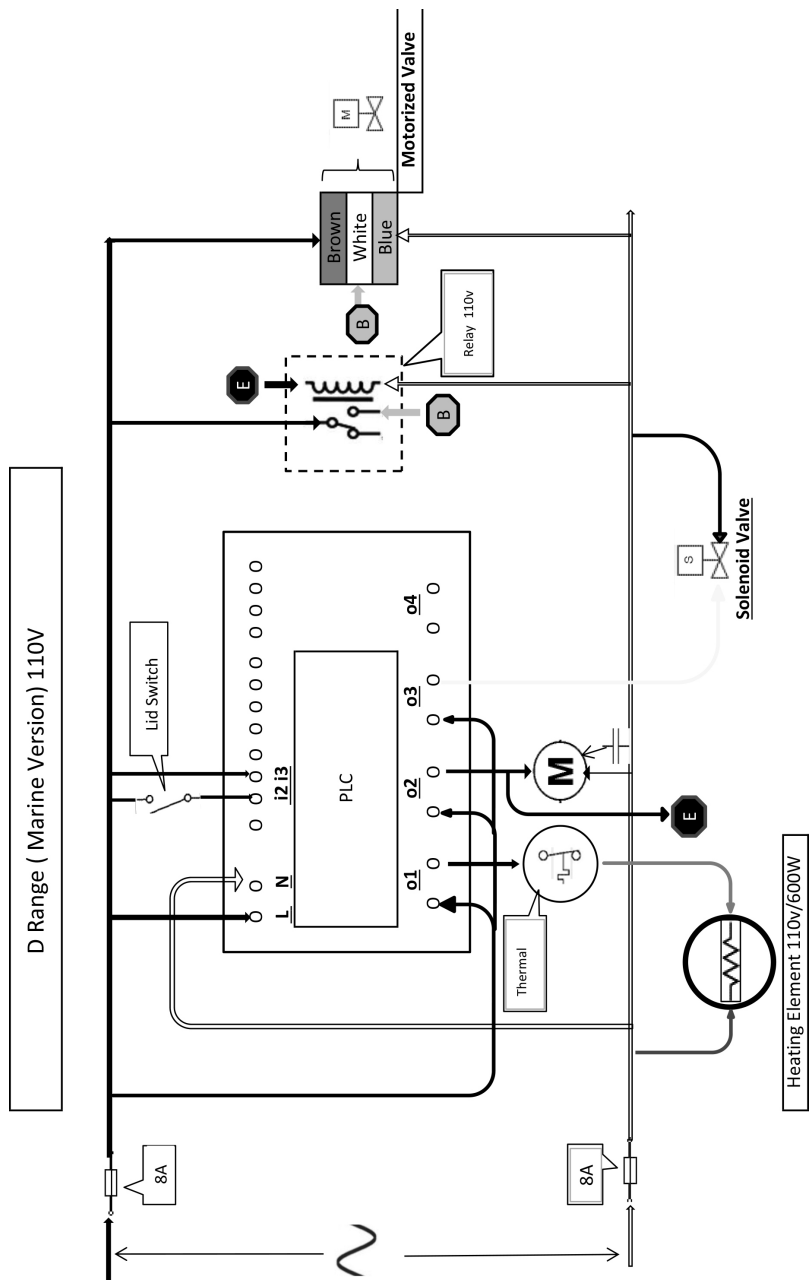
## 10 YEAR ANTI - PERFORATION WARRANTY ON GREASE GUARDIAN STAINLESS STEEL TANK

FM Environmental warrants, to the original user, that The Grease Guardian main tank (location in which grease is trapped) supplied and used in the service and in the manner for which it is intended shall be free from defects in materials and workmanship for a period of 10 YEARS. This Warranty is void should the product be damaged by its customer prior to acceptance or as a result of unreasonable use neglect, alteration, improper installation, improper service, maintenance neglect, installation or other causes not arising out of defects in material or workmanship. The warranty will also be void should the stainless steel tank be found to be in direct contact with copper, brass, or corrosive chemicals (acidic or alkaline), saline water (PPM > 1000) for excessive periods

# Appendix 1: D1 to D4 wiring diagram (230V)

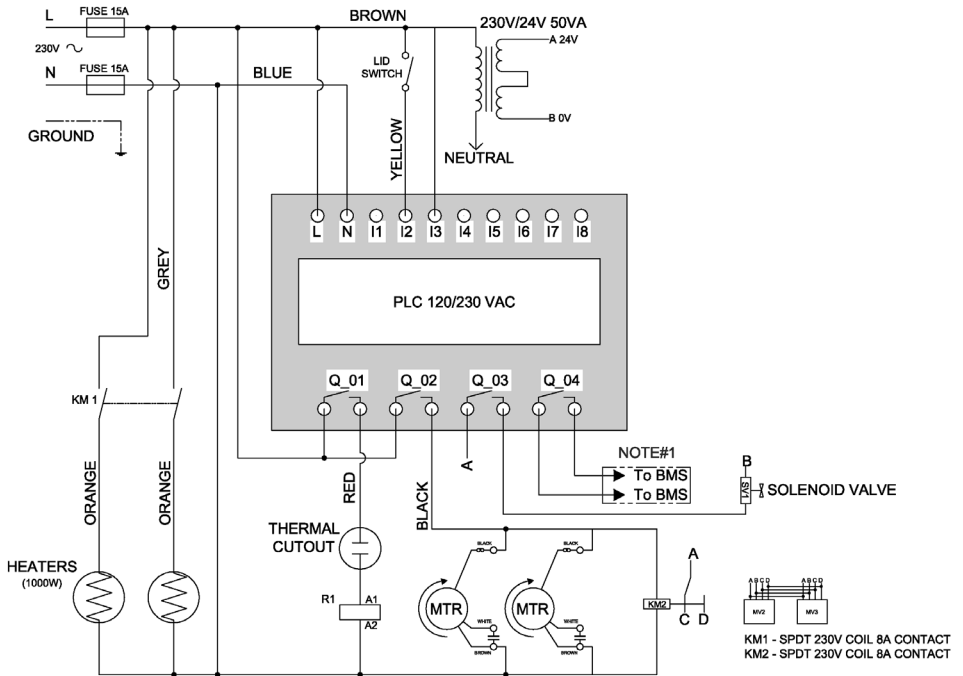


# Appendix 2: D1-D4 wiring diagram (110V)



## Appendix 3: D5 wiring diagram

### D5 Marine WIRING DIAGRAM - 230V



**Important: Additional backflow prevention regulations for water supplies**

The use of mains water spray bars may be subject to regulations on backflow prevention measures. Please check your local code before installing any spray bar systems, as codes will vary from country to country. FM Environmental Ltd does not take responsibility for providing backflow prevention devices or measures, unless explicitly contracted to do so for the application concerned at time of the Grease Guardian product sale.

**Important: Water supply (for manual and automatic spray bars)**

Wash water supply required: ½ inch BSP, 0.75l/sec (0.2 USG/sec) @ 3-6 bar. Temp 40-60°C (104-140°F). Plumbing of water supplies are to be carried out only by qualified personnel and all local plumbing codes adhered to where the Grease Guardian is being installed. To ensure proper solenoid valve performance and guarantee full warranty cover, the water supply preceding the solenoid valve must be fitted with a/a suitably sized water hammer arrestor and b/an in-line "WYE" type brass strainer.



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