

Diesel Fuel Recirculation Unit



**Complete with 5 micron filtration
for particles, 30 micron water filtration,
and a Purafiner fuel conditioner
and control electronics.**

WARNINGS



- Unit is not designed for pumping any fluid other than standard diesel fuel.
- Do not site the unit adjacent to a petrol dispenser or hazardous zone.
- The installation of the unit including the electrical connections must conform to all relevant electrical and local authority regulations and standards.
- The unit should be installed in a well ventilated area, all cabinets should be ventilated, and the tank designed to accept a re-circulation system.
- If the unit is fitted to an above ground tank, ensure that there is a check valve fitted with the correct spring ratio and pressure relief to suit the tank height. Max suction pressure = -0.3bar, Max delivery pressure = +2.0bar. If in doubt install pressure gauges as per the pump installation manual.
- Unit installation must be done by a competent fuel installation engineer.
- Make sure there are no warning lights on the front panel or fuel leaks after commissioning.
- Ensure that all relevant staff are trained on the operation of the unit, as part of your fuel installation risk assessment.
- The unit has been pressure tested and function tested after assembly and we recommend the use of union fittings to ensure that the sealed joint are not damaged by installation pipework.
- Fluctuating electrical parameters and fuel additives will reduce pump life.
- 30min duty cycle . Do not run the system for cycles greater than 30mins.
- We suggest more shorter cycles (e.g. four x 7 minutes)
- Support existing fittings when installing inlet and outlet pipework.

Wiring and functions are proprietary information of Centre Tank Services Ltd

SPECIFICATION

- For the re-circulating of diesel fuel in a storage tank, 1.5x tank capacity over 28 days
- IP55 protected electronics & pump, installed on a rear back plate for easy mounting to a tank.
- Magnetic fuel conditioner for breaking down molecules and double stage water and particle filtration.
- Control panel with large, visible coloured lights for alerting to a problem.
- The internal timer that controls the pre-set time periods that the fuel is circulated, is determined by your questionnaire (if completed).
- Mushroom style stop button on the plate to allow the immediate stop of pump functions by anyone.
- In the event of the filters blocking, the filter light on the control panel will illuminate and the pump will switch off until the filter is replaced.
- Non Latching Input for Low Level / Leak (N/O); for connecting a tank alarm or electronic gauge to detect a low fuel level. Activates the light on the control panel and turns off the pump, and can be doubled up for a leak probe if there is a drip tray installed.
- Two passive BMS outputs for remote warning of filter block and low level/leak/fault to alert the user that they need to take action.

Two models are available:

CTS1033 - For circulating (50lpm) max 3000 litres per day (40,000l tank)

CTS1048 - For circulating (70lpm) max 4,000 litres per day (70,000l tank)

INSTALLATION

Your unit will be pre-wired with a 600mm fly-lead. Please wire this through a suitable connection / isolation box, fused at 13A with a stable 230v 50Hz supply (242v max.)

- Ensure all pipework that is to be connected is free of any weld debris /excessive sealant, minimum dimensions of 1" pipework with a max tank height of 2.8m. Suction pipe to be as short as possible and delivery pipe to return to opposite side of tank to gain a cyclic effect. NRV must be installed on suction line inc wire strainer. Max suction pressure = -0.3bar, Max delivery pressure = +2.0bar. If in doubt install pressure gauges as per pump installation manual.
- Mount the rear plate to the tank or wall with sufficient fixings and room for service access for pump and filters change.
- If fitted outdoors ensure a rain and sun deflector is installed above the unit.
- Connections to inlet and outlet can be via flexible couplings and union fittings depending upon site requirements.
- We supply a ball valve for the suction inlet and recommend another ball valve to be specified and fitted by the installer / fabricator at a point on the discharge line to aid in the changing of the filters.
- Unit must be fitted with a suction non return valve and isolation valves before and after the unit.
- Install low level input if available from alarm relay or gauge relay.
- Once all pipework has been installed and the power is connected, open the valves and press and hold the priming button inside the panel (to be done by a competent installer) until fuel flows through both filters. If ACV installed then may require back-filling of the suction line. Refer also to pump user manual included.

IMPORTANT!

Please note: You must use the leak probe if fitted to a tank with a closed compartment that has a containment area. If the unit leaks into this containment area then the system will shut off to prevent the tank emptying.

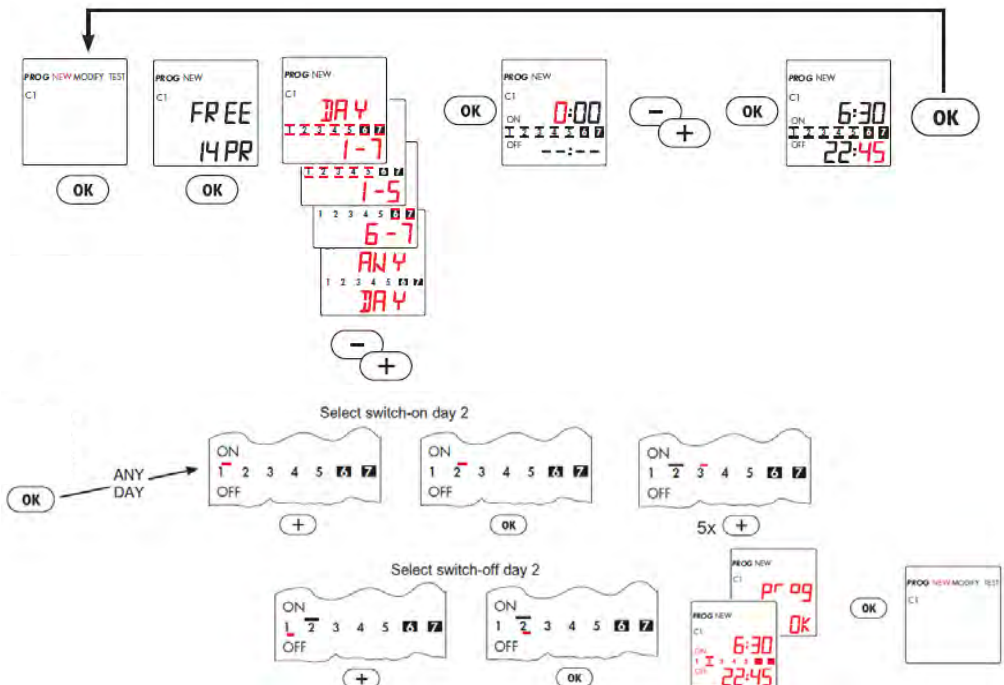
TIMER CONFIGURATION

The timer will be preset based upon cycling the tank once per week.
Do not set the timer to run the pump for any longer than a 30min cycle.
Leave at least 30 mins between cycles for cooling.

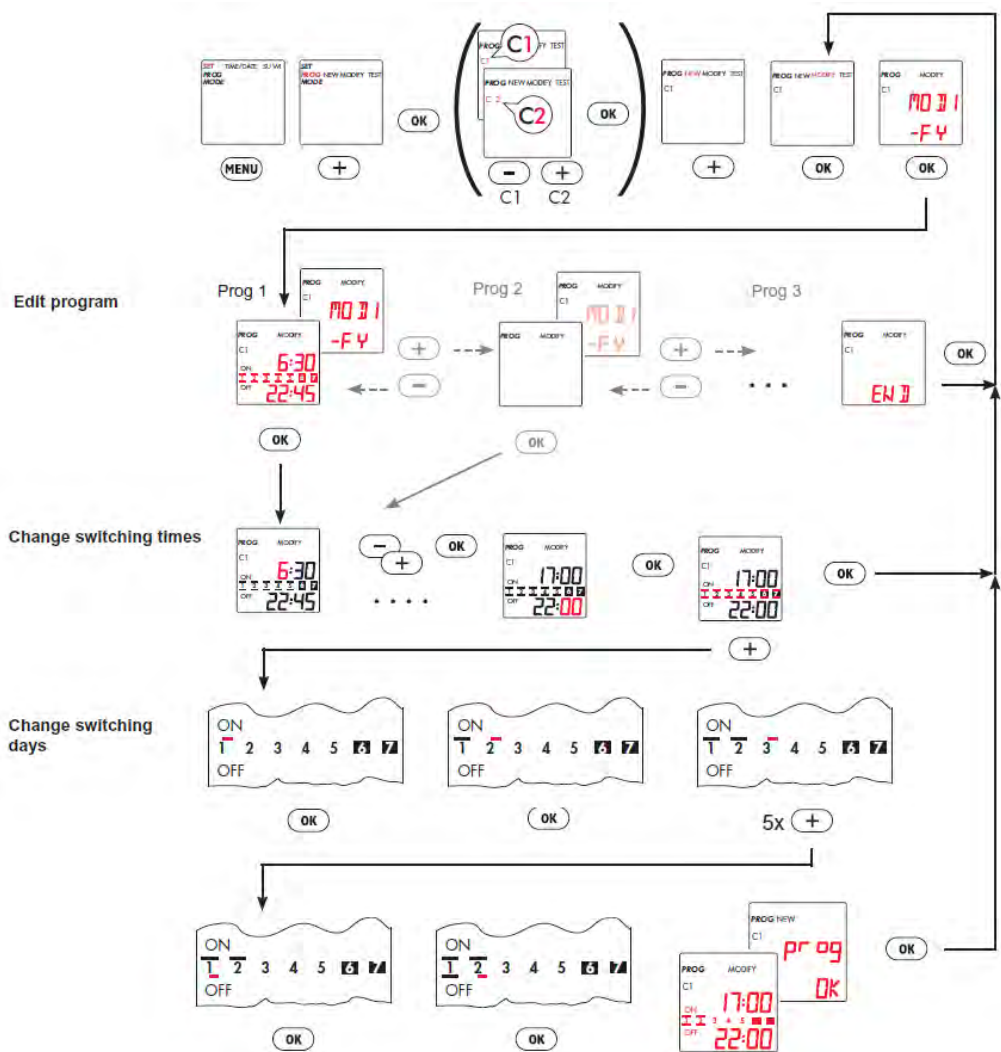
Set a new time:



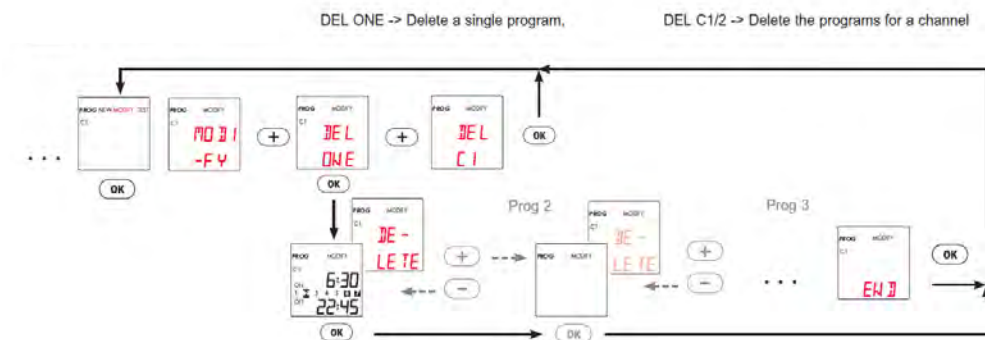
Programming: One program = switch-on time + switch-off time + switch-on and switch-off days.
Programs with predefined switch-on / switch-off days. • DAY 1-7 (MO-SU) • DAY 1-5 (MO-FR)
• DAY 6-7 (SA & SU). Programs for each channel are interlinked with OR logic.



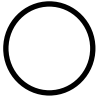
Modify a time:



Delete a time:



LIGHT INFORMATION



Internal Fuse OK

This protects the low/leak input at 100mA—Change the fuse if this does not illuminate and check safety relay inside.



Fault Light

Illuminates if the safety fuse activates or the safety contactor fails, or the Low input / Leak input state changes. The pump will not run during this phase. Once the fault is cleared the pump will resume on the timer. Power should be turned off to the unit if the fault can't be rectified, such as no fuel for several weeks.



Filter Blocked Light

Illuminates if the flow beyond the filter reduces past it pre-set limit. The pump will not run during this phase and will not restart until the filters have been changed and the power cycled. Power should be turned off to the unit if the filters can't be changed in a sensible period of time. If input voltage is too high (242v +) then this light can illuminate.



12v Internal Power

Illuminated to show that the 12v PSU is working normally. Check and change PSU if not operating.



230v Power

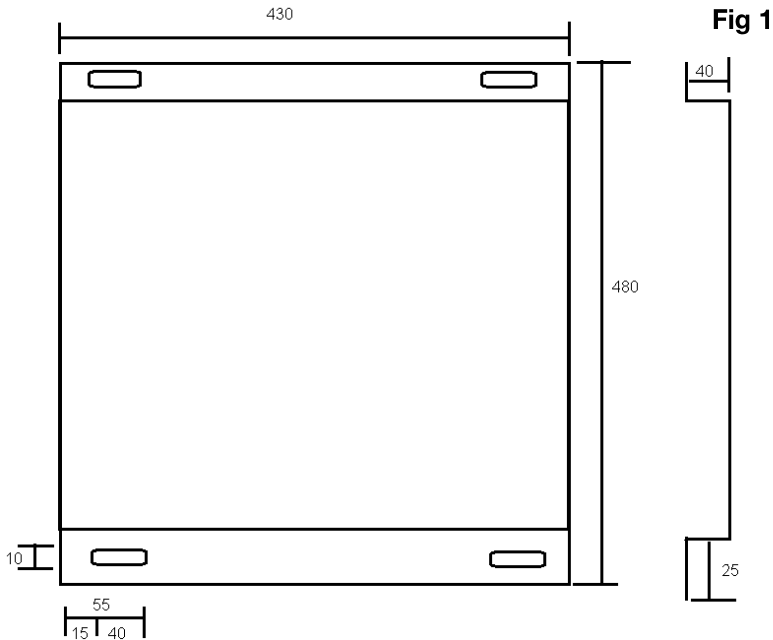
Illuminated to show that the unit has 230v mains power. Check the MCB inside the unit and the incoming supply if this is not illuminated.

CHANGING BLOCKED FILTER

The unit is fitted with a flow switch that detects when either of the bowl filters are blocked. Upon detection, the flow switch will stop the unit, and trigger a passive output to a BMS (if set up). The pump will not reactivate until the blocked filter has been replaced and the power cycled.

1. **IMPORTANT:** Press the mains isolator on the plated unit to ensure the pump is isolated from power whilst maintenance is carried out.
2. Turn the lever ball valve off at the fuel inlet and outlet to prevent fuel loss.
3. Drain the filter bowls by using the drain valves fitted to the base of each filter.
4. Remove the plastic clear bowl by unscrewing the large black encapsulating nut.
5. Replace the blocked filter with a spare element.
6. Refit the clear plastic bowl and tighten the large black encapsulating nut.
7. Make sure that the drain valve is in the closed position.
8. Open the lever ball valve on the fuel inlet and outlet.
9. Reset the isolator.
10. If timer is active and in timer mode the pump will automatically run for 10 seconds, if not follow initial priming instructions on page 5.
11. If no flow is detected the pump will switch off again, if this happens repeat step 10 and check valves are in the open position and check valve is not stuck.

DIMENSIONS



* All sizes are in mm and approximate

Max width of unit with elbows is 585 mm Max depth of unit is 250mm

Max height with filters closed is 780 mm

Recommended installation area requirements 635 mm wide x 1000 mm high

INPUTS & OUTPUTS

The inputs and BMS outputs all have labels. The flow switch is already connected. The low level and leak inputs are labelled next to the flow switch input, and should be doubled up if connecting both. The low/leak input is fuse protected @ 12v 100mA. The BMS clean contacts are located on the right top row and also labelled for connection to BMS.

SERVICING

Periodic inspection and changing of the filter media as required. Large tanks should have filter media changed regularly. On annual inspection the following should be changed:

- 2 x filter media
- Vanes and cover o-ring for pump
- Clean pump inlet filter
- Replace 12v safety relay (next to fuse) within electronic enclosure
- Confirm pump is operating to declared electrical specification
- Depending upon tank construction it may be necessary to check and clean the magnetic conditioner.
- Consider changing the pump and PSU when unit exceeds 1.5m litres.
- Inspect any flexible hoses regularly and change if signs of deterioration.

SPARE PARTS

F00611040—Spare water captor filter element 30 Micron.

F00611030—Spare particle filter element 5 Micron.

R112760000—Vane kit for Panther pump.

R11461000—Front cover plate o-ring.

ELEC5034—12v Contactor

SWS1035—Float probe for drip tray/leak.

F0075510D—230v Piusi OCIO gauge for tank reading and low level alert.

BCS1063 - 1" Male x Female Union for inlet and outlet, for easy installation.

* All parts are RTB warranty and do not extend the warranty period. Refer to our T&C's for further information.

TROUBLESHOOTING

If the RED light comes on when the pump switches off

- Check if there is a non-return valve fitted to the suction side.
- Check that the tank is no higher than 2.8m as the weight of fuel in the line may force the flow switch to close prematurely. Installer must respect the pressure noted at the front of this manual.
- Check that the minimum pipe dimension of 1" I/D pipe is being used.
- Check voltage is below 242v

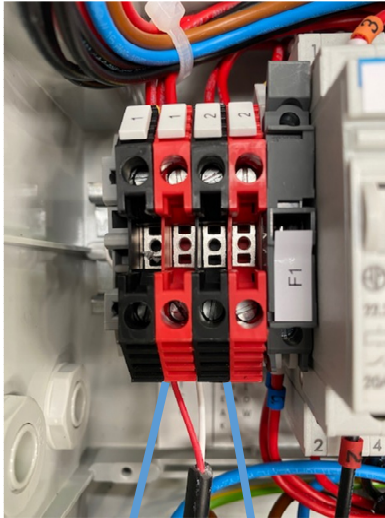
RED light comes on whilst the pump is still programmed to run

- Could be taking too long to prime once the pump starts – try changing the timer relay settings (1min & .3secs)
- Ensure the fuel pickup is far enough away from the fuel delivery (suction should be close to the pump and delivery should be to far side of the tank) as there is now air entering the system and the flow switch requires liquid to stay open – any air will cause this to close. Try to shorten the time that the pump runs for – thus split up the 15mins into two lots of 8 mins.
- Check the filters... they are probably blocked.
- Check that the minimum pipe dimension of 1" I/D pipe is being used.
- Check voltage is below 242v—reduce run time on pump timer to 7 mins per cycle.
- Check inlet pressure isn't too high

RED light comes on after the system has only run a few cycles

- Likely that the filters are actually blocked!
- If the fuel has never been filtered before the recirc unit is fitted then the filters will block quickly and are doing their job. Change filters and run unit again.
- Ideally the fuel should be polished before the recirc unit is used... or fresh fuel should be in the tank when the recirc unit is fitted.
- Check to see that the min pipe dimension of 1" I/D pipe is being used.

CTS Fuel Recirculation Unit - Wiring



**INPUT 1 – Clean
Contact N/O
activate on close**

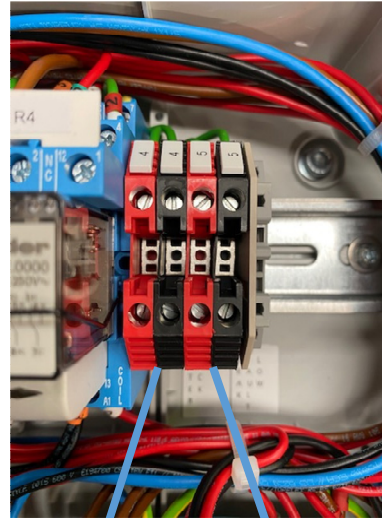
Flow Switch Input

**INPUT 2 Clean
Contact N/O
activate on close**

LOW Level
Switched input

LEAK switched
input

Wire in parallel if using a
Low Level input sensor
and a Leak sensor



**OUTPUT 4 Clean
contact N/O
activate on close**

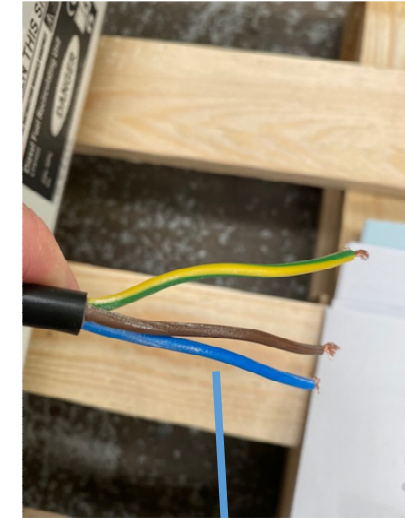
Filter Blocked
Indication

**OUTPUT 5 Clean
contact N/O
activate on close**

General Output for
LOW LEVEL sensor

General Output for
LEAK sensor

General Output for
Internal Fault
sensing



POWER INPUT

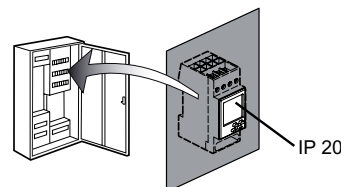
230v @ 50Hz

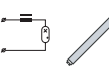
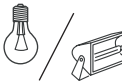
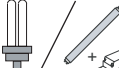
Cable from Emergency
Stop Button.

LIVE = BROWN

NEUTRAL = BLUE

EARTH = GREEN/YELLOW



 3680 W	 2300 VA
 1800 W	 1800 W
 60 W 7μF	 1200 W
 2300 W	 60 VA

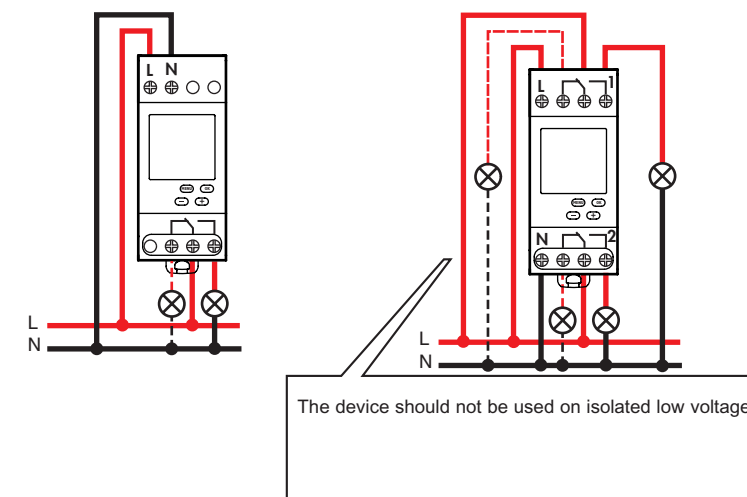


Diagram illustrating the sequence of screen displays for setting the alarm time:

- SET TIME/DATE SU WI
PROG MODE
- SET TIME/DATE SU WI
- SET TIME
0:00
- SET TIME
8:00
- SET TIME
8:00
- SET TIME
8:45
- SET TIME/DATE SU WI

Navigation buttons shown below the screens: MENU, OK, OK, -, +, OK, -, +, OK.

Programming
 One program = switch-on time + switch-off time + switch-on and switch-off days
 Programs with predefined switch-on / switch-off days
 • DAY 1-7 (MO-SU) • DAY 1-5 (MO-FR) • DAY 6-7 (SA and SU)
 Programs for each channel are interlinked with OR logic.

④



Change switching days

⑦

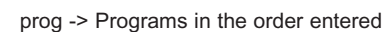


4/



DEL C1/2 -> Delete the programs for a channel

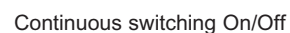
⑤



SERIAL -> Switching commands in chronological order

⑥

Mode PERManent

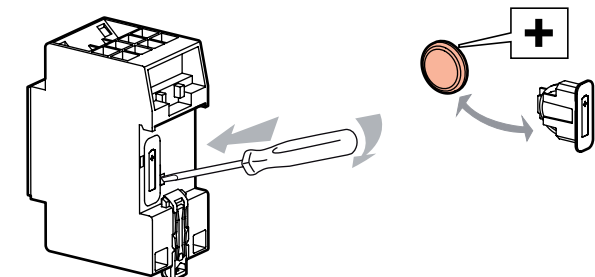


Reset



A reset clears the entire memory, which means that all previously set data will be lost. Press and hold all four keys together for about 2 seconds, then release them. The time, date, summertime/wintertime and switching times will have to be re-entered.

Switch off the device before dismantling the module. Do not switch on again until the module has been installed.
Always use a Li cell type battery (Li) CR2032, 3V. High temperature type min +70°C.



Recirc System Troubleshooting

No power to the system

- Check that you have incoming power +230v.
- Operate the Emergency Stop button.
- Check that the MCB inside the box is switched on ? No power on out side of MCB = Failure.
- Check that you have power to the MCB ? Power IN but no power OUT to MCB = Emergency Stop Failure.
- Check the terminal connections (with power switched off).

Mains light on but Low Power light OFF

- Check the 12v PSU to ensure connections are connected.
- Check terminal connections (with power switched off).
- Change PSU.
- Check incoming voltage >243v then component failure can occur.

Both power lights on but WHITE Fuse light is OFF and ORANGE fault light is on

- Check the 100ma glass fuse in the grey fuse holder on top row next to safety contactor.

ORANGE Fault light is ON and WHITE light is ON

- Check the input connections to the LOW/LEAK/FAULT terminals – top row left side. Try removing the connections to identify which input is giving the signal.
- Check the cables back to the sensors and operate any float switches or external relay inputs.

Water inside the control box

- Box lid has not been re-fitted correctly / rubber seal trapped / wire trapped in the seal. Unlikely to be used again if heavy ingress as onboard CMOS batteries will corrode and panel may run un-controlled – replace electronic panel.
- Check cable glands for tightness.
- Possible jet wash of box. IP55 only so stands rain.

Pump does not start

- Try pressing the GREEN Pump Prime button inside the control panel.
- Check that the mechanical switch on the pump is ON.
- Does the pump hummm ? Could be a broken vane or condenser failure.

Pump starts but no fuel flows

- Check to see that the min pipe dimension of 1" I/D pipe is being used on inlet and outlet.
- Check isolation valves on suction and delivery is open.
- Check that any non – return valves have been fitted in the correct direction.

- Does pump pull fuel ? – remove flexible hose and check suction. Back fill the hose and try pump again.
- Check internal bypass valve inside the pump head.
- Could be an air lock – try opening the filter bowl drain taps and prime the pump.
- Pour some fuel into the pump inlet and run pump again.

RED light comes on when the pump starts or should still be running

- Could be taking too long to auto prime once the pump starts - try changing the timer relay settings (1min & .3secs) on far right timer T2.
- Check T2 timer is set to SAN setting
- Open the plastic lid on the flow switch and check the WHITE TRIANGLE is visible.



- Ensure the fuel pickup is far enough away from the fuel delivery (suction should be close to the pump and delivery should be to far side of the tank) as there is now air entering the system and the flow switch requires liquid to stay open - any air will cause this to close. Try to shorten the time that the pump runs for - thus split up the 15mins into 2 lots of 8 mins.
- Check the filters....they are probably blocked.
- Check to see that the min pipe dimension of 1" I/D pipe is being used on inlet and outlet.
- Check isolation valve is open.
- Does pump pull fuel ? – remove flexible hose and check suction. Back fill the hose and try pump again.
- Check internal bypass valve inside the pump head.

If the RED light comes on when the pump switches off

- Check to see if there is a non-return valve fitted to the suction side.
- Check incoming voltage...if greater than +238v then delay timer kit required – ELEC6004
- Check to see that the tank is no higher than 2.5m as the weight of fuel in the line may force the flow switch close prematurely. Custom retro fit kit available (ELEC6004) for tanks between 2.5m and 3m but installer must respect the pressure noted at the front of the instruction manual.
- Check to see that the min pipe dimension of 1" I/D pipe is being used on inlet and outlet.

RED light comes on after the system has only run a few cycles

- Check incoming voltage...if greater than +238v then delay timer kit required – ELEC6004
- Check to see if there is a non return valve fitted to the suction side.
- If the fuel has never been filtered before the recirc unit is fitted then the filters will block quickly and are doing their job. Change the filters and run the unit again.
- Ideally the fuel should be polished then the recirc unit used.....or fresh fuel should be in the tank when the recirc unit is fitted.
- Look at the filter media – if it appears black then change the filters.
- Check to see that the min pipe dimension of 1" I/D pipe is being used.