

Installation of the heater.

The Mikuni MY series heaters are blown air diesel fired heaters running off either a 12 or 24 volt DC supply. To ensure good service from your heater it is important to install it correctly paying attention to all the details laid out within this instruction leaflet.

Planning the Installation

Take time to plan your installation!

The heater should be sited in an area where:

- (i) It will not have items stored against it.
- (ii) It will not be exposed to weather.
- (iii) It is within the parameters set out in this manual regarding fuel and power supply.
- (iv) It is within the parameters set out in this manual regarding heater mounting.
- (v) The exhaust outlet skin fitting is well clear of the water line.
- (vi) The exhaust pipe is not touching anything inside the boat which could be damaged by heat-The exhaust pipe does get hot even though it is insulated!

Tools for your installation:

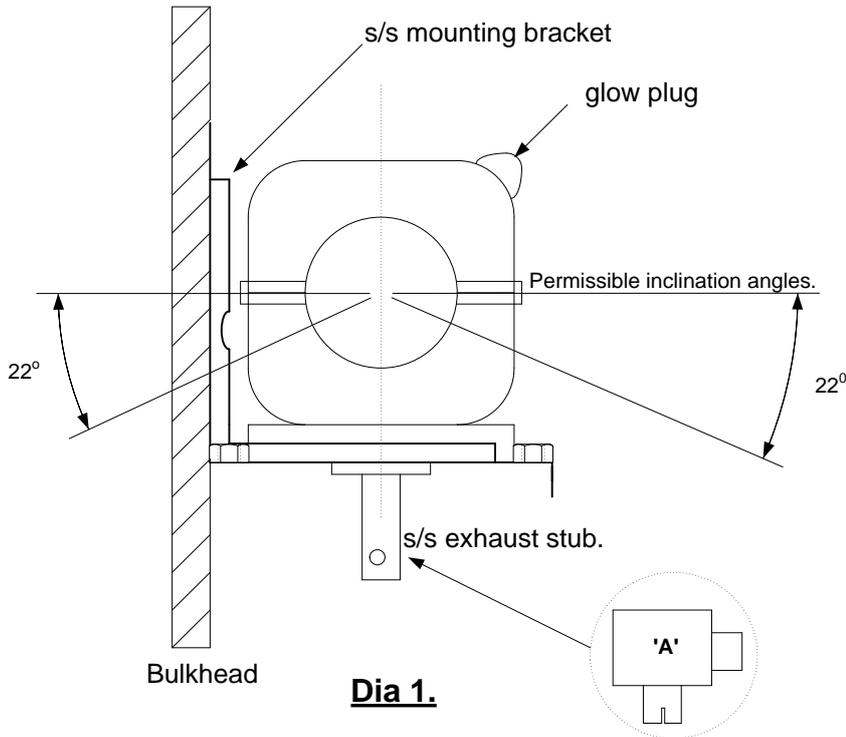
Here is a list of some of the tools required to help with your installation:

Hole saws		
Application	MY16	MY30
Hot air outlets	95mm	95mm
Ducting	60mm	90mm
Skin fitting	42mm	42mm
Fuel standpipe	22mm	22mm

1. Electric drill with slow speed.
2. Crimping pliers.
3. Wire cutters.
4. Metric spanners 8mm to 13mm.
5. Flat blade & posidrive screwdrivers.
6. Sharp knife.

1. Mounting the heater.

The heater should be mounted in a well ventilated locker which should be dry and within 2 metres of a suitable site for the exhaust skin fitting. It should also give consideration to servicing and access to cleaning the glow plug. The heater should be mounted in such a way that the axis through the hot air outlet and fresh air inlet is horizontal.



The heater is supplied with a stainless steel 'L' shaped mounting bracket which is designed to be fitted on a vertical bulkhead with the heater sat in it (see dia 1.) The heater has to be mounted in this way for correct operation.

Examine the chosen mounting place carefully to make sure that it has enough strength to support the heater and that it is free from excessive vibration while the boat is in use.

MY16:

Fix the mounting bracket to the bulkhead using the 4 x 3/4" No10 self tapping screws provided. The heater can now be fitted in place either way round (whichever is the most convenient for the ducting run) with the 4 x s/s M6 x 20 set screws provided.

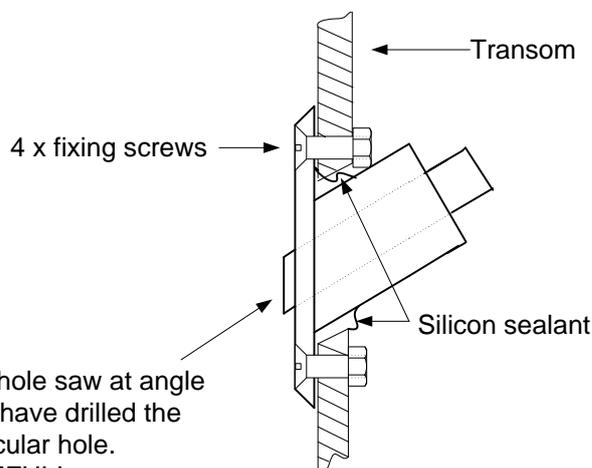
MY30:

Fix the mounting bracket to the bulkhead using the 6 x 3/4" No10 self tapping screws provided and mount the heater using the 4 x s/s M8 x 20 set screws. Now screw the s/s exhaust stub into the bottom of the heat exchanger, and slide the combustion air manifold 'A' over the top.

2. Exhaust and combustion air system:

The exhaust skin fitting needs to be fitted as far above the water line as possible to prevent any ingress of water into the heater. An ideal place for the skin fitting is on the transom.

Once you have planned the siting, drill a 4mm pilot hole as guidance for the pilot drill on the hole saw arbour. Now drill the correct size hole: MY16/ MY30 = 42mm. When you have completed this re-drill the hole at an angle at a slow speed (see dia 2) to allow the skin fitting to fit in a snug hole. Now drill 4 x 5mm holes for the fixing bolts, apply silicon to the rear of the face and secure in place with the 4 x M5 x 40 button head s/s screws provided.



Drill with hole saw at angle after you have drilled the perpendicular hole.
BE CAREFUL!

Fix the s/s exhaust to the skin fitting and secure with the heavy duty clamp. Cut the exhaust at a convenient place to insert the silencer, (MY30 Only) and secure with a tridon hose clip.

IMPORTANT TIP: (MY30 Only.) Put an exhaust clamp on one end of the remaining exhaust, now take the combustion air manifold and insert the split spigot into the end. Push this assembly onto the exhaust spigot of the heater making sure that it slides home over the heat exchanger casting, and tighten the clamp. The MY16 does not require an exhaust silencer.

NOTE: THE EXHAUST DOES GET HOT- DO NOT CLAMP IT TO ANY COMBUSTIBLE MATERIALS. The exhaust lagging should now be wrapped around the full length of the exhaust pipe and secured at each end with the hose clips supplied.

Dia 2.

2.Continued:

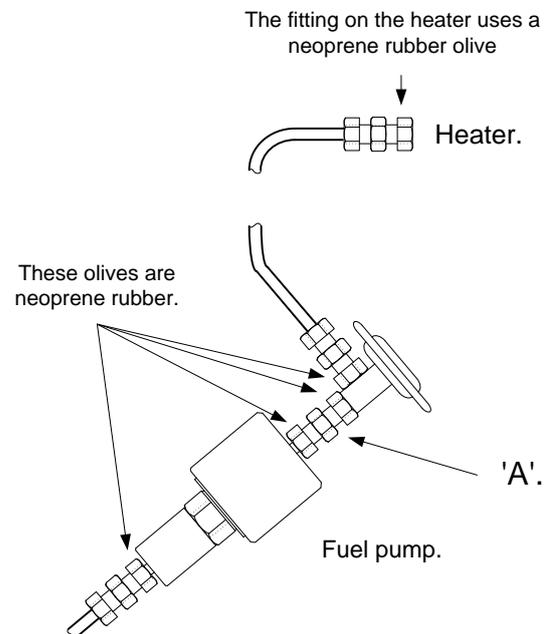
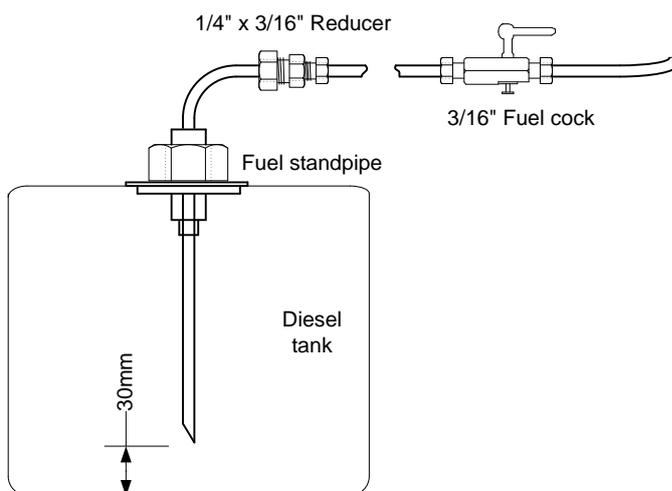
MY30 Only: Take the combustion air inlet silencer and fix to the front of the heater s/s mounting bracket with the cable ties provided. Cut the black combustion air tube to length and fix to the silencer and the heater with the two 32mm hose clips.

3. Fuel system:

The heater is supplied with a fuel standpipe to be fitted into the top of the fuel tank. Use this wherever possible-it is the preferred method because it does not interfere with the engine fuel supply. Find a suitable location in the fuel tank that has no obstructions inside, put some grease around the chosen location and drill a 22mm hole - the grease should help prevent any debris falling into the fuel tank. Now cut the standpipe so that it is about 30mm off the bottom of the fuel tank, slide into place and tighten the fixing nut. (see dia 3.)

Installation of copper fuel line.

1. Fit the 1/4" to 3/16" reducer onto the standpipe.
2. Cut the required length of copper pipe from the amount supplied and fit to the fuel cock.
3. Fit the straight connectors to the fuel pump. NOTE: 3 connectors are fitted with 1 rubber olive and 1 copper olive and 1 straight connector is fitted with 2 rubber olives. The connector with 2 rubber olives is to be mounted between the fuel pump outlet and the fuel damper. Item 'A'.
4. Mount the fuel pump near the fuel cock at a 45° angle as shown.
5. Fix the remaining connector to the fuel inlet on the heater with the rubber olive on the heater stub.
6. Cut the copper pipe to length, fit to the pump and the heater.



Length of pipe (max)	(mm)
Standpipe to fuel pump:	2000
Fuel pump to heater:	5000
Head (max)	
Bottom of fuel tank to pump centre:	1000
Pump centre to heater centre:	<2000

Dia 3.

NOTE: The fuel pump is a solenoid which is pulsed by the control box - be careful not to mount it on a board that may resonate. If after installation the pump is noisy re-locate it!

4. Electrical:

The Mikuni heaters come complete with simple plug together wiring looms

(a) MY16:

The MY16 wiring loom comes in 2 parts, the main harness and the power loom. Plug all the parts together, mount the motor fuse next to the control box using the plate provided.

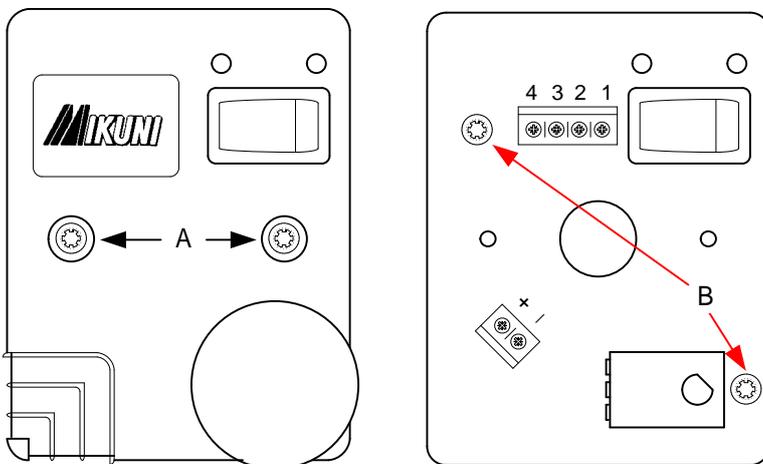
Now run the thin 2 core cable to the fuel pump and connect up - polarity is not important on the fuel pump.

Run the 6 core loom to the thermostat, trim to length and connect up as shown in dia4.

Connect the main power loom directly to the battery via a 30 amp fuse.

NOTE: Do not connect the live feed to the main power switch. If the power is turned off at the supply whilst the heater is running, it will not be able to perform its cool down purge cycle, which could cause internal damage to the heat exchanger.

MY16 Thermostat unit:



Dia 4.

Mounting the thermostat:

Try and mount the thermostat in an area where it will get reasonable air flow, but is not in a doorway or direct sunlight. This would cause the heater to cycle incorrectly.

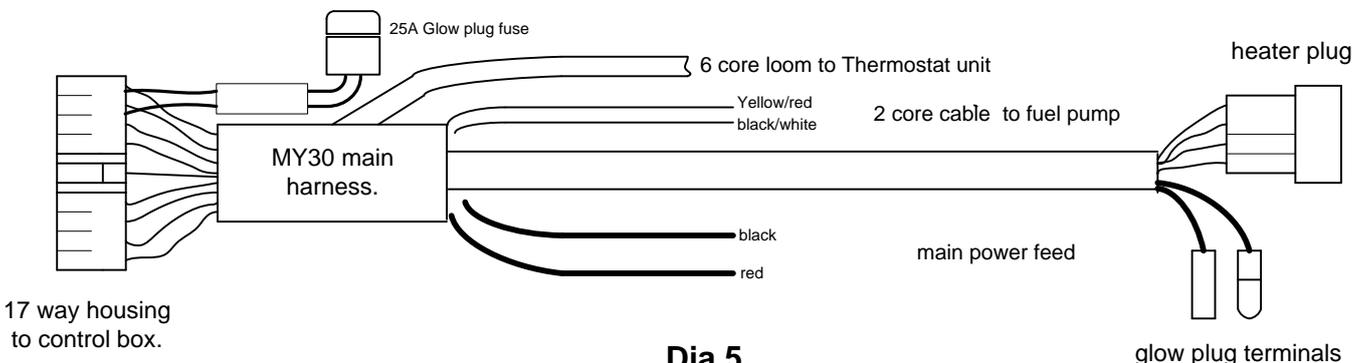
Prise the knob off with a screwdriver and then remove 2 x self tapping screws A in dia 4. The lid will now come off to expose the pcb inside. Remove the pcb by undoing 2 x self tapping screws B. Now fix the base plate onto a flat vertical surface with the 2 x screws provided. Fix the pcb back onto the base plate and wire as per diagram below.

The lid can now be screwed into place and the knob pushed back onto the spindle. There are 2 x blanking plugs provided to cover screws A in the lid.

MY16 Wiring Instructions	
+	Blue / Yellow
-	Black
1	White
2	Green
3	Red
4	Red / Yellow

(b) MY30:

The MY30 wiring loom is pre-assembled as shown in Dia 5.



Dia 5.

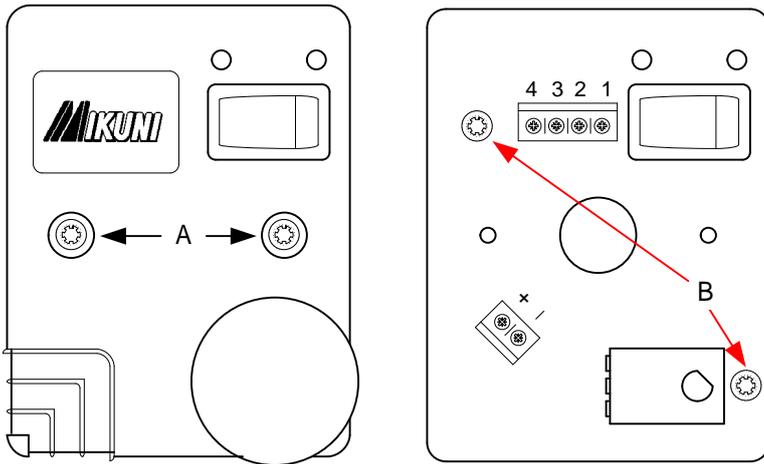
Mount the control box on a flat vertical surface with the 17 way housing at the bottom. Secure in place using the 4 x 3/4" No10 self tappers provided. Now plug the main harness into the control box and then the heater and glow plug terminals ensuring that they are a tight fit. Plug the 2 core fuel pump loom into the main harness, trim to length, attach the 2 bullet receptacles and plug into the fuel pump - polarity is not important.

Now run the 6 core loom to the thermostat, trim to length and connect up as shown in dia 6.

Plug the main power loom into the harness and run directly to the battery via the 30 amp fuse supplied.

NOTE: Do not connect the live feed to the main power switch. If the power is turned off at the supply whilst the heater is running, it will not be able to perform its cool down purge cycle, which could cause internal damage to the heat exchanger.

MY30 Thermostat unit:



NOTE: The mounting instructions are the same as MYH16 but note that the cable colours are different!

MY30 Wiring Instructions	
+	Red
-	Black
1	Green
2	Red/Yellow
3	Blue/Yellow
4	White

Dia 6.

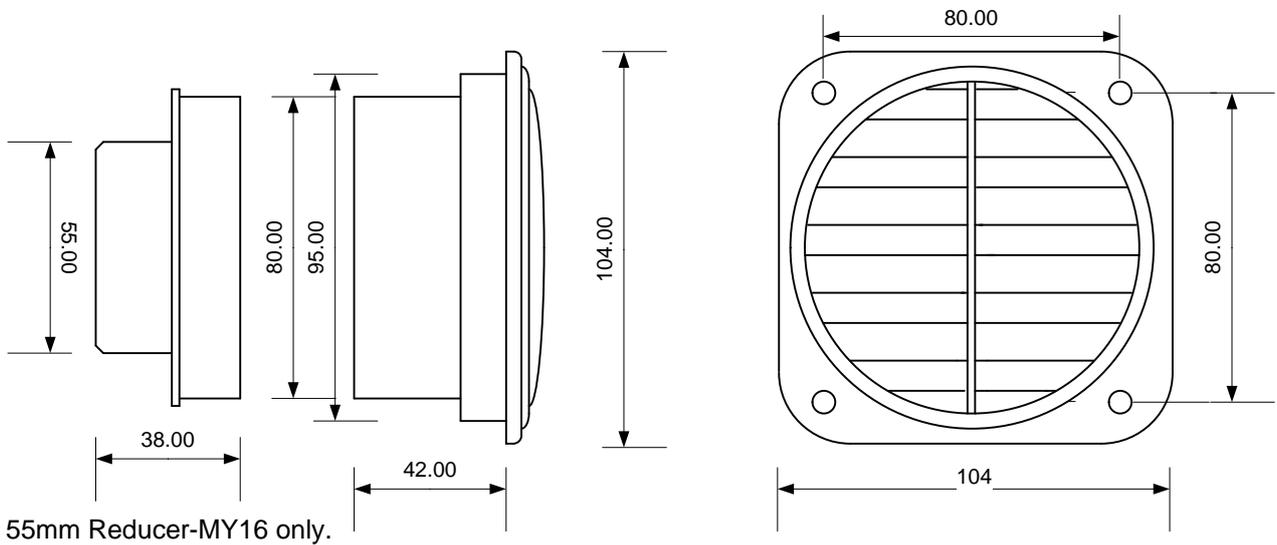
5. Air distribution:

The hot air ducting should be run through the boat in the most direct route possible - the less bends the better the air flow!

The MY16 uses 55mm ID ducting so use a 60mm hole saw to allow clearance when running the ducting through bulkheads and partitions, the MY30 uses 80mm ID ducting so use a 90mm hole saw.

The hot air outlets require a 95mm hole saw for mounting. There are 2 types, the directional vent and the open/close vent. There must always be at least one permanently open vent on the installation to prevent overheating of the unit. The MY16 vents have an extra plug in reducer on the back of the outlet to accept the 55mm hot air ducting. (see dia7).

PLASTIC DIRECTIONAL VENT



Dia 7.

When the holes have been drilled for mounting the hot air outlets they should be secured using the 4 x 1/2" No8 black c/s self tapping screws provided. It is advisable to secure the 55mm reducers with a self tapping screw to prevent them working loose - especially on motor boats.

Air inlet:

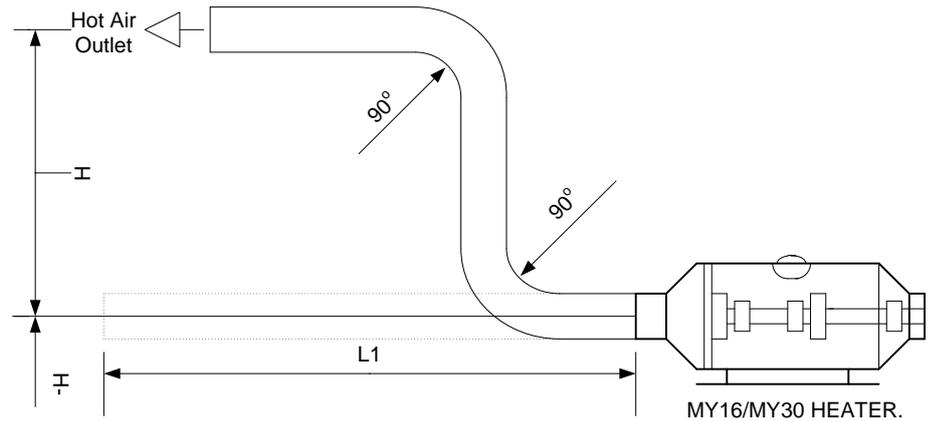
This is usually taken from within a well ventilated locker, but if for instance the heater was mounted in an engine room then it would be necessary to duct the inlet air to the heater to prevent any fumes being drawn into the cabin area.

The inlet ducting should always be kept to a minimum length to prevent any restriction in air flow.

Ducting parameters:

Specifications	MY16	MY30
Ducting Dia (mm)	55	80
Max length L1 (mm)	5000	8000
Max starting head H.	1200	1500
Max No of 90° bends	4	7

NOTE: The max length of ducting shown is to the first permanently open outlet.



Dia 8.

TRIAL OPERATION:

Final check:



Confirm that all the wires are connected according to the wiring diagram and that all the connectors are firmly in place.



Check that the wiring loom is secured neatly in place and will not be subjected to any chafing or excessive heat. ie: Keep away from the heater exhaust pipe.



Check that the exhaust clamps are tight and that the pipe is secured away from any combustible materials.
ie: Bilge pipes-recommended min air gap= 10mm.



Check that all hose clips on the hot air ducting are in place and are correctly tightened. Ensure that the ducting has not been deformed to cause any restriction in air flow.



Check that the fuel line is all clipped in place O.K and that the clips are all tight - ensure there is fuel in the tank.



Check that the battery has sufficient charge to operate the heater.

Trial operation procedure:

(a) Fuel priming:

The fuel should be primed to the inlet of the pump by either syphoning or with a syringe. Note: A priming pump is available to distributors part no: SP21.

MY16: Switch the heater on at the thermostat and turn the dial clockwise until the green light comes on. The red LED will be flashing slowly and the heater motor will start. After approximately 40 seconds the fuel pump will start to pulse and fuel will start pumping up to the heater. This may take several attempts depending on the length of the fuel line between the pump and the heater. Note that the heater will go through 2 cycles and stop, you should then wait 5 minutes switch the thermostat off and then on again to reset the electronics. The cycle will now be repeated. When the fuel reaches the heater it will ignite and after approximately 80 seconds the glow plug will switch off and the red LED on the thermostat will be on constant.

MY30: The thermostat on the MY30 has a 3 position switch to allow the heater to blow cold air as well. First disconnect the fuel line at the heater end and put into a suitable receptacle. Now disconnect one of the cables going to the glow plug. Push the switch on the left side for heat; the red LED will illuminate and the heater motor will start slowly, after approximately 40 seconds the fuel pump will start to pulse. The heater will go through a cycle and stop; switch the thermostat off and then on again to repeat the cycle until fuel is starting to pulse into the receptacle. Now reconnect the fuel line and glow plug terminal and switch the heater back on. It should ignite and after approximately 80 seconds the glow plug will switch off and the right hand light will come on on the thermostat. The thermostat on the MY30 operates the heater between high and low heat.

Final checks (both models).

Any heater when it is new requires running in to clear any odours from ducting, exhaust lagging etc. After the heater has ignited any smoke from the exhaust should clear within 5 minutes (unless the heater has been flooded during priming).

Continue running the heater and recheck all the items in the final check list.

Run the heater for two hours at full heat to clear any odours from the ducting etc.

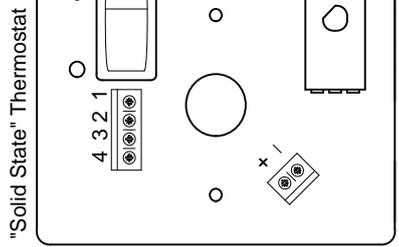
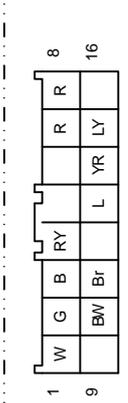
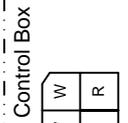
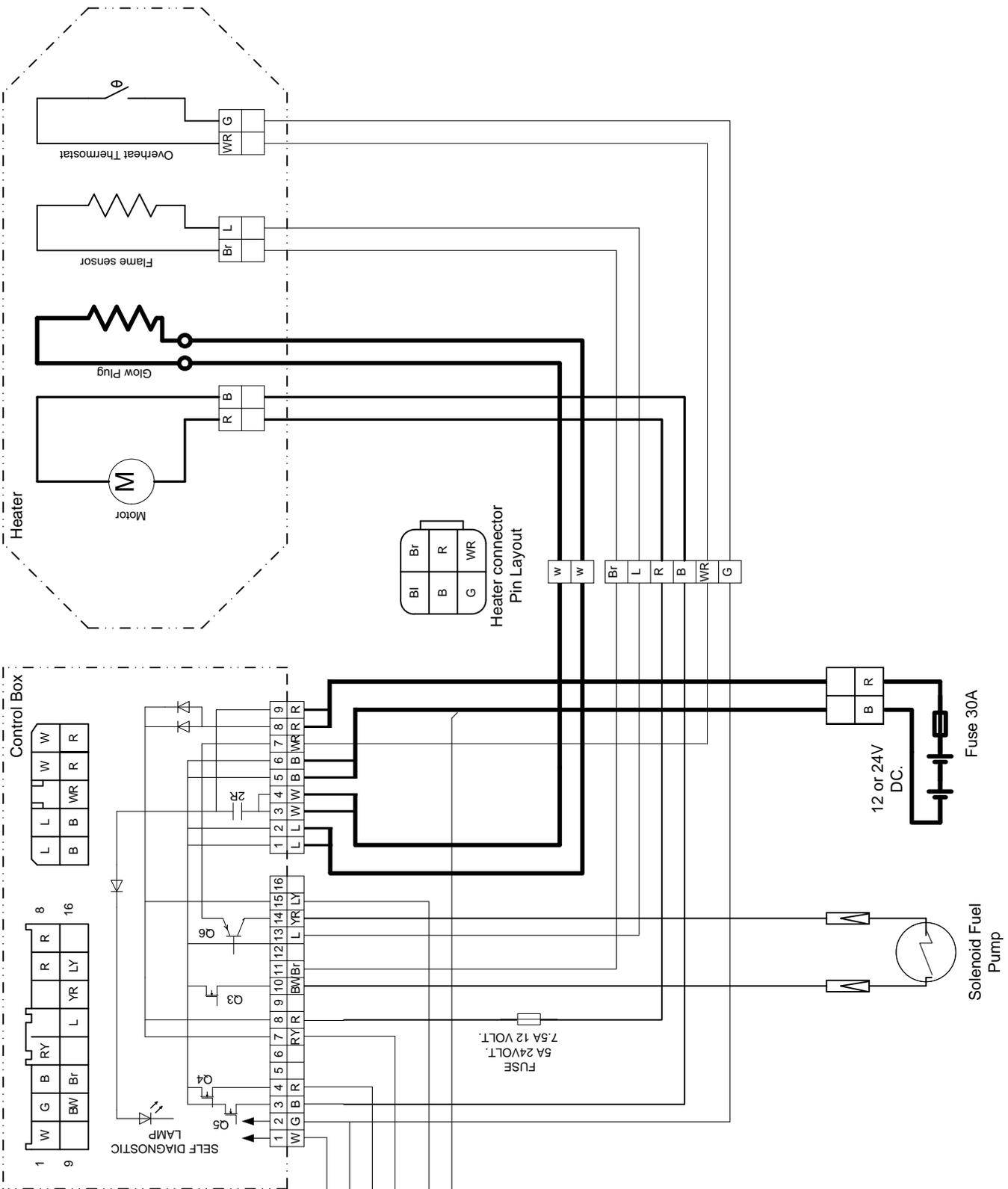


WARNING:

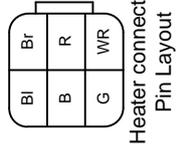
- 1. Ensure that no flammable substances are near the heater exhaust pipe.**
- 2. Ensure that there are no obstructions near the exhaust outlet ie: Fender or pontoon. Note that exhaust gases are hot!**
- 3. If the heater overheats whilst operating, first turn off the operation switch, investigate the cause and rectify before operating the heater again.**
- 4. Always switch the heater off when filling fuel tanks.**
- 5. If ignition fails do not attempt to start the heater more than 3 times, you will flood it with diesel! - Investigate the cause and rectify.**

Specifications.

Specifications	Model:	MY16	MY30
Heat output	(kw/h)	1.9	Hi=3.5 Lo=1.75
Air Flow	m ³ /h	50	Hi=136 Lo=92
Rated voltage	D.C.V	12/24	12/24
Operating voltage	D.C.V	12v=10.5-14 24v=21-28	12v=11 - 14 24v = 22 - 28
Current consumption	A	12v=3.4A 24v=1.7	12v=3.8/1.9 24v=2.0/1
Fuel		Diesel fuel	Diesel fuel
Fuel consumption	L/h	0.22	Hi=0.42 Lo=0.21
	Gallon/h	0.06	Hi=0.11 Lo=0.058
Operating temperature	°C	-40- plus 40	-40 - plus 80 (control box: -40 - plus 40)
	°F	-40- plus 104	-40 - plus 176 (control box - 40 - plus
CO2 value in exhaust gas	Vol %	10 - 11.5	104)
Smoke value in exhaust gas	No.	Max:3	Hi=10 - 11. Lo= 7- 8
		See operation manual	Max:2
Safety device	mm	364 x 146 x 141	See operation manual
Heater dimensions	kg	3.6	426 x 182 x 179
Weight			5.65



Wiring Instructions for "Solid State" Thermostat.	
+	= Blue/Yellow
-	= Black
1	= White
2	= Green
3	= Red
4	= Red/Yellow

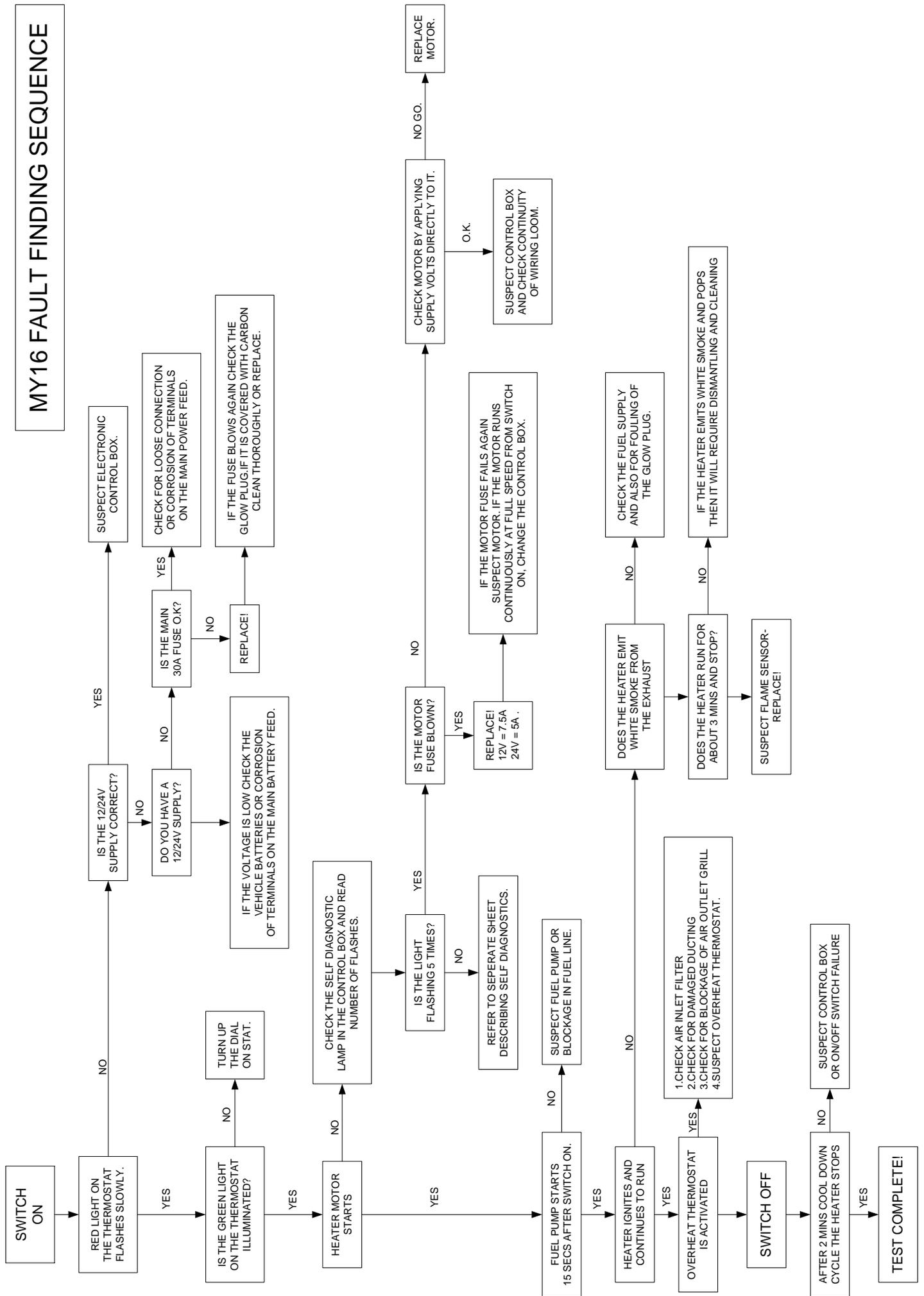


MY16 Self Diagnostic Fault Finding System.

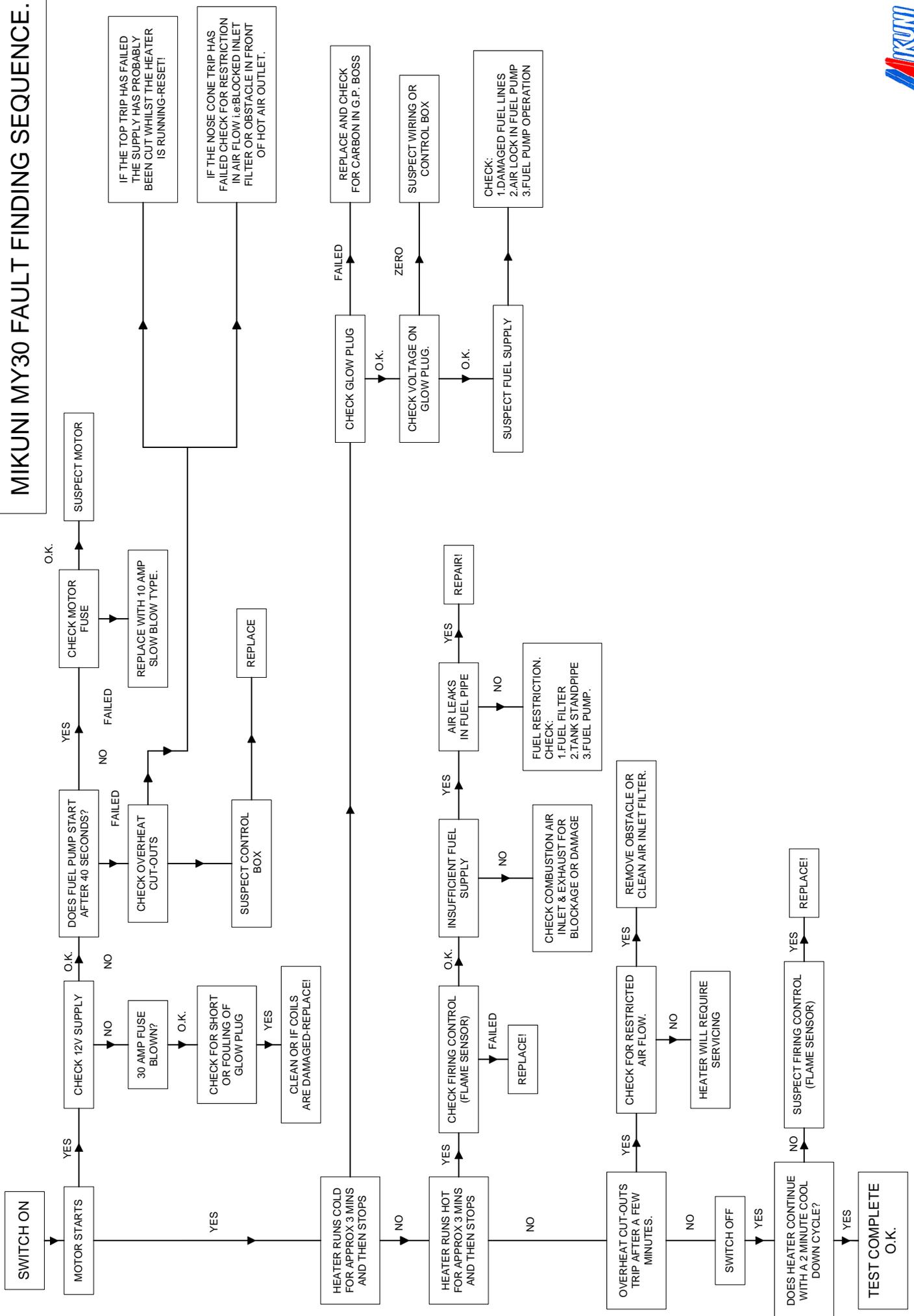
The MY16 heater is equipped with a self diagnostic fault finding system to aid repair should a fault occur. **NOTE:** Should any part fail or if there is a loose connection then the control box will not allow the heater to start at all and a fault code should flash in the control box window. The following table should assist you in repairing the heater if you follow the instructions step by step. This list has been compiled from experience of the MY16 on the UK market. If you discover any new anomalies please inform us so that we may add them to our list.

ON/OFF FREQUENCY	CAUSE	REMEDY-MOVE FROM POINT TO POINT IN ORDER UNTIL FAULT IS LOCATED
1.	IGNITION FAILURE	CHECK FUEL SUPPLY > FROZEN FUEL LINE? > CHECK AND CLEAN FILTER IN FUEL PUMP > CHECK FOR BLOCKED STANDPIPE > COMBUSTION AIR OR EXHAUST PIPE BLOCKED OR DAMAGED? > IF HEATER RUNS OK FOR APPROX 3 MINS AND STOPS-SUSPECT FLAME SENSOR > IF HEATER SMOKES BADLY AND STOPS AFTER 3 MINS STRIP DOWN AND DECOKE.
2.	NO FLAME SENSING.	CHECK ALL PLUGS AND SOCKETS IN WIRING LOOM > LOOK AT FLAME SENSOR; IF THE SEALANT IS PUSHING OUT OF THE RETAINING NUT REPLACE WITH A NEW FLAME SENSOR; IF NOT CHECK FOR BAD CONNECTIONS ON PCB INSIDE GLOW PLUG COVER > CHECK CONTROL BOX.
5.	MOTOR FAILURE	CHECK MOTOR FUSE 12V=7.5A 24V=5A > IF FAILED ENSURE THAT MOTOR SPINS FREELY > CHECK WIRING LOOM CONTINUITY > CHECK MOTOR > CHECK CONTROL BOX > CHECK FOR BAD CONNECTION ON PCB INSIDE GLOW PLUG COVER.
6.	FUEL PUMP FAILURE	CHECK CONTROL BOX > CHECK CONTINUITY OF WIRING LOOM AND INSPECT FUEL PUMP TERMINALS FOR CORROSION > CHECK CONTINUITY OF FUEL PUMP.
7.	GLOW PLUG FAILURE	CHECK GLOW PLUG FUSE=25A (IF APPLICABLE) > CHECK GLOW PLUG AND GLOW PLUG RESISTOR ON 24V MODELS. > CHECK CONTROL BOX > CHECK WIRING LOOM. NOTE: THE GLOW PLUG RESISTOR IS A DIFFERENT PART TO THE GLOW PLUG -DO NOT INTERCHANGE! [24 VOLT ONLY].
8.	BATTERY VOLTAGE ABNORMAL	THE HEATER WILL CUT OFF IF THE BATTERY VOLTAGE IS TO HIGH OR TO LOW. OPERATING RANGE FOR THE 12V MODEL IS 10.5 > 14VOLTS AND THE 24V MODEL IS 21 > 28 VOLTS. CHECK THE VOLTAGE AT THE HEATER WHILE IT IS RUNNING (SO THAT THE BATTERY IS UNDER LOAD) WITH THE BOAT ENGINE OFF AND AGAIN WITH THE ENGINE RUNNING TO ENSURE THAT THE VOLTAGE IS WITHIN THE OPERATING RANGE OF THE HEATER.
9.	OVERHEATING	MAKE SURE THAT THE HEATER HAS COOLED DOWN AND CHECK THE MOTOR FUSE > CHECK THE AIR INLET AND THE HOT AIR OUTLET FOR BLOCKAGE THE HOT AIR OUTLET FOR BLOCKAGE OR RESTRICTION. NOTE: OVERHEAT CUT-OUT WILL AUTOMATICALLY RE-SET WHEN THE HEATER COOLS DOWN.
NOTES:	(a)	IF THE HEATER FAILS TO START BUT THE DIAGNOSTIC IS NOT FLASHING-CHECK THE THERMOSTAT BY LINKING THE TWO RED WIRES TOGETHER.
	(b)	ON INITIAL OPERATION OR IF THE VEHICLE HAS RUN OUT OF FUEL THE SYSTEM WILL NEED TO BE RE-PRIMED. THIS SHOULD BE DONE BY PUSHING FUEL THROUGH THE PUMP WITH A SYRINGE OR BY USING THE MIKUNI SP21 PRIMING PUMP.
	(c)	IF THE GLOW PLUG FAILS, INSPECT THE BOSS FOR CARBON DEPOSIT OR STRAY STRANDS OF SIS GAUZE. CLEAN AS NECESSARY AND ENSURE THAT THE GAUZE IS NOT BURNT OR DAMAGED. IF IT IS REPLACE THE GLOW PLUG BOSS ASSY.

MY16 FAULT FINDING SEQUENCE



MIKUNI MY30 FAULT FINDING SEQUENCE.



Mikuni MY Series Marine Installation Manual.
Part No: MY30 Marine ins-NT.
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