

Installation and operating manual

Serial number:

Last Updated: 19 February 2007

NB: See pages 26-27 for the conditions of the extension of the guarantee to 3 years

1. Introduction:

We congratulate you on your purchase of this MAX POWER Marine Fuel Cell, which will allow you to produce your electricity in a silent and environmentally friendly way, as and when required.

1.1 Warnings/Safety instructions:

Before operating the MAX POWER MFC, make sure you read the entire operating manual. Keep it for future reference.

The MFC and its accessories must only be installed by qualified personnel, in accordance with the legislation in force.

Only genuine spare parts must be used.

⚠ There is a fire risk if any methanol is spilled.

Methanol evaporates completely, without leaving any residue.

Methanol is poisonous when inhaled or swallowed, and can be a serious health risk. In the event of an accident or if you feel unwell, consult a doctor immediately and show him/her the label on the fuel cartridges, this manual, and the methanol safety and data sheet.







⚠ Please consult the methanol safety and data sheet, either on the fuel cartridges or at the end of this manual before the first use of the MFC system.

⚠ CO₂ is produced in very small amounts and must be vented naturally.

⚠ Take care not to breath in this gas directly or for a prolonged period.

⚠ The MFC, its accessories and packaging are made from material that can be recycled, in compliance with the legislation in force in the country.

⚠ Methanol residues should be considered as special waste and treated as solvents, in compliance with the legislation in force in the country.

	Never, under any circumstances, open or dismantle the MFC and its fuel cartridges. Any modification or dismantling of the equipment will compromise safety and lead to the annulation of the operating license and the guarantee of both the equipment and its accessories.
	Do not store or use the MFC or the fuel cartridges at temperatures exceeding 45 °C. Do not expose the MFC or the fuel cartridges to a heat source or sunlight.
	When not in use, store the equipment in an area that will not freeze or use the automatic antifreeze protection.
	Keep the MFC and its fuel cartridges away from all naked flames and from any potential source of fire.
	Do not smoke when handling the MFC or fuel cartridges.
	Keep the MFC , the fuel cartridges, and the packaging and components out of the reach of children. Risk of suffocation on the plastic sheeting and cardboard.

1.2 Usage restrictions:

The **MFC** is a fixed or portable **battery charger** for **12V lead-acid batteries**. It must only be used for this purpose.

The **MFC** will only work with **genuine MAX POWER MFC fuel cartridges**. No others must be used.

The **MFC** system is not designed to supply power to essential life-support equipment such as some types of medical devices.

1.3 Compliance certificate:



MAX POWER 10 Allée François Coli 06210 Mandelieu, France, hereby declares that the **MFC 60 / 110 / 140** comply with the European Guideline 89/336/EEG concerning electromagnetic compatibility. The following standards were applied: DIN EN 61000-6-1, DIN EN 61000-6-3.



In compliance with EU regulation no. 10, these products have been declared suitable for operation in motor vehicles. Certification number: E24 10R-020234

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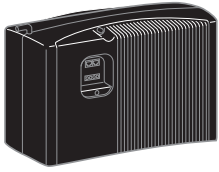
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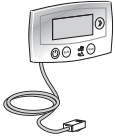
9. Guarantee conditions/Extended guarantee form

3. Delivery/Technical data:

The MFC is delivered with the following items:



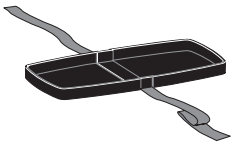
MFC 60 / 110 / 140



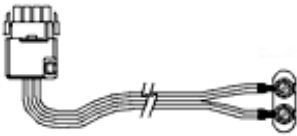
Control panel and cable (5m)



Fuel cartridge holder with strap



Mounting plate with strap



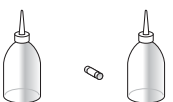
Charging cable (1m)



Silicone exhaust tube (1.5 m)



Hot air exhaust kit



Maintenance kit (G 250 V 8 A/6.5A, 5 x 20 fuse, 8A/6.5A, 6.35 x 32 fuses, in-line fuse holder and Medium Process)

Installation and operating manual.

Technical data			
Product	MFC 60	MFC 110	MFC 140
Power rating	30 W	55 W	70 W
Charging capacity	720 Wh per day (60 Ah per day)	1320 Wh per day (110 Ah per day)	1680 Wh per day (140 Ah per day)
Rated voltage	12 V	12 V	12 V
12 V charging current	2.5 A	4.6 A	5.8 A
Starting threshold*	U < 12.5 V	U < 12.5 V	U < 12.5 V
Stopping threshold*	U > 14.2 V I < 2.0 A	U > 14.2 V I < 2.0 A	U > 14.2 V I < 2.0 A
Minimum voltage for operation	>10.8 V	>10.8 V	>10.8 V
Standby power consumption	15 mA	15 mA	15 mA
Methanol consumption*	1.1 l/kWh	1.1 l/kWh	1.1 l/kWh
Consumption when operating in antifreeze mode	0 °C 50 ml/day, -10 °C 60 ml/day, - 20°C 70ml/day		
Batteries that may be connected	12 V lead acid (liquid or gel), 40 to 400 Ah		
Noise level	43dB at 1m/23 dB at 7m		
Dimensions (L x W x H)	43.5 x 20.0 x 27.6 cm		
Weight of MFC without accessories:	6.7 Kg	7.4Kg	7.7Kg
Operating temperature	- 20°C to + 40°C		
Storage temperature	+ 1°C to + 45°C		
Ambient humidity	20% to 90%		
Fuel cartridge	Volume: 5.0 litres/Weight: 4.2Kg/Energy content*: 3.8Kw		

*on average at the rated charge.

NB: per day = 24h

4. Installation:

This equipment generates heat that must be dissipated. Please take this into consideration when choosing the place of installation.

The MFC system and its fuel cartridge must be installed onto the same **stable and horizontal** surface, securely fixed with screws or bolts, washers, nuts etc., to avoid shocks and falls.

The MFC is not waterproof! Make sure that water and dust cannot enter the equipment.

In boats, and particularly sailing boats, due to heel when navigating under sail, we recommend installing the MFC in the fore and aft alignment, preferably amidships (see the maximum permanent angles allowed).

4.1 Choosing the place of installation:

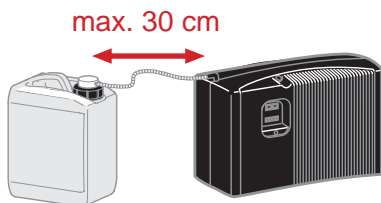
The ambient operating temperature must range from - 20°C to + 40°C.

Select a well-ventilated area with cool air circulating from below (the boat's bilge is often the coolest place) that dissipates the hot air upwards.

Avoid installing the equipment in a restricted space where the hot air could accumulate. Make sure that there is enough free space around the MFC. Do not block the cool air intake.

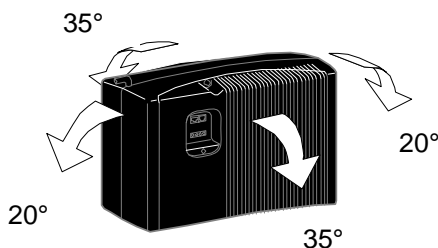
Make sure that you can easily remove the MFC.

Electrical connections, the filler opening for the Process Medium and the fuel cartridge must all be easily accessible.



The MFC and the fuel cartridge must be mounted at the same level, taking care not to stretch or kink the metal fuel hose.

The installation of the fuel cartridge mounting base is obligatory and guarantees a correct and secure positioning.



Particularly for sailing boats, make sure that the equipment is not subjected during navigation to angles greater than:

Along the transverse axis, in continued operation:
35° < 10 minutes : 40°.

Along the longitudinal axis, in continued operation:
20° < 10 minutes: 35°.

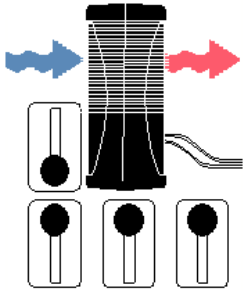
Note:- When these values are exceeded, the MFC automatically switches to Safety mode until the angular conditions return to normal.

In an environment where the temperature is less than + 3 °C, the MFC must always be provided with enough fuel and with a 12 V battery to protect it against freezing.

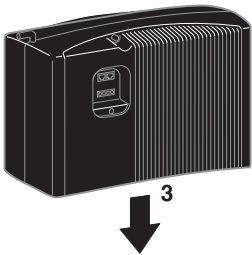
When it is not possible to regularly connect a full fuel cartridge, store the MFC system at a temperature exceeding 3 °C.

During operation, the MFC consumes about the same amount of oxygen as a human from the surrounding air, i.e. about 60 l/h or 86 g/h of O₂. It also emits a small amount of carbon dioxide, about 40 l/h or 80 g/h of CO₂ and on average 60 ml/h of water via the exhaust tube.

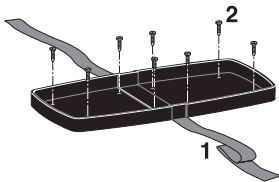
4.2 Fitting the MFC and its fuel cartridge holder:



The fuel cartridge must be placed where it is not exposed to the heat emitted by the equipment, and where it will not block the cooling air intake. This also applies for storing spare cartridges.

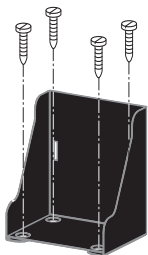


The MFC system must only be fitted vertically (upright), on a horizontal surface. The MFC, as well as the fuel cartridge, must both be solidly secured using the mounting bases provided.



Once you have selected an installation position based on the above criteria, screw or bolt the mounting plate securely in place to ensure that it will not break free even when subjected to severe shocks during navigation.

Securely strap the equipment to the mounting plate.



Screw in the fuel cartridge holder in the same way as above, taking care not to block the cooling air intake.



Securely strap the cartridge to its holder.

4.3 Connecting the exhaust tube:

The exhaust tube must imperatively be fitted to the MFC to ensure that the system operates correctly.

Note:- Retain the red cap in order to plug the opening to prevent spillage during transport.

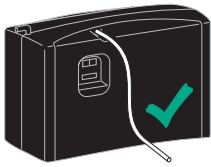
⚠️The moist exhaust may reach up to 60°C, there is therefore a risk of burns.

Remember that the exhaust contains water vapour (distilled water), which may condense forming droplets that must be discharged.

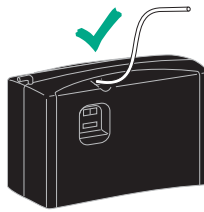
To avoid any risk of freezing, the length of the tube must not exceed 50 cm.

Guide the tube, taking care to avoid kinks or create a siphon.

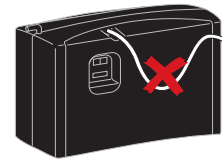
Connecting the exhaust tube:



Downwards



Maximum 1.2 m upwards



Do not create a siphon

Downwards:

Installation towards a washbasin, shower, sump or bilge, etc. Guide the tube without creating a siphon, to allow the discharge of the distilled water (it may also be recovered in a cartridge). Then cut to the required length. Always ensure that the end of the tube is above water level so that the gas can flow out naturally.

Upwards:

Installation towards the deck, the cockpit, etc. with protection. Guide the tube, without creating a siphon, (maximum head of 0 to 1.2m) to discharge the gas and water to the exterior. Check that nothing can enter or block the tube. (Sand, dust, water from the exterior, etc.).

The original tube may be extended on condition that the following points are respected:

Never exceed the maximum head cited above.

Always provide a constant downward slope, without siphons, to ensure easy discharge.

Use a tube with at least 12 mm inside diameter, and of good quality (will not distort or kink). Never exceed a total length of 4 metres. To connect the tubes together we recommend inserting the smaller diameter tube into the larger tube. Make sure the tubes are watertight.

⚠ **For sailing boats, remember to take into account the angle of heel when under sail and provide enough slope to avoid the creation of a siphon.**

⚠ In the event of damage to the fuel hose or the tube, replace only with genuine spare parts.

4.4 Electrical connections:

⚠ **Only qualified electricians are authorised to carry out this installation.**

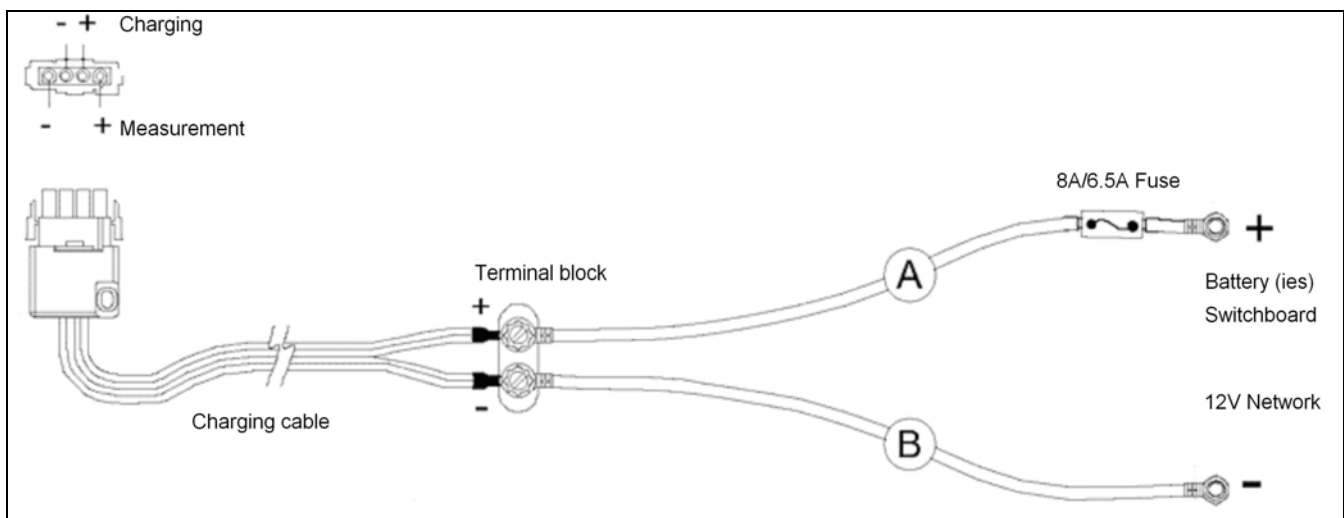
The charging cable may be installed either directly to the service battery bank or to the service battery cut-off switch or to the main distribution panel.

Extend the original charging harness with cables of the same cross section and use different colours to indicate polarity, red for positive (+) and black for negative (-).

Total length (A + B)	Cross section in mm ²	AWG section
Up to 5.0 metres	2.5 mm ²	14
Up to 10 metres	4 mm ²	12
Up to 15 metres	6 mm ²	10
Up to 20 metres	10 mm ²	8

Cable connections must be carried out using either a junction box with screw type terminals, insulated terminal strips, insulated sockets, etc., or by soldered connections under heat-shrink insulation.

Make sure that a fuse is installed on the battery side of the charge cable.



4.5 Hot air exhaust duct:

The hot air exhaust duct with 100mm diameter adapters allow the circulation of air inside the MFC to be controlled, thus permitting operation of the equipment in confined spaces.

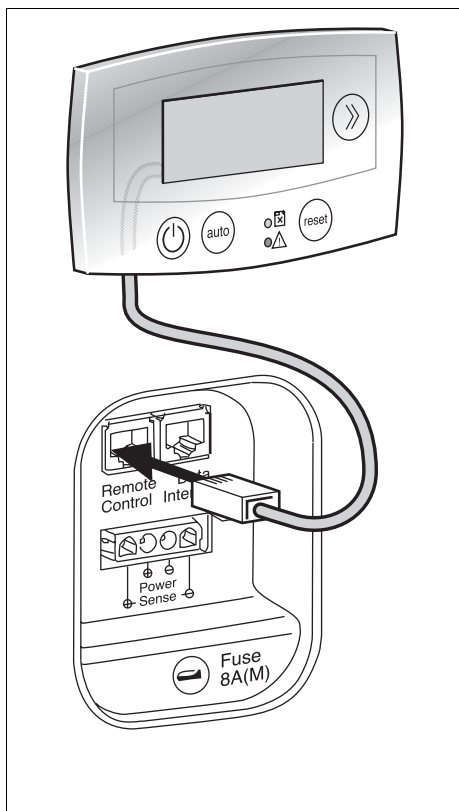


Screw the adapter into place on the MFC, insert the duct into the adapter, and then guide the duct outside of the compartment in which it is installed.

The duct must be as short as possible in order to limit charging losses and ensure maximum efficiency of the MFC.

Make sure that there are no kinks in the duct and that no moisture or debris can accumulate inside it.

4.6 Control panel:



The control panel indicates the status of the equipment and allows it to be controlled.

Install it in a dry area, where it is easily visible and readily accessible.

Check that there is a sufficient length of cable. If not, you may replace it with a longer cable (type: Cat.5).

Two types of mounting are possible: built-in or free-standing. Use the template provided.

Connect the control panel to the equipment's left-hand "Remote control" socket.

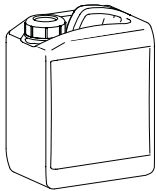
5. Use and operation:

5.1 Connecting the fuel cartridge:

⚠ Keep the MFC and the fuel cartridges out of reach of children.

⚠ In order to ensure correct functioning of the system and for safety reasons, it is imperative to only use genuine MAX POWER MFC fuel cartridges. Use of fuel of any other origin may cause poor working order, damage to the system, and is dangerous. It will therefore invalidate the guarantee.

⚠ Do not smoke. Take all the usual safety precautions.

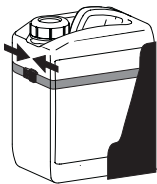


It is possible to change the fuel cartridge whilst the system is operating.

Unscrew the connector from the empty fuel cartridge.

Replace the empty cartridge with a full one, do not open it.

Only connect the fuel cartridge once it has been correctly positioned and securely strapped into the holder.



Unscrew the fuel cartridge protection cap, and then screw on the connector.

Replace the cap on the empty cartridge.

Do not carelessly discard empty cartridges. Use the disposal/recycling arrangements in force in the country.



MFC fuel cartridges are disposable and must not be refilled once empty.

Methanol residues should be considered as special waste and treated as solvents, in compliance with the legislation in force in the country.

5.2 Information/Operation:

- ⚠ The ambient operating temperature must always be in the range of - 20°C to + 40°C.
- ⚠ Important: The battery voltage must never be less than 10.8V.
- ⚠ It is not necessary to add any Medium Process the first time the MFC is operated.

Note:-

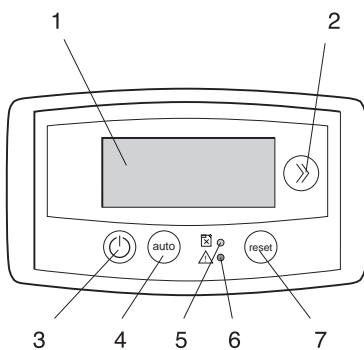
Every MFC has been factory tested for several hours before delivery.

By default, the MFC operates in automatic mode and goes through a starting phase of 20 to 30 minutes before the MFC system provides any current.

During operation, the production of current is interrupted briefly several times an hour (cycles), without any significant effect on efficiency.

A manual stop may take up to 30 minutes, this is not a fault.

The fuel cartridge may be changed whilst the system is operating.



- (1) Display panel (2 lines X 16 characters)
- (2) (>>) - Information/language selection.
- (3) (I) - On/Off
- (4) (auto) - Automatic
- (5) Yellow LED - Change the fuel cartridge
- (6) Red LED - Incident
- (7) (reset) - Reset

The 1st line indicates the **mode**: "Automatic / On / Off".

The 2nd line indicates the **status**:

"Standby / Start phase / Charging mode / Antifreeze mode / Shutdown procedure".

5.3 Starting :

Select language: With the equipment switched on, press and hold (>>) for 2 seconds, then press briefly and repeatedly to scroll through the languages. Select one and press and hold (>>) again for 2 seconds to confirm: **French, English, German, Italian, Spanish, Dutch**.

Note:- From then onwards, you can press (>>) at any time to scroll through data such as: **Voltage / Current / Software version / Operating hours**.

On/Off: Press **(I)**

The display panel indicates: **On** or **Off** or **Automatic**

If you wish to start the equipment manually, without taking the battery voltage into account:

If the equipment is **Off** press the **(I)** key once

The display panel indicates: **On / Start phase**: The equipment will charge up to >14.2 V and will then move to **Automatic** mode.

Automatic mode: The display panel indicates **On** or **Off** press **(auto)**

Operating incidents and solutions:

If the **yellow LED** indicator lamp flashes and the display panel indicates "**Error 21, change the fuel cartridge**": replace the fuel cartridge then press **(reset)**.

Note:- The fuel cartridge may be changed while the system is operating.

If the **red LED** indicator lamp flashes and the display panel indicates "**Error 10 to..... 61**", correct the error by consulting the troubleshooting list below.

⚠Never open the equipment!

Contact your supplier if you cannot correct an incident.

After correcting the error press **(reset)**.

⚠Never press the **(reset) key several times in succession.**

Incident 10: Contact the after-sales service

Incident 11/12: Check the exhaust tube.

Incident 20/21: Change the fuel cartridge.

Incident 30: Top up with Medium Process.

Incident 40: Slowly thaw the equipment.

Incident 50/52: Battery voltage too low.

Incident 51/53: Battery voltage too high.

Incident 63: Automatic restarting.

Interruption: Ambient temperature too high.

The equipment does not start: Check the connections, battery and fuses.

5.4 Stopping/Switching off :

Press the **(I)** key, the equipment stops in a controlled manner while respecting the different protection cycles, taking a minimum time of 30 minutes from the time that the MFC was started. If the equipment switches off before this, the corresponding time continues to be counted and the display panel indicates "**Shutdown procedure**". Keep the cartridge and the battery connected throughout this procedure.

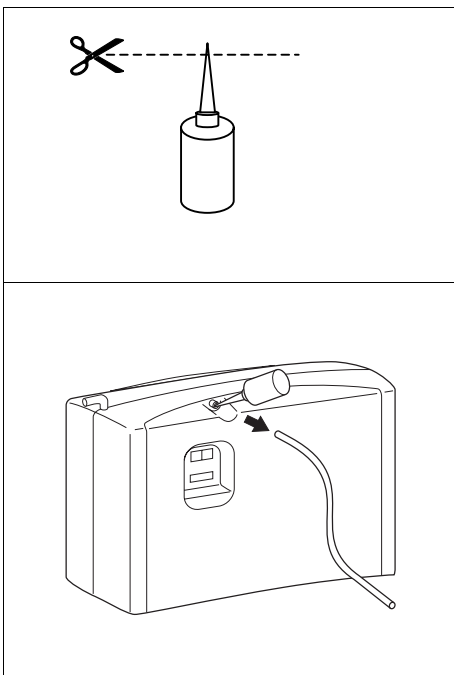
5.5 Medium Process:

If there is not enough Process Medium, the red indicator lamp lights and the following message is displayed on the display panel: "**Please add Service Fluid**" (**Medium Process**).

⚠When the equipment is operated for the first time, it is not necessary to add any Medium Process.

Only use genuine Medium Process. The container is not reusable. Never add more than one container!

Stop the equipment, disconnect the charging cable.



Disconnect the exhaust tube.

Cut the end off the container spout.

Place the container spout in the opening, gently press the container and empty it completely.

Never add more than one container!

If the liquid overflows, clean with a rag.

Reconnect the exhaust tube.

Press the **(reset)** key.

The message is erased and reverts to the preceding mode, e.g.: "**Automatic**".

5.6 Automatic antifreeze mode

⚠The MFC must imperatively be connected to a battery in good condition and supplied with methanol.

The MFC is fitted with an automatic antifreeze protection system that maintains its internal temperature when the external temperature drops below + 3 °C.

The display panel indicates "**Antifreeze mode**".

If no energy production is required for a prolonged period, remove the MFC and store it in a frost-free place in its original packaging.

If the MFC freezes despite the protective measures, allow it to thaw for 24 hours. Only start it after this time has elapsed.

6.0 Accessories and spare parts

5-litre M5 fuel cartridges (set of 2)

Fuel cartridge holder with strap

Control with cable

Cable (5 m)

Mounting plate with strap

Charging cable with terminal strip

Silicone exhaust tube (1.5 m)

Hot air discharge kit , (flange, elbow, duct, fixing screws)

Flange and Hot air elbow

Medium Process (2 containers)

7.0 Methanol safety data sheet

We supply methanol in the form of safety cartridges which have undergone numerous checks. These safety cartridges protect you from direct contact with the contents providing they are used in compliance with the instructions.

Please carefully read the following instructions, which are given in accordance with the legislation in force, before first using the MFC system.

In the event of an accident or if you fell unwell, consult a doctor immediately and show him this Methanol safety data sheet.

Safety Data Sheet according to 91/155/EWG

Issue date : September 2002

1 Identification of the Substances / preparation and the company

Identification of the substance or preparation:

Synonyms : Methyl alcohol, methyl hydrate, wood spirit, methyl hydroxide

Product use : Solvent, fuel, feedstock

CAS no. :	000067-56-1	NFPA code :	1-3-0
EC index no. :	603-001-00-X	Molecular weight :	32.04
EINECS no. :	200-659-6	Formula :	CH3OH
RTECS no. :	PC1400000		

Company/undertaking identification:

MAX POWER
 10 Allée Francois Coli
 Parc D'Activite De La Siagne
 06210 MANDELIEU
 FRANCE
 Tel.: +33 (0)4 92 19 60 60 Fax.: +33 (0)4 92 19 60 61

Telephone number for emergency:

(+32) 14-58 45 45
 Information centre of dangerous goods (B.I.G.)
 Technische Schoolstraat 43A, B-2440 Geel, Belgium

2 Composition / information on ingredients

Hazardous ingredients	CAS no.	Conc in %	Hazard class.	Risks (R-phrases)
METHANOL	000067-56-1	99.85	F;T	11-23/24/25-39/23/24/25

3 Hazards identification

- Toxic by inhalation, in contact with skin and if swallowed
- Toxic: danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed
- Highly flammable
- May build up electrostatic charges: risk of ignition
- Gas/vapour flammable with air within explosion limits

4 First Aid measures

Eye contact:

- Rinse immediately with plenty of water for a minimum of 15 minutes, ensuring all surfaces and crevices are flushed by lifting lower and upper lids

- Consult a doctor/medical service

Skin contact:

- Remove clothing before washing
- Wash immediately with lots of water/soap for 15 minutes
- Consult a doctor/medical service if irritation occurs

After inhalation:

- Remove the victim into fresh air
- Restore or assist breathing if necessary
- Consult a doctor/medical service

After ingestion:

- Swallowing methanol is life threatening
- Onset of symptoms may be delayed for 18 to 24 hours after ingestion
- If conscious and medical aid is not immediately available, do not induce vomiting
- Transport to medical attention

5 Fire-fighting measures

Suitable extinguishing media:

- Small fires: Powder, carbon dioxide, halon, water spray, Standard foam
- Large fires: Water spray, AFFF(R)(Aqueous Film Forming Foam (alcohol resistant)) type with either a 3% or 6% foam proportioning system

Unsuitable extinguishing media:

- N.D.

Hazardous Decomposition Products:

- Toxic gases and vapours; carbon monoxide, carbon dioxide and formaldehyde

Instructions:

- Methanol burns with a clean clear flame, which is almost invisible in daylight
- Keep upwind, mark the danger area
- Concentrations of greater than 25% methanol in water can be ignited
- Cool tanks/drums with water spray and remove them into safety
- Take account of toxic firefighting water
- Use firefighting water with moderation, contain it if possible

Special protective equipment for firefighters:

- Fire fighters must wear full face, positive pressure, self-contained breathing apparatus or airline and appropriate protective clothing
- Protective fire fighting structural clothing is not effective protection from methanol. Do not walk through spilled product as it may be on fire and not visible

Accidental release measures

Personal protection:

see 6.6

Environmental precautions:

- Prevent soil and water pollution
- Substance must not be discharged into the sewer
- Plug the leak, cut off the supply
- Dam up the liquid spill
- Try to reduce evaporation
- Recover methanol or dilute with water to reduce fire hazard

Clean-up:

- Eliminate all ignition sources
- Fluorocarbon alcohol resistant foams may be applied to spill to diminish vapour and fire hazard
- Maximize methanol recovery for recycling or reuse
- Collect liquid with explosion proof pumps
- For small spills: take up into non-combustible sorbent

6 Handling and storage**Handling:**

- Reduce/avoid exposure and/or contact
- Keep container tightly closed
- No smoking or open flame
- Use spark-/explosionproof appliances and lighting system
- Take precautions against electrostatic charges
- Handle uncleaned empty containers as full ones

Storage:

- Keep away from heat and ignition sources, oxidizers, acids, bases
- Store in a dry and well-ventilated area
- Store in totally enclosed equipment
- Tanks must be grounded and vented and should have vapour emission controls
- Provide for a tub to collect spills

Issue date : **May 2001 3 / 7**

Materials for packaging:

- Anhydrous methanol is non-corrosive to most metals at ambient temperatures except lead and magnesium
- Coatings of copper (or copper alloys), zinc (including galvanized steel) or aluminium are unsuitable for storage as they are attacked slowly
- Mild steel is the recommended construction material for tanks

Exposure controls/Personal protection**Recommended engineering controls:**

- In confined areas, local and general ventilation should be provided to maintain airborne concentrations below permissible exposure limits
- Ventilation systems must be designed according to approved engineering standards

Sampling methods:

NIOSH 2000

Exposure limits:

TLV-TWA :		mg/m3	200	ppm
TLV-STEL :		mg/m3	250	ppm
TLV-Ceiling :		mg/m3		ppm
OES-LTEL :	(266)	mg/m3	(200)	ppm
OES-STEL :	(333)	mg/m3	(250)	ppm
MAK :	270	mg/m3	200	ppm
TRK :		mg/m3		ppm
MAC-TGG 8 h :	260	mg/m3		
MAC-TGG 15 min. :		mg/m3		
MAC-Ceiling :		mg/m3		
VME-8 h :	260	mg/m3	200	ppm
VLE-15 min. :	1300	mg/m3	1000	ppm
GWBB-8 h :	266	mg/m3	200	ppm
GWK-15 min. :	333	mg/m3	250	ppm
Momentary value :		mg/m3		ppm
EC :	260	mg/m3	200	ppm
EC-STEL :		mg/m3		ppm

Odour threshold : 2000 ppm
(irritation at 1000 ppm, poor olfactory warning properties)

Sampling methods:
NIOSH 2000 / OSHA 91

Personal protection:

eye protection:

- Face shield and chemical splash goggles

hand protection:

- Gloves

skin protection:

- Protective clothing

materials for protective clothing:

- Butyl rubber
- Nitrile rubber

respiratory protection:

- Air respirator when airborne concentrations exceed exposure limits

7 Physical and chemical properties

7.1	Appearance (at 20°C) :	Clear liquid
7.2	Odour :	Slight alcohol odour
7.3	Colour :	Colourless
7.4	pH value :	N.D.
7.5	Boiling point/boiling range :	64.5 °C
7.6	Melting point/melting range :	-97.8 °C
7.7	Flashpoint :	11 °C (TCC)
7.8	Auto-ignition point :	385 °C
7.9	Explosion limits :	6/36 vol%
7.10	Vapour pressure (at 20°C) :	1278 hPa
7.11	Relative density (at 20°C) :	0.792
7.12	Water solubility :	Completely
7.13	Soluble in :	Ethanol, ether, acetone, chloroform
7.14	Relative vapour density :	1.1
7.15	Saturation concentration :	166 g/m ³
7.16	Viscosity :	0.0006 Pa.s

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8 Stability and reactivity

Stability:

- Stable under normal conditions

Reactivity/Hazardous decomposition products:

- Reaction with oxidizers, strong acids, strong bases
- May be corrosive to lead and aluminium
- Hazardous decomposition products: formaldehyde, carbon dioxide and carbon monoxide

9 Toxicological information

Acute toxicity:

LD50 oral rat :	5628	mg/kg
LD50 dermal rat :	N.D.	mg/kg
LD50 dermal rabbit :	15800	mg/kg
LC50 inhalation rat :	85	mg/l/4 h

The odour threshold of methanol is several times higher than the TLV-TWA

Chronic toxicity:

EC carc. cat.:	not listed
EC muta. cat.:	not listed
EC repr. cat.:	not listed
Carcinogenicity (TLV):	not listed
IARC classification:	not listed

Routes of exposure: **swallowed, inhalation, eyes and skin**

Acute effects/symptoms:

- Swallowing even small amounts of methanol may cause blindness or death Effects of sub lethal doses may be nausea, headache, abdominal pain, vomiting and visual disturbances ranging from blurred vision to light sensitivity
- Inhalation of high concentrations: irritation of the mucous membranes, headache, sleepiness, nausea, confusion, loss of consciousness, digestive and visual disturbances and death
- High vapour concentration or contact with liquid: irritation of the eyes, tearing and burning
- May be absorbed through the skin in toxic or lethal amounts

Chronic effects:

- Repeated exposure by inhalation or absorption: systemic poisoning, brain disorders, impaired vision and blindness
- Inhalation may worsen conditions such as emphysema or bronchitis
- Repeated skin contact may cause dermal irritation, dryness and cracking

Reproductive effects:

- Reported to cause birth defects in rats exposed to 20000 ppm

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10 Ecological information

Ecotoxicity:

- LC50 (96 h) : 10800 mg/l (SALMO GAIRDNERI/ONCORHYNCHUS MYKISS)
- EC50 (48 h) : 24500 mg/l (DAPHNIA MAGNA)
- EC50 (72 h) : 8000 mg/l (ALGAE)

Methanol can be harmful for as well salt water organisms as freshwater organisms

Mobility:

- Volatile organic compounds (VOC): 100%
- Soluble in water

For other physicochemical properties see section 9

Persistence and degradability:

- biodegradation BOD5 : 0.6 - 1.1 g O2/g substance
COD : 1.42 g O2/g substance
- water : Readily biodegradable in water(test: 99% OECD 301D. BOD 80% ThOD)
- soil : N.D.
- Methanol will be broken down to carbon dioxide and water

Bioaccumulative potential:

- log Pow : -0.82/-0.66
- BCF : < 10 (LEUCISCUS IDUS)
- Slightly bioaccumulative

Other adverse effects:

- WGK : 1 (Classification in compliance with Verwaltungsvorschriftwassergefährdender Stoffe (VwVwS) of 17 May 1999)
- Effect on the ozone layer : Not dangerous for the ozone layer(Council Regulation (EC) No.3093/94, O.J. L333 of 22/12/94)
- Greenhouse effect : No data available
- Effect on waste water purification : Sludge digestion is inhibited at800 mg/l/Nitrification of activated sludge is inhibited at 160 mg/l; 50%

11 Waste disposal considerations**Provisions relating to waste:**

- Waste material code (91/689/EEC, Council Decision 2001/118/EC, O.J. L47 of 16/2/2001): 07 01 04 (other organic solvents, washing liquids and mother liquors)
- Waste material code (Flanders): 001; 015; 034
- Waste code (Germany): 55315
- Hazardous waste (91/689/EEC)

Disposal methods:

- Incineration is the recommended disposal method
- Biological treatment may be used on dilute aqueous waste methanol
- Methanol wastes are not suitable for underground injection
- Waste materials must be disposed of in accordance with your municipal, state, provincial and federal regulations

Packaging:

- Waste material code packaging (91/689/EEC, Council Decision 2001/118/EC,O.J. L47 of 16/2/2001): 15 01 10 (packaging containing residues of or contaminated by dangerous substances)

Transport information

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1230

Classification of the substance in compliance with UN Recommendations

UN-number :	1230
CLASS :	3
SUB RISKS :	6.1
PACKING :	II
PROPER SHIPPING NAME :	UN 1230, Methanol

ADR (transport by road)

CLASS :	3
PACKING :	II
DANGER LABEL TANKS :	3+6.1
DANGER LABEL PACKAGES :	3+6.1

RID (transport by rail)

CLASS :	3
PACKING :	II
DANGER LABEL TANKS :	3+6.1
DANGER LABEL PACKAGES :	3+6.1

ADNR (transport by inland waterways)

CLASS :	3
PACKING :	II

DANGER LABEL TANKS :	3+6.1
DANGER LABEL PACKAGES :	3+6.1
IMDG (maritime transport)	
CLASS :	3
SUB RISKS :	6.1
PACKING :	II
MFAG :	19
EMS :	-
MARINE POLLUTANT :	-

ICAO (air transport)

CLASS :	3
SUB RISKS :	6.1
PACKING :	II
PACKING INSTRUCTIONS PASSENGER AIRCRAFT :	
PACKING INSTRUCTIONS CARGO AIRCRAFT :	

Special precautions in connection with transport

none

Limited quantities (LQ)

When substances and their packaging meet the conditions established by ADR/RID/ADNR in chapter 3.4, only the following prescriptions shall be complied with:

each package shall display a diamond-shaped figure with the following inscription:

- 'UN 1230'

or, in the case of different goods with different identification numbers within a single package:

- the letters 'LQ'

12 Regulatory information

Enumerated in substance list Annex I of directive 67/548/EEC et sequens



Highly flammable



Toxic

R11 :	Highly flammable
R23/24/25 :	Toxic by inhalation, in contact with skin and if swallowed
R39/23/24/25:	Toxic: danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed
S(01/02) :	(Keep locked up and out of reach of children)
S07 :	Keep container tightly closed
S16 :	Keep away from sources of ignition - No smoking
S36/37 :	Wear suitable protective clothing and gloves
S45 :	In case of accident or if you feel unwell, seek medical advice (show the label where possible)

13 Other Information

The information provided on this MSDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

N.A. = NOT APPLICABLE

N.D. = NOT DETERMINED

* = INTERNAL CLASSIFICATION

Full text of any R-phrases referred to under heading 2:

R11 : Highly flammable
 R23/24/25 : Toxic by inhalation, in contact with skin and if swallowed
 R39/23/24/25 : Toxic: danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed

Exposure limits:

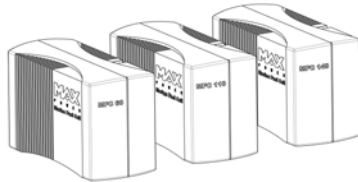
TLV : Threshold Limit Value - ACGIH US 2000
 OES : Occupational Exposure Standards - United Kingdom 2001
 MEL : Maximum Exposure Limits - United Kingdom 2001
 MAK : Maximale Arbeitsplatzkonzentrationen - Germany 2001
 TRK : Technische Richtkonzentrationen - Germany 2001
 MAC : Maximale aanvaarde concentratie - the Netherlands 2002
 VME : Valeurs limites de Moyenne d'Exposition - France 1999
 VLE : Valeurs limites d'Exposition à court terme - France 1999
 GWBB : Grenswaarde beroepsmatige blootstelling - Belgium 1998
 GWK : Grenswaarde kortstondige blootstelling - Belgium 1998
 EC : Indicative occupational exposure limit values - directive 2000/39/EC

NOTE TO PHYSICIAN

Acute exposure to methanol, either through ingestion or breathing high airborne concentrations can result in symptoms appearing between 40 minutes and 72 hours after exposure. Symptoms and signs are usually limited to CNS, eyes and gastrointestinal tract. Because of the initial CNS's effects of headache, vertigo, lethargy and confusion, there may be an impression of ethanol intoxication.

Blurred vision, decreased acuity and photophobia are common complaints.

Treatment with ipecac or lavage is indicated in any patient presenting the symptoms within two hours of ingestion. A profound metabolic acidosis occurs in severe poisoning and serum bicarbonate levels are a more accurate measure of severity than serum methanol levels. Treatment protocols are available from most major hospitals and early collaboration with appropriate hospitals is recommended.



MAX POWER MFC – Guarantee conditions

1. Guarantee

The MAX POWER MFC guarantee:

a) is valid during a 24 (twenty-four) month period for up to 3,000 (three thousand) hours of operation, should there be no registration of the unit on record as described in paragraph 1b. The guarantee applies in the case of malfunctioning of the MFC attributable to faulty components or faulty manufacturing.

b) is valid during a 36 (thirty-six) month period for up to 3,000 (three thousand) hours of operation provided that the manufacturer has a written registration of the unit on record. The unit must be registered by returning the guarantee form opposite by fax or by post to MAX POWER. The unit must be registered no later than 4 (four) weeks after the date of purchase. Registration is subject to the purchaser agreeing to have his/her data recorded by the manufacturer. The guarantee applies in the case of malfunctioning of the MFC attributable to faulty components or faulty manufacturing.

2. Guarantee coverage

The guarantee covers defects (see 1. Guarantee) from the time of sale.

The manufacturer reserves the right to remedy such defects either by repair or replacement (updated model where applicable) as deemed appropriate by the manufacturer. Should the manufacturer provide a guarantee, the guarantee period, with regard to repair or replacement parts, shall not recommence from the time of service. Instead, the guarantee from time of sale will remain in force. Any other claims, in particular claims for damages on the part of the purchaser or a third party, are invalid. The provisions of the product liability law remain in effect, as well as any claims against the manufacturer pertaining to guarantees remain in force as provided by law. The guarantee does not extend to any extra costs associated with installing or removing the unit.

3. Guarantee exclusions

The guarantee does not include malfunctioning caused by improper use of the unit that is not in accordance with its purpose, or with the installation and operating instructions, in particular:

- If fuel cartridges other than original MAX POWER fuel cartridges are used
- Inappropriate handling not in accordance with the installation and operating manual
- Water damage
- Improper transportation not in accordance with the installation and operating manual
- If the unit has been opened.

Also excluded from the guarantee:

- Costs caused by an inappropriate installation
- Costs caused by an improper use of the unit that is not in accordance with its purpose as described in the manual
- Costs caused by use of an inappropriate fuel
- Repair costs caused by non-qualified personnel tampering with the system
- Damage caused by a lack of normal service and maintenance
- The replacement of parts due to normal wear and tear

4. Making a Claim

Always notify the Max Power service centre network in writing in case of malfunction. Please describe the defect in detail. Please also indicate the serial number and include the original invoice. The purchaser must bring or send the unit to the manufacturer at his/her own risk so that the manufacturer can determine whether the defect is covered by the guarantee. The unit must be sent to the factory ordinary merchandise. If the defect is covered by the guarantee, the factory shall assume the transportation costs. Should the defect not be covered by guarantee, the manufacturer shall notify the customer, informing the customer of what repair costs the manufacturer will not assume. The customer shall bear the cost of transportation in this case.

The manufacturer's address is:

MAX POWER -10 Allée François Coli – 06210 MANDELIEU – France
 Tel : +33 4 92 19 60 60 Fax : +33 4 92 19 60 61
 email: mp@max-power.com - www.max-power.com



Serial No.:

Extended guarantee – 3 years in total FREE!

We congratulate you on your purchase of this MAX POWER Marine Fuel Cell, with which you automatically benefit from a 2 (two) year guarantee from the date of purchase.

This guarantee period can be extended for FREE to 3 (three) years from the date of purchase if you register your MFC within 4 (four) weeks of the purchase date by returning this form duly completed with the necessary documents.

IMPORTANT
Please complete this form and return it to Max Power by fax or by post with a copy of your purchase invoice and your installation invoice so that we can validate the extension of your guarantee to 3 (three) years.

To be completed by the owner (*Obligatory):

Name*, Tel No. *, Address*, E-mail, Country*, Postcode*

Signature *, Date*

To be completed by the installer (*Obligatory):

Reminder: The installation must imperatively be carried out by qualified professionals in compliance with the legislation in force.

MFC Model*, Installation date *, Boat type and model*, Constructor, Year of construction, Boat launch date, Size in feet*

The MFC installation was tested and fonctioned correctly* : YES NO

Important: Refer to the installation and operating manual for more information.

Name of installer*, Signature & company stamp*

PLEASE RETURN BY FAX (+33.4.92.19.60.61) OR BY POST:
MAX POWER -10 Allée François Coli – 06210 MANDELIEU – France
WITH THE NECESSARY DOCUMENTS AS REQUESTED
IN ORDER TO OBTAIN THE EXTENSION OF YOUR GUARANTEE TO 3 (THREE) YEARS

