

**Telair**  
AIR CONDITIONER



BREVETTATO  
**ECOENERGY**  
TG 480/600

## Installation / Use / Maintenance Manual



Installation must be performed by skilled workshops

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GB

ENGLISH

# Eco Energy & Innovative Devices

|  |   |
|--|---|
| <ul style="list-style-type: none"><li>• The “key” points for the installer are indicated by the symbol</li><li>• This handbook is to be delivered to the user client</li></ul> |  |
| <ul style="list-style-type: none"><li>• The installation procedure for models TG 480 and TG 600 is the same</li></ul>  |   |
| <ul style="list-style-type: none"><li>• The “key” points for the User Client are indicated by using symbol</li></ul>   |  |
| To get the best from your Eco Energy TG 480/600, we suggest you use service batteries with > = 160 to 250 Ah overall capacity (e.g. No. 2 100 Ah parallel•connected batteries) |   |

The present handbook describes the conditions of safety, installation, use and maintenance of the  
“12V Eco Energy TG 480/600”  
below called “Eco Energy TG 480/600”

**Please read this handbook before starting installation, use or maintenance operations.**

## CONTENTS

### 1.Safety

#### **For the Installer**

- 3. Packaging content
- 5. Identification of components
- 8. Installation – Connection diagram
- 15. Testing
- 17. Installation – LPG gas system

#### **For the User Client**

- 24. Use of Eco Energy
- 27. Tips for proper use
- 28. Maintenance
- 29. Troubleshooting
- 31. Transport
- 31. Disposal
- 32. Technical Specifications and “CE Declaration of conformity”
- 34. Warranty

## Safety

The Eco Energy TG 480/600 is safe and reliable in all its phases of work (transport, installation, use and maintenance) on condition that the instructions given by this handbook are respected.

You must be aware of and have understood the handbook content before proceeding to even one phase of installation or use.

Failing that can cause personal injuries, damages to the Eco Energy TG 480/600, to the connected fixtures or to the vehicle on which it has been installed.

The Eco Energy TG 480/600 has been designed and manufactured for installation and use on motorhomes/caravans (for recreational use only).

### • Anomalous operation or noise

In case of anomalous operation or noise: deactivate the Eco Energy and contact Telair s.r.l. (or authorised service centres).

### • The engine exhaust gas is toxic

The exhaust gas has always to be piped outwards .

Do not run the Eco Energy in closed or unsuitable environments (garages, ferry•boat holds, car transporters and any other closed place): make sure that the Eco Energy is off (switch on control unit in 0 or OFF position, Eco Energy TG 480/600 knife•switch open or Eco Energy TG 480/600 gas tap closed).

### • Cooling air and exhaust gas

Outlets for hot air (Eco Energy TG 480/600 cooling) and exhaust gas of Eco Energy TG 480/600 MUST NOT be clogged or piped inside the motorhome. Exhaust gas and cooling air must not penetrate the living areas of the motorhome.

### • Cooling fan

**Warning!!** Open the electric knife•switch before removing the service cover.

By removing the service cover you can also access the cooling fan which can suddenly start running.

### • Installation

The Eco Energy has to be installed outside the motorhome and, in any case, in open and ventilated environment. Never install the Eco Energy in domestic environments (such as cellars, garages, or closed spaces of any kind). The ground clearance of the Eco Energy must ensure safety also in reverse and when travelling on rough grounds, humps and ramps!

Do not make electrical connections between the Eco Energy TG 480/600 and the 12V service system different from those specified in this handbook, otherwise the Eco Energy TG 480/600, the connected fixtures or the vehicle on which it has been installed could be damaged.

The Eco Energy TG 480/600 must be supplied with LPG gas pressure of 30 mbar. A 30 mbar ( $\pm 2$ ) pressure reducer (normally provided on all motorhomes) must always be provided upstream of the Eco Energy. Never connect the Eco Energy directly to the LPG gas tank or bottle.

### • LPG gas is toxic, flammable and explosive

*Do not smoke or use open flames in the vicinity of the bottle compartment or the Eco Energy as well as during the installation and LPG gas refueling operations. LPG gas refueling must always be made in open spaces.*

## Packaging content



"12V Eco Energy TG 480/600"



"Remote Control Module" with sound and visual signals

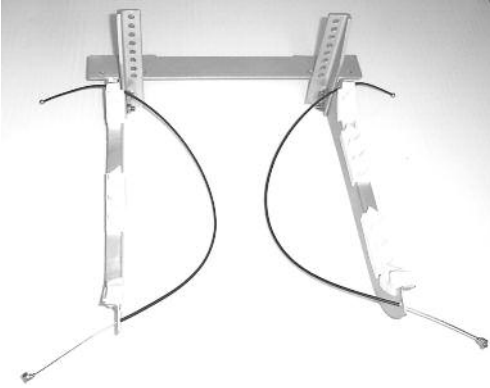


Signal cable (with connectors) to connect the Eco Energy TG 480/600 to the control unit (code 30142).



Electronic control unit (preset for the "remote" module) with control software.

## Packaging content



Support frame (code 30143) to be applied to the motorhome, equipped with two steel ropes.

## HANDLING



Always handle the Eco Energy TG 480/600 in horizontal position (see photo).

### List of safety and identification labels

- Product identification label
- Label showing the guaranteed acoustic power level (LWA), according to the 2000/14/CE directives
- “exhaust gas” outlet label
- “fan danger” label.

### Preliminary checks

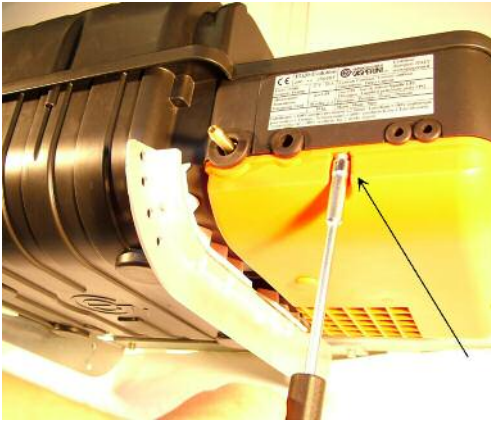
- Make sure that all components as listed above are in the packaging and check for their integrity.
- **Start the installation only if everything is regular**, otherwise contact Telair s.r.l.

## Identification of components



**A1 and A2** : Hot air (produced by the Eco Energy TG 480/600 while running) to be piped out of the motorhome.

**B** : Exhaust gas to be piped to ground or to the motorhome roof



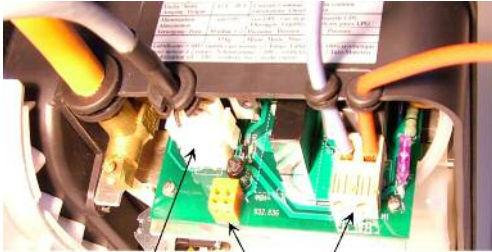
Service cover code 30038



Oil tank cap code 30087



Cooling fan.  
**Warning:**  
Can set on suddenly !



Service board code 30006

**Terminal board (A)** for connection to the service battery

**CN1connector (B)** for signal cable

**M3 Terminal board (C)** to activate the “safety lock”

B C A



Aeration grid

## “Remote” Module which runs the operation of the Eco Energy TG 480/600

### Note:

The operation of the Eco Energy TG 480/600 can last from few seconds to some dozens minutes depending on many factors.

Button for manual start•up (automatic switch•off)



Switch to turn ON/OFF the Eco Energy TG 480/600

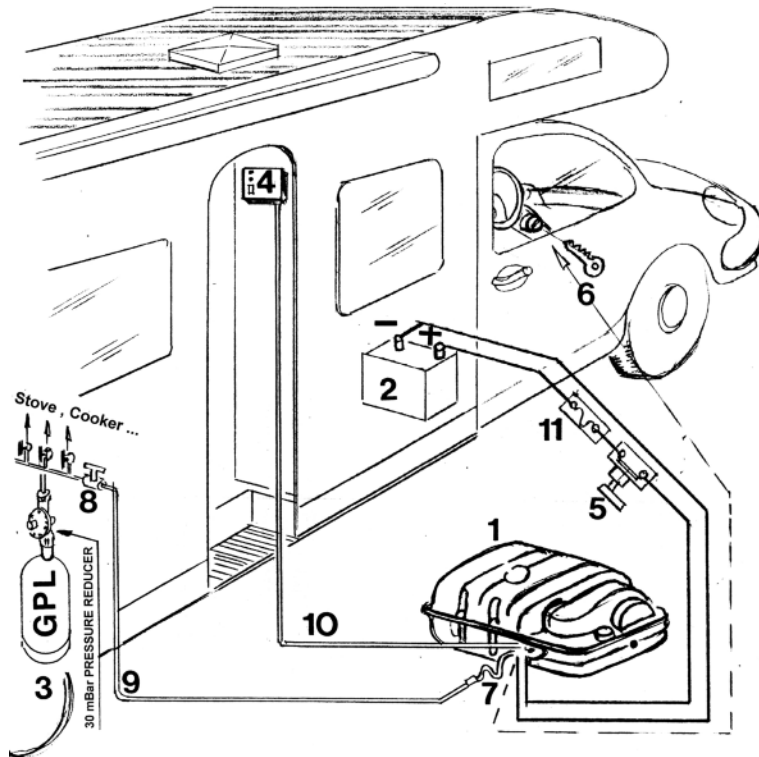




## Installation (Skilled Workshops) and connection diagrams

You should read all the sections of this handbook before proceeding to the installation of the Eco Energy.

The installation of the 12V Eco Energy TG 480/600 for motorhomes has to be made by skilled technicians having specific, appropriate technical knowledge in the motorhome field, in particular: body work, electric installation and Gas system.



### Legend :

- (1) Eco Energy TG 480/600
- (2) Service Battery
- (3) LPG gas bottle or tank with pressure reducer (30 mBar)
- (4) Electronic control unit
- (5) Battery knife-switch ( on positive cable)
- (6) Connection to activate the "Safety lock" service (using a key lockable contact)
- (7) Flexible approved hose (to use with LPG gas)
- (8) Tap for LPG gas supply
- (9) Rigid gas pipe Ø 8mm•
- (10) Multipole cable for the electronic control unit (supplied)
- (11) 80A Fuse



## Before starting the installation of the Eco Energy TG 480/600

(Preliminary checks and assessments)

To install the Eco Energy TG 480/600, it is to be applied under the vehicle floor (however in an area which is segregated from the motorhome interior).

Before proceeding, make sure that such an installation is allowed by the vehicle manufacturer.

The attachment points must guarantee a pulling resistance of at least 110 Kg.

**Note:** The Eco Energy TG 480/600 has to be installed in horizontal position!



### Choosing a location and checking the space needed for the installation of the Eco Energy TG 480/600.

*Decide the location of the Eco Energy TG 480/600 according to the following criteria:*

- Minimum required space: 700x400x280 mm.
- Minimum ground clearance: it has to guarantee safety also into reverse and when travelling on rough grounds (humps, ramps...)
- Distance from heat sources (silencer): At least 20 cm from the catalyser  
At least 10 cm from the exhaust tail part.
- The aeration grid of the Eco Energy TG 480/600 should not be directed towards the motorhome exhaust gas / water and mud splashes
- The Eco Energy TG 480/600 should not be directly hit by water or sand from a wheel or by the engine exhaust gas; if necessary, fit a mudguard or a rubber strap as a protection.



### To be agreed with the user client

*The following should be agreed with the user client:*

- How to convey hot air:  
to be used for outdoors only ! (See also the related section on this handbook).
- How to convey the exhaust gas of the Eco Energy TG 480/600:  
Towards ground (rear side of the motorhome !?) or towards the roof (recommended as the smell of exhaust gas is less felt) (See also the related section on this handbook).
- Oil topping up:  
*Assess the user client's requirements*  
Topping up is required every 115 working hours.
- Installation inside a storage compartment:  
Make a hole of diameter 14 cm approx. for intake of cooling air of the Eco Energy TG 480/600 and for safety purpose.  
The storage compartment must be airtight to the other living areas of the motorhome!!  
Hot air (taken from the cooling cycle of the Eco Energy TG 480/600) and exhaust gas must be piped out of the motorhome !!!

## Material required for installation

- **M8 screws and the related anti-loosening nuts**, both stainless steel

Or: Steel tubular rivets (M8).

To be used to fasten the support coded 30143 to the motorhome chassis.

**Note:** Assess the most suitable fastening system according to the application.

- **Unipolar 80A knife-switch** In case of failure or for specific requirements, it allows you to separate the Eco Energy TG 480/600 from the electric installation of the motorhome.
- **80A fast (or Automotive) fuse and the related fuse holder.** Necessary to protect the installation between the service battery and the Eco Energy TG 480/600.

- **Unipolar 10 mm<sup>2</sup> or 16 mm<sup>2</sup> electric cable**

Red and blue. Suitable for temperatures up to 90°C.

Antiflame. For connection between the service battery and the Eco Energy TG 480/600.

*To choose the suitable section, see the specific paragraph.*

- **Unipolar 1 mm<sup>2</sup> antiflame electric cable.**

Suitable for temperatures up to 90°C.

Antiflame. For connection of the "Safety lock"



- **Steel (or aluminium) flexible hose Øin 50 mm**  
to be used to convey exhaust gas



- **Flexible self-extinguishing corrugated**  
(Øin 57 mm) PVC hose.

Suitable for temperatures up to 90°C .

This hose is used to pipe hot air (\*) produced by the Eco Energy TG 480/600.

(\*) : Taken from the cooling cycle of the Eco Energy TG 480/600 engine.



- **Flexible hose, LPG gas-approved**  
(see Cig or IMQ standards)

- **Ø 8 mm copper or iron pipe** for gas system.

- **LPG gas tap**

- **Adjustable steel straps for:** exhaust gas pipe (Ø 50 mm) - LPG flexible hose

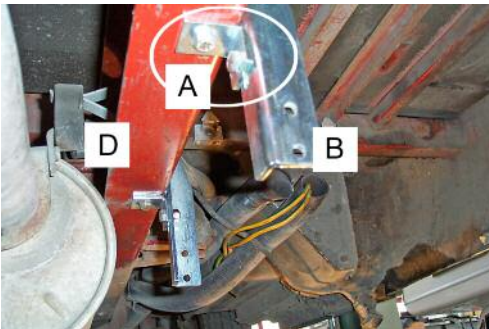
- **Sheath for electric installations.**

## Mechanical installation of the Eco Energy



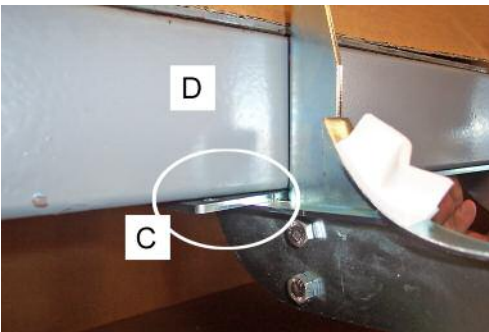
Mark the fixing holes (\*) you want to use on the side frame. Where possible, use the already existing holes.

**Note:** (\*) Additional holes must be made in accordance with the directions of the vehicle's manufacturer.



Perform the final fixing of the two uprights (B) and the two squares (A).

**Installing the squares (A)** is superfluous if point (C) is in contact with the side frame (D)  
In this case (C) has to be fixed to the side frame (D) by means of the screws and self locking nuts

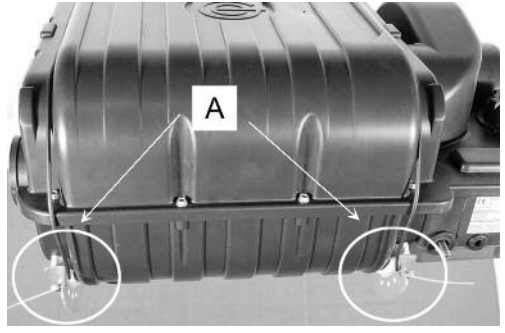


Tighten the screws. The fixing system used must prevent slackening or screwing out!

**Note:** Use self locking nuts



Place the Eco Energy TG 480/600 on the support frame (code 30143)



Apply the two steel cords (A) with the ends outwards



**Do NOT stretch the steel cords too much;** the vibration-damping plug should only be slightly pressed.



Raise the support with the Eco Energy TG 480/600 and bring it to the right position.



Fasten the support frame (code 30143) to the uprights definitively via the suitable bolts and spring washers. **Tighten the bolts locking the uprights** to the motorhome chassis by interposing the supplied spring washers properly.

## Electrical connections



### Cross section of cables for connection to the service battery

Use two cables! (One for the positive pole and the other for the negative pole).

Do not use the vehicle chassis as a ground connection!

- Red (+) Blue (-) antiframe type 90°C
- If the distance between the Eco Energy TG 480/600 and service battery is **less than 4 metres** :  
Use 10 mm<sup>2</sup> cross section
- If the distance between the Eco Energy TG 480/600 and service battery is comprised **between 4 and 8 metres**:  
Use 16 mm<sup>2</sup> cross section

### Electric installation

Before connecting the cables to the battery fit the electric knife-switch  
(see installation diagram)

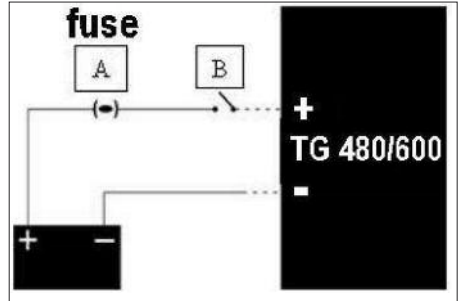


Remove the service cover code 30038

Locate the fixing points of the 80 A knife-switch (B) and the 80 A fuse (A) .  
 Lay the cables connecting the service battery and the Eco Energy TG 480/600

**Notes:**

- Use a sheath to contain/protect the cables.
- Fastening should not cause the cables to swing, be stretched or abraded.
- Cables should not be laid next to heat sources and/or sharp parts.
- The knife-switch “B” has to be installed in an easy to reach position for the user.



**Recommended fuses**

- 14x51GL(32A); 10x38GL(32A);
- Automotive Megaval (40 to 50A);
- Automotive Midival (50 to 60A);
- Automotive Maxival (50 to 60A);
- Buss Class T (40 to 50A);
- Buss Class F (60 to 70A);
- Buss Class UF (70 to 80A);

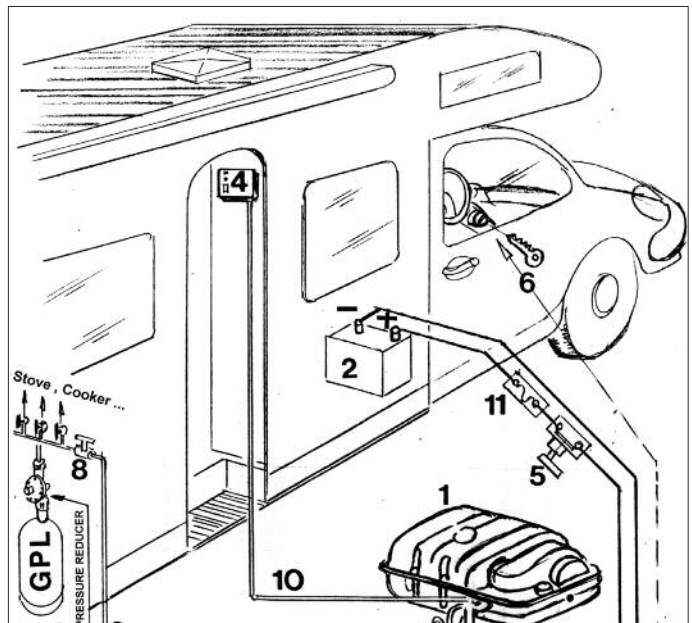
Insert the electric cable in the fairlead (inside diameter 8 mm)  
 Insert the electric cable in the terminal.



- Install the 80A fuse (11) (as close as possible to the positive pole of the service battery).
- Install the 80A knife-switch (5) and leave it in open position.  
 Make the connection as per the installation diagram

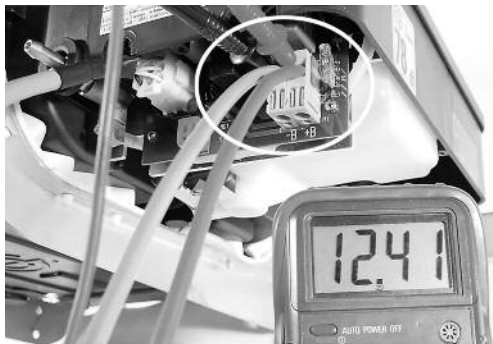
**Note:**

Mark the knife-switch and the fuse (Example: “Eco Energy TG 480/600”)





## PRELIMINARY TEST on electrical power connections



a) Close the 80A knife-switch:  
**the Eco Energy TG 480/600 must not start up!**  
(If it starts, check connections on the battery and the Eco Energy TG 480/600 for proper polarity.).

b) Check that the battery is live on the terminal block of the service board (the value on the photo is for indication only).



- c) Open the knife-switch again.
- Install the control unit (typically in a cabinet).
  - Set the switch of the remote module to OFF.



Installing and connecting the remote module to the control unit.

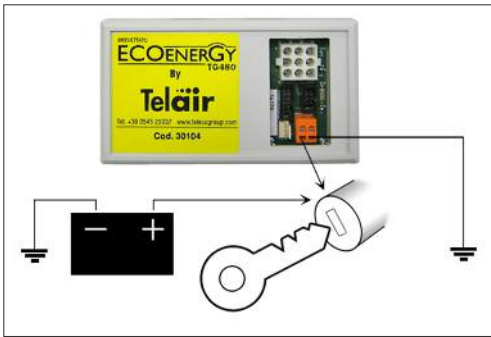
### Note:

The installation point of the remote module should be such that the sound and visual signals are always perceived by the user.



Connect the signal cable (code 30142) to the board on the Eco Energy TG 480/600.





On the electric installation of the motorhome, identify a +12 Vdc terminal when the motorhome engine is running and 0 Vdc when the motorhome engine is off.

This terminal (+D or key lockable) is normally used to control the tree-way refrigerator.

Make the connection as shown in the picture to activate the “safety lock” which has the following functions:

**Motorhome engine status:** On : Status of the Eco Energy TG 480/600 OFF

**Motorhome engine status: Off (parked motorhome) :** Status of the Eco Energy TG 480/600 After being enabled (OFF then ON on the Eco Energy TG480/600 control unit) the Eco Energy TG 480/600 is ready to run in automatic mode.

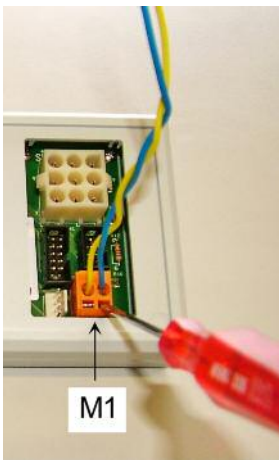
**Note:**

As soon as the motorhome stops for parking (engine off), the control unit of the Eco Energy TG 480/600 activates a sound signal (“Bip”). The “Bip” advises the user to check the Eco Energy TG 480/600 for proper running conditions. Do not use the Eco Energy TG 480/600 inside ferryboats, garages, closed or unsuitable places.



Connect the wires which activate the “safety lock” by using the M1 (on control unit coded 30104) or M3 (on board coded 30006) terminal board.

**NOT BOTH OF THEM!**



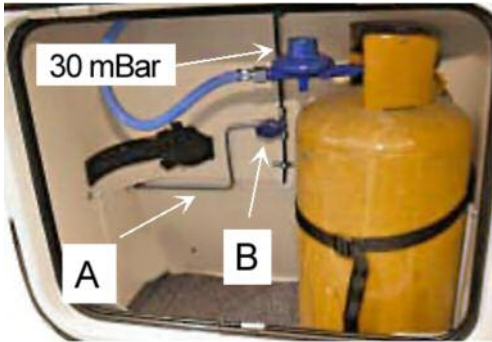
No polarity must be respected on the M1 and M3 terminal boards. To insert the wires on M1 or M3 : use a small flathead screwdriver, push the M1 or M3 spring contact and insert the wires (see photo).



- Connect a wire between M1 (or M3) and the earth of the vehicle.
- Connect a wire between the free terminal (of M1 or M3) and a key lockable contact (on the motorhome this is indicated with codes +D or SC (key lockable)).
- Make sure that this signal is 12V (10v min – 16V max) when the motorhome engine is on and 0V when the motorhome engine is off.



## Installing the LPG gas system



From the LPG gas bottle downstream of the pressure reducer (30 mBar), install a gas tap (B) and shunt a new line (A) to feed the Eco Energy TG 480/600.

### Use:

- A suitable  $\varnothing$  8 mm copper ( or iron ) pipe up to the Eco Energy TG 480/600.
- Mark the tap with the wording "TG480/600"



- Approved flexible hose (about 50 cm) to connect the Eco Energy TG 480/600 to the copper (or iron ) pipe.
- Tighten the flexible hose by using steel clamps .

## Installing the pipes to convey exhaust gas and hot air

**Important notes** about the pipe conveying the "exhaust gas" and the pipes conveying the "hot air" (produced by the Eco Energy TG 480/600 during operation).

- The minimum inside diameter of the pipe used to convey exhaust gas is 50 mm.
- The minimum inside diameter of the pipe used to convey cooling air of the Eco Energy TG 480/600 is 55 mm.

Pipes with inside diameter of less than 55 mm will prejudice proper Eco Energy cooling, which could affect the operation and lifetime of the Eco Energy TG 480/600.

- If you won't pipe the exhaust gas to the roof and /or use hot air to warm any external area of the motorhome (engine compartment, drain valves), it is necessary to install three pipes with a minimum length of 0.5 m .

To prevent any liquid from flowing back into the Eco Energy, the pipe ends must be directed downwards.



- A1 ..... < 5 metri / metres /mètres  
 A2 ..... < 5 metri / metres /mètres  
 B ..... < 5 metri / metres /mètres

(A1 + A2 + B ) ..... < 12 metri / metres /mètres



## Piping out the exhaust gas

### Eco Energy TG 480/600

### SUMMARY OF THE DIFFERENT INSTALLATION MODES OF THE EXHAUST GAS

| PIPE EXHAUST GAS              |                  | Material to be used for the Siphon Shaped section (2) | Material to be used for the section under the floor (3) | Material to be used for the section in the motorhome interior (4) |
|-------------------------------|------------------|---|---|---|
| Piped to the Roof (suggested) | Mode A<br>Mode B | Flexible Steel<br>Flexible Steel                      | Flexible Steel<br>Flexible PVC (30280)                  | Flexible Steel<br>Flexible Steel                                  |
| Piped to Ground               | Mode C<br>Mode D | Flexible Steel<br>Flexible Steel                      | Flexible Steel<br>Flexible PVC (30280)                  |   |

#### ADVANTAGES PRODUCED BY MODE B COMPARED TO MODE A

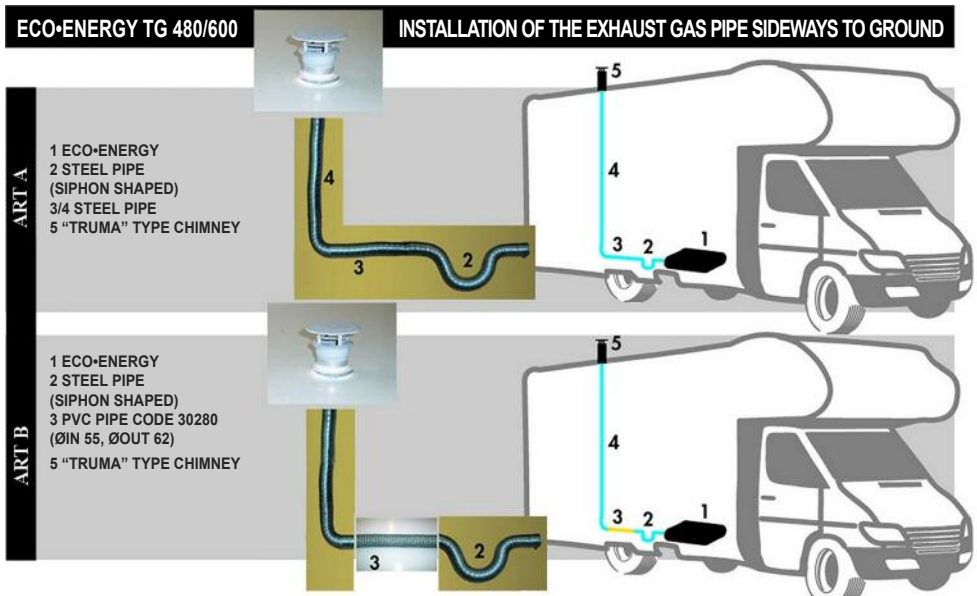
Noise is more concentrated under the floor. The motorhome interior and the chimney area are more silent

#### ADVANTAGES PRODUCED BY MODE D COMPARED TO MODE C

Noise is more concentrated under the floor. The pipe end area is more silent

### Mode A - Mode B

### (Exhaust gas piped to the roof)



### HOW TO CHOOSE THE INSTALLATION TYPE

Exhaust gas piped to the ROOF

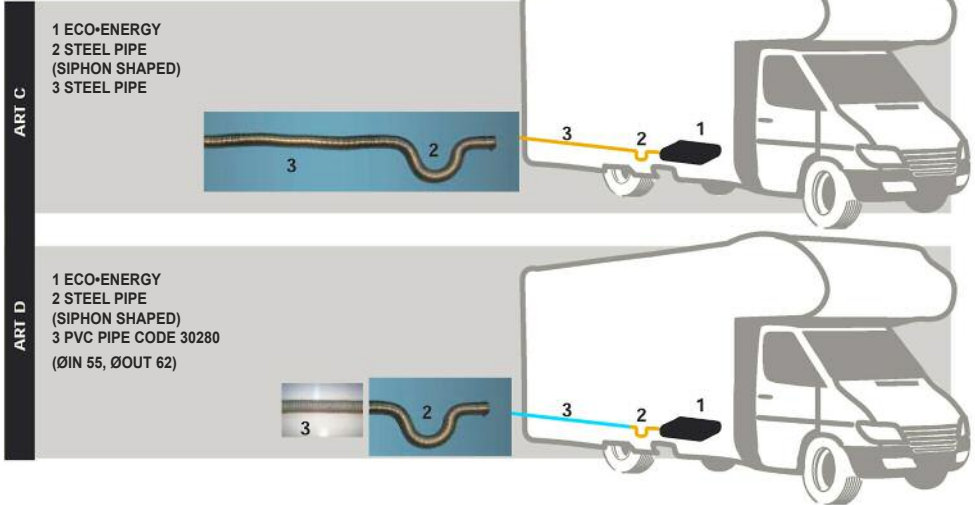
- When energy consumption and the user needs require prolonged operation times of the Eco Energy TG 480/600

**Note :** Check that roof lights are provided with a fan taking air inside out

Exhaust gas piped to GROUND

- When energy consumption and the user needs require the Eco Energy TG 480/600 to run for short times

**Note :** Exhaust gas should be piped beyond the motorhome rear profile



### Installing the exhaust gas conveyance pipe



Insert the flexible steel hose.  
Fasten with silicone or  
polyurethane.

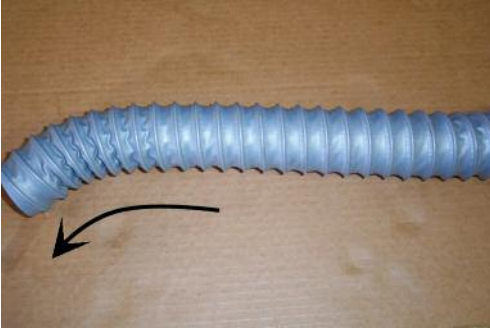
Bend the pipe (siphon-shape) as shown in the  
photo.  
Perforate the lowest point via a drill  $\varnothing$  3.5 to 4 mm.



When piping the exhaust gas to the ground, the  
end part of the pipe may be made of flexible steel  
or PVC code 30280 (suggested – see photo).

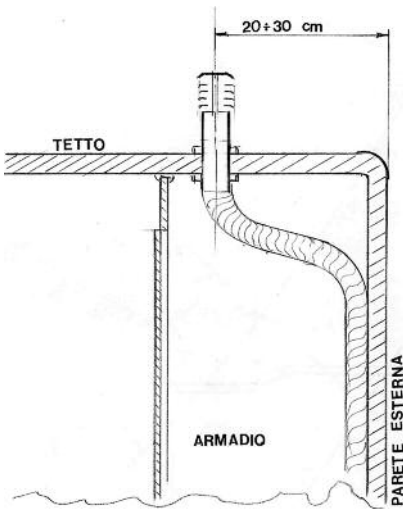


## Piping the exhaust gas to the ground



The end part of the exhaust pipe must slightly be directed downwards to avoid water ( rain, vehicle washing etc) flow back

## Piping the exhaust gas to the roof



In the drawing, chimney is set back from the motorhome wall. Noise produced by the chimney should further be "deadened" because the roof is interposed as a shield towards other motorhomes parked nearby.

This type of installation is a proposal and should be evaluated case by case.

**Use a steel pipe inside the vehicle (as a general rule the pipe is let into wardrobe). The pipe is to be used exclusively for the Eco Energy TG 480/600 exhaust gas.**



**The chimney must not obstruct exhaust gas emission upwards.**

Use (for instance) chimneys as in the photo.

The chimney must be placed far from roof lights/windows or suction fans.



## Installing hot air conveyance pipes

Hot air recovered during the operation of the Eco Energy TG 480/600 can be piped towards drain valves, engine compartment and/or tanks.

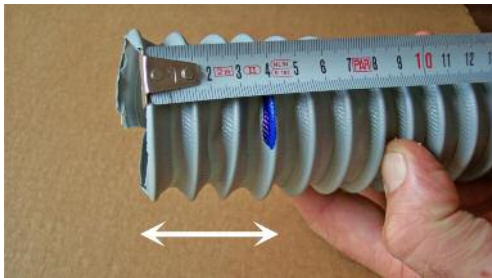
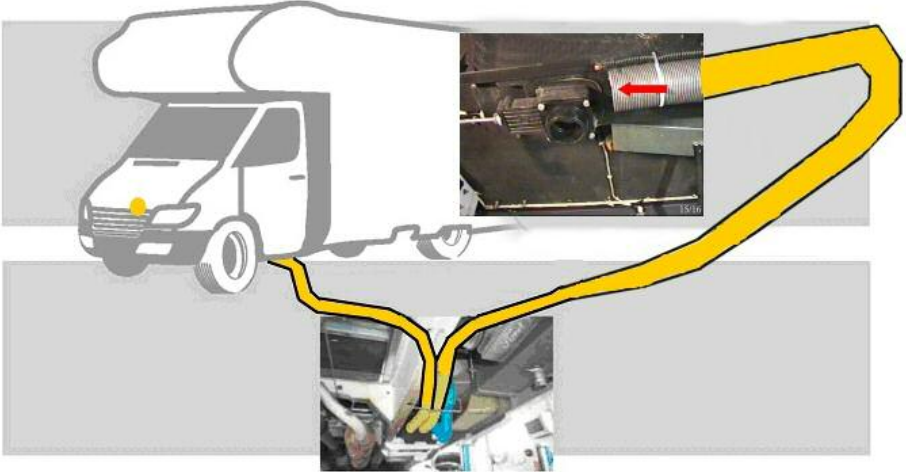
### Note:

Hot air outlets **MUST NEVER** be obstructed!

Hot air coming out of the Eco Energy TG 480/600 must **NOT** be piped **inside the motorhome!**

Eco Energy TG 480/600

HOT AIR FOR CRITICAL POINTS



Eco Energy side:  
mark the two self-extinguishing pipes CODE 30280 (Øin 57 mm) at a distance of 40 mm from the edge.



Apply silicone on the pipes.  
Insert the two pipes in the hot air holes up to the mark.

**Warning:**  
**Do not insert the pipes beyond the mark!**  
There are moving parts next to the hot air outlets.



Secure the hot air pipes to the vehicle by means of clamps.

**Note:**  
The free end of the pipe must be directed downwards (to prevent rain water from getting in).



## Testing

### Service battery efficiency

- 1) Connect a load of about 50 Watt to the service battery (for instance: switching on all lamps in the motorhome)
- 2) Use a tester to measure the service battery voltage : the measured value is to be more than 12 Volt.

### Testing procedure

| Action   | Outcome  |
|--|--|
| Close the battery knife-switch dedicated to the Eco Energy TG 480/600.     |  |
| Open the gas tap dedicated to the Eco Energy TG 480/600.                   |  |
| Set the remote module <b>switch to ON (I)</b> .                            | On the remote module you should notice the following in sequence:<br><br>1) the two green and red leds go on for 1 second<br>2) a sound signal is emitted for 1 second<br>3) the green led begins flashing slowly. |
| If the battery voltage is below the programmed threshold (about 11.9 Volt) | the Eco Energy TG 480/600 starts up immediately.   |
| If the battery voltage is over the programmed threshold (about 11.9 Volt)  | the Eco Energy TG 480/600 does not start up and remains in "stand by".   |

## Creating the start-up conditions for the Eco Energy TG 480/600

### First possibility

Apply a load (lamps, hair dryer etc ) to discharge the service battery; the Eco Energy TG 480/600 starts up as soon as voltage drops below the programmed threshold (about 11.9 Volt).

### Second possibility

When the battery voltage is **more than 12 Volt** (and less than 13 Volt) the Eco Energy TG 480/600 can be started by pressing the button (A) on the remote module; it always goes off automatically.



**Note:** also in this case, the Eco Energy TG 480/600 will go on running until the service battery reaches the maximum programmed threshold (about 14.5 Volt).

Once started, the Eco Energy TG 480/600 runs until the battery voltage reaches the maximum programmed threshold (about 14.5 Volt).

**Running duration depends on the battery condition : from few seconds to some hours.**

### Note:

If some air is included in the system which feeds the Eco Energy TG 480/600 (installation phase or bottle change) the Eco Energy TG 480/600 will probably start up through the “modulated gas metering” system which is automatically activated after the second start-up attempt.





# Use of Eco Energy

## Foreword

The Eco Energy TG 480/600 is automatically controlled via a microcontroller unit which constantly monitors the battery voltage.

**The user only has to activate or deactivate the Eco Energy TG 480/600 through the remote module.**

(I) switch-on - (O) switch-off

### **Motorhome running**

(the motorhome engine runs).

The "Safety Lock" circuit inhibits the operation of the Eco Energy TG 480/600 (see 12.2)

### **Motorhome parked**

(the motor home engine is switched off)

Switching off and then on the button on the remote module allows the Eco Energy TG 480/600 to run.

The user has to check the safety conditions suitable for the operation of the Eco Energy TG 480/600 are complied with.

The Eco Energy TG 480/600 must not be activated in closed or unsuitable places (such as garages, ferryboats).

### **Activating the Eco Energy TG 480/600**

Open the gas tap dedicated to the Eco Energy TG 480/600

Close the knife-switch dedicated to the Eco Energy TG 480/600

Set the switch to 1 (ON) on the remote module

The control unit will perform a system check.

### **Situation with "charged battery"**

(12 to 14 Volt)

Eco Energy TG 480/600 in standby. In this case, the green led flashes (1 second frequency) .

### **"partially discharged battery"**

(voltage below 12 Volt)

In this case, the control box performs the Eco Energy start-up procedure. Once the Eco Energy TG 480/600 is started, the green led is illuminated steady.

### **"battery completely down"**

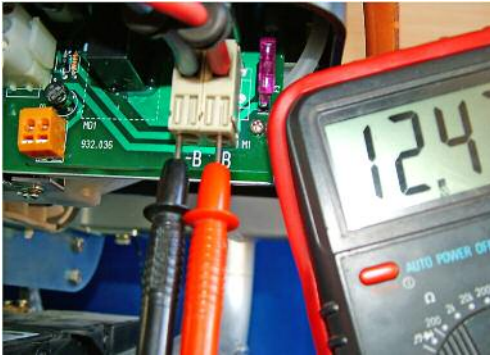
(the battery is exhausted and cannot be recharged)

The Eco Energy **cannot start.**

In this condition the control unit emits an acoustic "failure" signal.  
Replace the battery



## START and STOP thresholds VARIABLE running time



As soon as the battery voltage level drops below the minimum threshold (about 12 Volt), the Eco Energy starts automatically and brings the battery to the upper limit threshold (about 14.5 Volt)1.

(1) : measure on the terminal block of the Eco Energy TG 480/600 as shown in the photo

**The running time** of the Eco Energy TG 480/600

changes depending on the following factors:

- 1) battery charging level
- 2) battery ageing status
- 3) capacity (Ah).
- 4) outdoor temperature (battery compartment).
- 5) current absorbed by fixtures.
- 6) battery downtime.
- 7) battery discharge mode:

- Slow discharge (low, yet long lasting, discharge currents) requires a quite long recharge time
- Rapid discharge (high, yet short lasting, discharge currents) requires a quite short recharge time.

### The Eco Energy TG 480/600 STARTS UP FREQUENTLY

#### Causes:

#### A) “Sleeping” service battery

DO NOT replace the battery. You only have to carry out discharge and recharge cycles (items 1,2,3,4)

This situation can occur when the service battery is not used very often (or is new) and/or in wintertime. See “tip 1”.

#### B) Exhausted / faulty service battery

Replace the battery

#### C) How to check whether the service battery is “sleeping” or exhausted/faulty

(The following tests are reported as an indication only!)

- 1) Eco Energy TG 480/600 in OFF mode
- 2) Discharge the service battery down to about 11.3 V with a load of about 5 A  
(e.g.: you can switch on 4 to 5 lamps)

- 3) When the battery is at 11.3 V (approx.) Eco Energy TG 480/600 in ON mode increase the absorbed current up to 12 to 15 A (e.g.: you can switch on 7 to 8 lamps plus your TV)
- 4) Let the Eco Energy TG 480/600 on until it goes off automatically. If the Eco Energy TG 480/600 remains on for less than 2 hours, it is recommendable to repeat steps 1 to 4 .
- 5) If the Eco Energy TG 480/600 remains on for more than 2 hours (note 1) the battery is likely to be "sleeping".

*One or two cycles (see items 1,2,3,4) will "wake up" the "sleeping" battery.*

### **Tip 1**

*Use service batteries with a total capacity of at least 150 to 200 Ah if the vehicle is also used in wintertime or if the battery is often "sleeping". Alternatively, it is possible to use the "BRIDGE" (a device that operates and controls the parallel connection between the engine battery and the service battery. See also [www.telecogroup.com](http://www.telecogroup.com)).*

*Temperature has a considerable impact on the behaviour of lead batteries and consequently, on that of Eco Energy. A fully efficient lead battery at an ambient temperature of 0°C will generally lose over 15% of its capacity compared to 20°C temperature conditions. If the ambient temperature further decreases to -20°C, the loss of capacity will exceed 40%*

### **Note 1**

*If the Eco Energy TG 480/600 remains on for more than 12 hours, the tests could have been carried out incorrectly and it is advisable to call a technician.*

## **Deactivation**

### **Momentary deactivation**

- Set the switch to "0" (OFF) on the remote module

### **Prolonged deactivation**

- Switch off the button on the remote module (0•OFF)
- Close the gas tap (dedicated to the Eco Energy TG 480/600)
- Open the electric knife-switch (dedicated to the Eco Energy TG 480/600)

### **Note:**

This procedure should also be used to deactivate and fully isolate the Eco Energy from the other systems on the motorhome.

## Tips for a proper use

With temperatures below 5°C

When the Eco Energy TG 480/600 runs with temperatures below 5°C please wait at least 2 minutes running before switching it off.

---

In the nighttime

Consider the possibility of keeping the Eco Energy TG 480/600 off overnight to avoid noise; run it in automatic mode in the daytime.

### **IMPORTANT:**

If the motorhome is also used in wintertime, we recommend you install service batteries with an overall capacity as indicated in item 15 of the manual (Technical specifications).

- Before you switch the Eco Energy off in the night-time, perform a manual start-up via the button on the remote module.
- 

Oil topping up

Once a year it is advisable to check the oil level to avoid having to top up during the trip.

---

“BRIDGE”  
Patented and approved product  
([www.telecogroup.com](http://www.telecogroup.com))

### **OPTIONAL**

Telair s.r.l. has created the Bridge, an automatic/manual device that operates and controls the parallel connection between the engine battery and the service battery(s).

---

“TimeSwitch”  
([www.telecogroup.com](http://www.telecogroup.com))

### **OPTIONAL**

Telair s.r.l. has created the TimeSwitch, a timer which enables you to programme the operation of the Eco Energy TG 480/600

## Maintenance with replacement of wear parts

The maintenance operations listed below are performed at the Telair S.r.l. laboratories (or Authorized Service Centres):

| Maintenance period                    |  | Main reference operations   |
|---------------------------------------|--|---|
| Every 300 to 400*<br>running hours    | Equivalent to 3 to 4 l oil consumption   | Replace the silencer with GMC calibration, if required. Perform the necessary implementations and updates |
| Every 600 to 800*<br>running hours    | Equivalent to 6 to 8 l oil consumption   | Replace the cooling fan and the igniter plug  |
| Every 1500 to 1800 *<br>running hours | Equivalent to 15 to 18 l oil consumption | Replace the dynamo brushes.   |

\* Approximate value

### Oil topping up (1 litre ~ 115 running hours)

The oil level is controlled by a probe in the tank of the Eco Energy TG 480/600. The minimum oil level is reported on the remote module and causes the Eco Energy TG 480/600 to be deactivated automatically. To top up use exclusively 100% synthetic oil as shown on the following list:

ELF Moto 2xT Tech - MOBIL 1 Racing 2T – AGIP 2T Racing – ERG K Kart 2T Corse – CASTROL TTS EP 2T – PUTOLINE TT Scooter+ – CASTROL Biolube

### Perform the following checks at least once a year

#### “Aeration” holes and “condensate/oil drain”

- Make sure the holes are open, above all after having travelled on muddy grounds, high grass, brushwood etc.

#### Checking the gas system and the related hoses

- Check the gas system and particularly the expiry date of the flexible hose safety period.

#### Checking the Eco Energy TG 480/600 unit

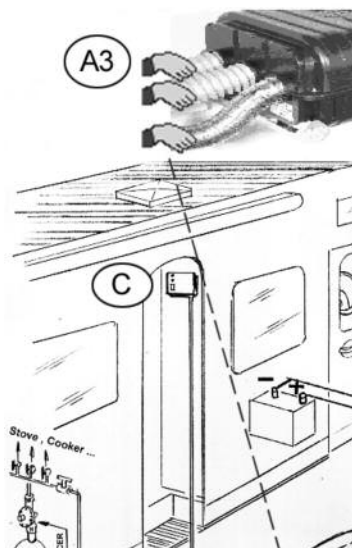
(together with this check, make the oil topping up )

- Check the housing for breaks, cracks or deformations.
- Check the whole fastening system (chassis, safety ropes, electric cables condition)

## Troubleshooting

### Tests to be performed when the Eco Energy TG 480/600 does not start (see 12.1 and 12.2)

Carry out the following operations:



1. Disconnect (A1) the gas pipe from the Eco-Energy TG 480/600
2. Connect (B1) another gas bottle temporarily
3. Disconnect (A2) the battery cables
4. Make a temporary connection (B2) to another battery (12V 100Ah).
5. Disconnect (A3) the hot air and exhaust gas conveyance pipes from the Eco Energy .
6. Start (C) the Eco Energy (if it does not start automatically, press the manual start-up button).
7. If the Eco-Energy TG 480/600 does not start:

- A) Write down the LED status (see 12.2)
- B) Contact the technical service

The control unit makes a self-diagnosis which identifies, in many cases, the type of failure of the Eco Energy TG 480/600.

Any malfunction and/or failure in the Eco Energy TG 480/600 is coded via suitable sound (buzzer) and light (green and red led) signals on the remote module.

## Failure signals

Sound and visual signals on the operating conditions of the Eco Energy TG 480/600

| GREEN led                    | RED led               | Sound signals  | Condition                               |
|------------------------------|-----------------------|----------------|---|
| 1 flash every 0.8 sec        | Off                   | Off            | Stand by - Waiting                      |
| On steady                    | Off                   | Off            | Supplies power                          |
| Off                          | On steady             | 1 every 10 sec | Gas missing / failure                   |
| Off                          | 1 flash every 0.1 sec | 1 every 10 sec | Oil missing                             |
| Off                          | 1 flash every 0.8 sec | 1 every 10 sec | High internal temperature               |
| 1 flash every 0.2 sec        | On steady             | 1 every 10 sec | Too flat/damaged battery                |
| 1 flash every 0.8 sec        | 1 flash every 0.2 sec | 1 every 10 sec | Replace fuses F1 and F2 (service board) |
| 1 flash every 0.2 sec        | Off                   | Off            | Start-up phase                          |
| 1 flash every 0.8 or 0.2 sec | Off                   | 1 every 5 sec  | Safety lock activated                   |

## Troubles • Checks / Solutions

| Trouble   | Checks / Solution   |
|---|---|
| The Eco Energy doesn't start (failure or exhausted gas signal)                                      | Check that gas is fed and the tap is open.<br>Check that gas pressure is 30 mBar. As a test, feed the Eco Energy TG 480/600 by using another bottle and another pressure reducer!   |
| Fuse F1 and/or F2 interrupted on power circuit  | On board 30006, replace F1 and F2 fuses with others of the same kind (do not increase capacity!)  |
| High temperature signal   | Check that the aeration holes are unobstructed<br>Check the fan integrity (*)   |
| The Eco Energy starts, runs for a few minutes and then stops by signalling exhausted gas or failure | Check that the aeration holes are unobstructed<br>Check the fan integrity (*)   |
| A loud mechanical noise comes from the Eco Energy   | Check the fan integrity. (*)  |
| Lubricant missing signal even if the tank is full   | Contact the service centre  |
| The Eco Energy alternates between runs and stops of about ten seconds.                              | <b>Assumption (A):</b> The service battery is "sleeping" (#)<br><b>Assumption (B):</b> The service battery is exhausted (#)   |
| The Eco Energy starts up hardly and performs badly  | <b>Assumption (A):</b><br>The gas pressure in the motorhome installation is not correct. Make sure the gas pressure is 30Mbar; replace the pressure reducer if required.<br><b>Assumption (B):</b><br>The engine exhaust port is clogged and/or the silencer unit must be replaced. (#) |
| Other troubles  | Please contact Telair S.r.l.  |

(\*) Warning: Read the "Safety" section.

(#) Read the previous paragraphs



## Transport

To send the Eco Energy to Telair s.r.l. or a service centre, please follow the instructions below:

- Empty the oil tank.
- Arrange the Eco Energy TG 480/600 in the packaging; the oil plug must be turned upwards.
- Package the appliance properly.
- Use the original box or a suitable box.
- Apply labels indicating that the box must be transported without overturning it.
- If possible, use a pallet

### **WARNING !!**

**•An unsuitable packaging will cause serious damages to the internal and external frame of the Eco Energy TG 480/600 ••**

## Disposal

In case of scrapping, keep in mind that the Eco Energy TG 480/600 contains metals (iron, copper, aluminium, lead) and plastics (abs, polyethylene, silicone). The appliance should be delivered to car scrap collecting centres. Please dispose of carefully.



## Technical Specifications and Declaration of Conformity

| Technical specifications                                      | TG 480   | TG 600   |
|---|--|--|
| Operation   | Automatic, operated by micro-controller                                    | Automatic, operated by micro-controller  |
| Operating Temperature   | +50 °C to +25 °C (with temperature < 0 °C use propane gas)                 | +50 °C to -25 °C (with temperature < 0 °C use propane gas)                     |
| Working relative humidity                                     | 0 to 95% without condensate  | 0 to 95% without condensate  |
| Rated voltage   | 12 V   | 12 V   |
| Rated current   | 20 A (at 0 m a.s.l.)   | 25 A (at 0 m a.s.l.)   |
| Two-stroke engine feeding                                     | LPG (pressure 30 mBar ±2)  | LPG (pressure 30 mBar ±2)  |
| LPG consumption   | 0.27 Kg / actual running hour  | 0.295 Kg / actual running hour   |
| Lubricant   | 100% synthetic lubricant for two-stroke engine                             | 100% synthetic lubricant for two-stroke engine                                 |
| Lubricant consumption   | 1 litre ~ 115 actual running hours   | 1 litre ~ 115 actual running hours   |
| Oil tank capacity   | 1 litre  | 1 litre  |
| Eco Energy TG 480/600 shutdown and signal on the control unit | With minimum oil level   | With minimum oil level   |
| Sound pressure at 7 m (SPL)                                   | 51 dB (A)  | 52 dB (A)  |
| In compliance with directive 2000/14/CE:                      | Measured sound power LwA: 74 dB (A)<br>Measured sound power LwA: 76 dB (A) | Guaranteed sound power LwA: 76 dB (A)<br>Guaranteed sound power LwA: 78 dB (A) |
| Weight  | 19 Kg with full lubricant tank<br>( + 2 Kg for bracket support)            | 19 Kg with full lubricant tank<br>( + 2 Kg for bracket support)                |
| Length, Width, Height (mm)                                    | 565x380x250 H  | 565x380x250 H  |
| Space required for installation (mm)                          | 700x400x280 H  | 700x400x280 H  |
| Recommended battery capacity                                  | > = 160 to 200 Ah  | > = 160 to 250 Ah  |
| Storage temperature   | -25 °C to +70 °C   | -25 °C to +70 °C   |
| Maximum operating altitude                                    | 2000 m above sea level   | 2000 m above sea level   |
| Maximum gradient with running Eco Energy TG480/600            | 17%  | 17%  |

**Note:** Performance and consumption values change depending on altitude

## "CE" DECLARATION OF CONFORMITY

under Machine Directive 89/392/EEC, attachment II A

We hereby represent that the generating set –data of which are specified below – has been designed and built in compliance with the essential safety and health requirements as laid down by the European Directive on Machine Safety.

This statement shall no longer be valid if any changes are made in the machine without our written approval.

Machine: **GENERATING SET**

Model: **Eco Energy TG 480/600**

Serial number: .....

Reference Directives:

Machine Directive (89/392/EEC) version 91/31/EEC

Low Voltage Directive (73/23/EEC)

Electromagnetic Compatibility 2004/108/EC

Harmonised standards applied, in particular: EN 292•1; EN 292•2; EN 60204•1

Date .....07/12/2010

President



## WARRANTY

**TELAIR guarantees its products against any material and/or manufacturing faults and defects.**

**The right to warranty cover for new products is valid for a period of 24 months from the time of handing over to the end user, or for a maximum of 1000 operating hours, whichever limit is reached first. In all cases the warranty period shall end no later than 26 months (28 months if delivered outside of Europe) after ex factory delivery.**

For electric and hydraulic components, pipes, belts, sealing elements, injection nozzles, clutches, drives, the warranty term is 12 months from the time of handing over to the end user, or a maximum of 1000 operating hours, whichever limit is reached first. In all cases the warranty period shall end no later than 14 months (16 months if delivered outside of Europe) after ex factory delivery.

In any case, the costs of lubricants and consumables shall be charged.

Any transport expenses shall have to be covered by the purchaser; the same applies to any expenses connected with inspections requested by the customer and accepted by TELAIR.

**The warranty shall only be valid if:**

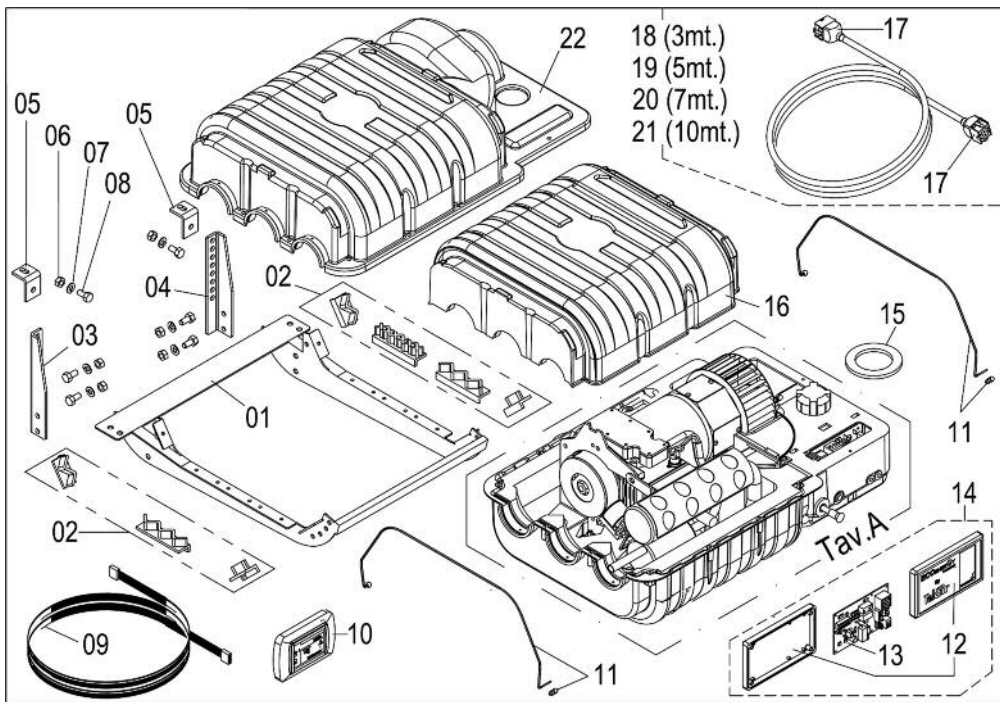
- the customer has carried out all routine maintenance according to the recommended schedule and has promptly visited the nearest after-sale centre if required.
- the customer is able produce a document showing the date of sale (invoice or receipt for fiscal purposes).

Such document shall be kept with care and be intact when produced to the TELAIR After-Sales centre on requesting service.

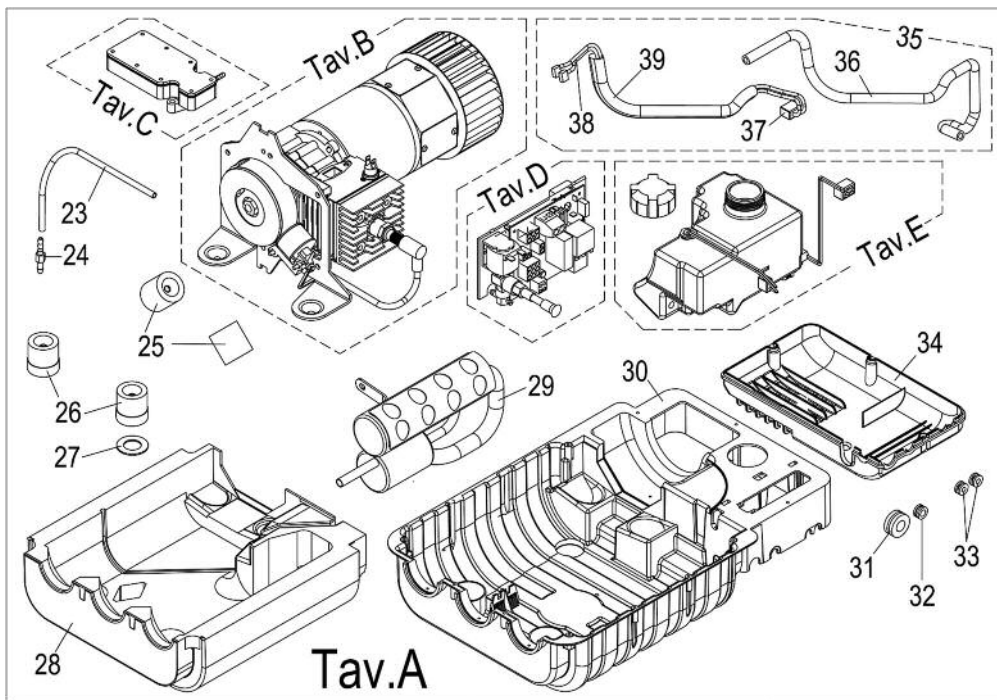
**In any case, the purchaser shall not be entitled to:**

- terminate the contract;
- claim damages to persons or property;
- ask that the warranty be extended in the event of product defects or malfunctioning.

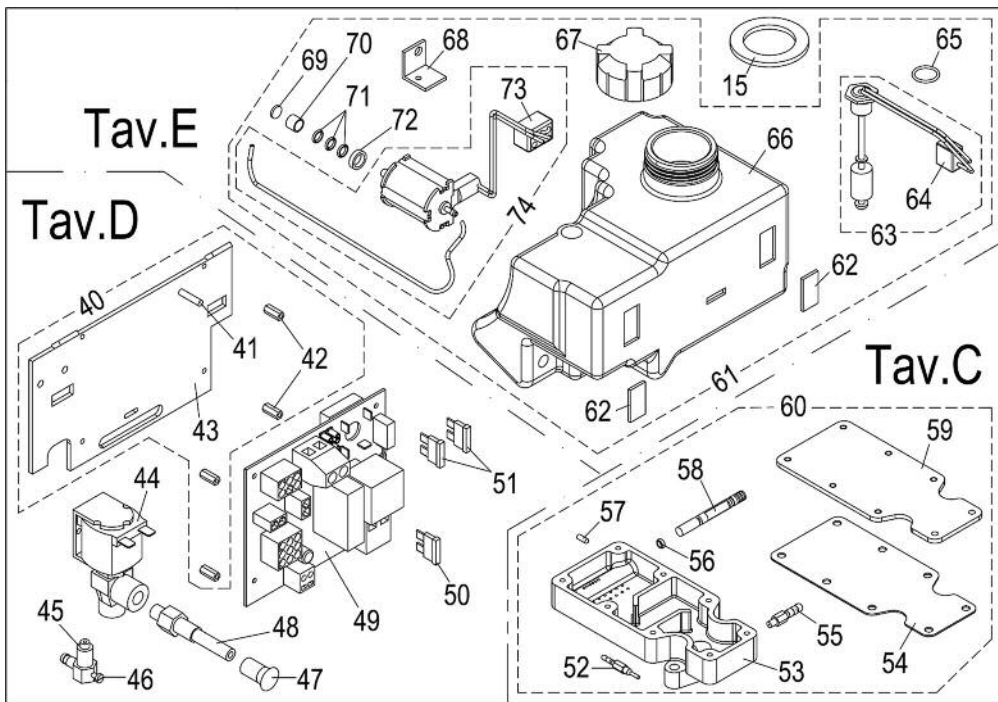
*Changes and updatings are carried out without prior notice*



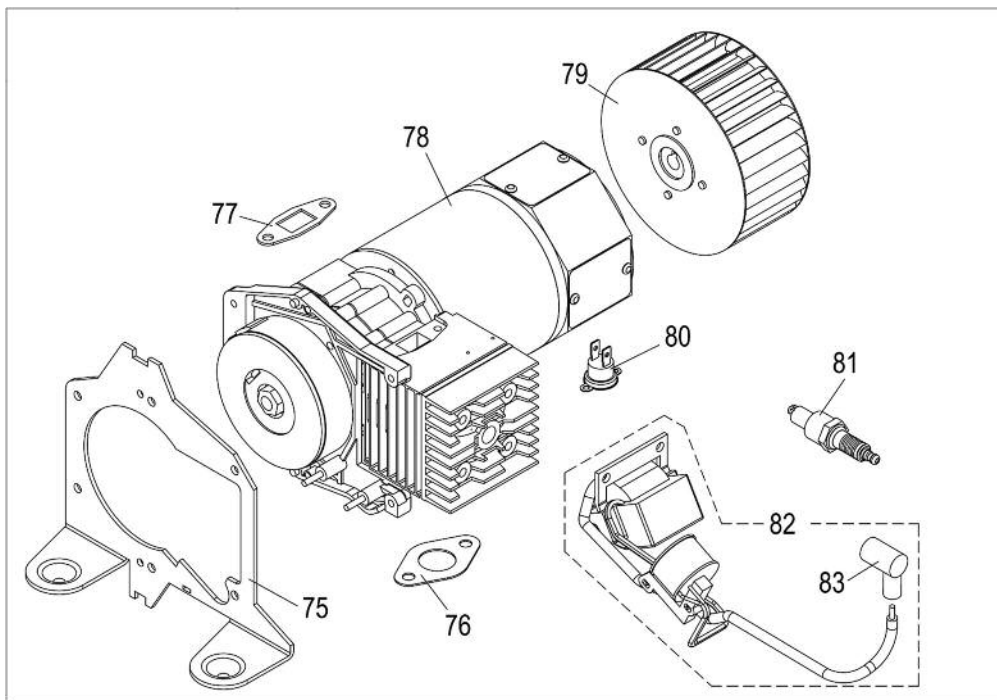
| Pos. | Code  | Q.tà | Description                           |
|------|-------|------|---------------------------------------|
| 1    | 30144 | N. 1 | 90° bracket frame                     |
| 2    | 30148 | N. 1 | Anti-vibration kit for frame          |
| 3    | 30145 | N. 1 | Left upright                          |
| 4    | 30146 | N. 1 | Right upright                         |
| 5    | 30147 | N. 2 | L-shaped reinforcement square         |
| 6    | 05302 | N. 6 | M8 nut                                |
| 7    | 05303 | N. 6 | Ø8 spring washer                      |
| 8    | 05304 | N. 6 | M8 screw                              |
| 9    | 30117 | N. 1 | Remote module connection cable        |
| 10   | 30320 | N. 1 | Remote module                         |
| 11   | 30149 | N. 2 | Safety wire + terminal                |
| 12   | 30114 | N. 1 | Box for electronic control unit       |
| 13   | 30105 | N. 1 | PCB for control unit                  |
| 14   | 30104 | N. 1 | Electronic control unit               |
| 15   | 30103 | N. 1 | Tank neck gasket                      |
| 16   | 30039 | N. 1 | Polyurethane insulation for top cover |
| 17   | 05319 | N. 2 | Mate-N-Lok 9-pole connector body      |
| 18   | 30303 | N. 1 | Signal cable 3 m long                 |
| 19   | 30142 | N. 1 | Signal cable 5 m long                 |
| 20   | 30304 | N. 1 | Signals cable 7 m length              |
| 21   | 30269 | N. 1 | Signal cable 10 m long                |
| 22   | 30002 | N. 1 | Top cover                             |



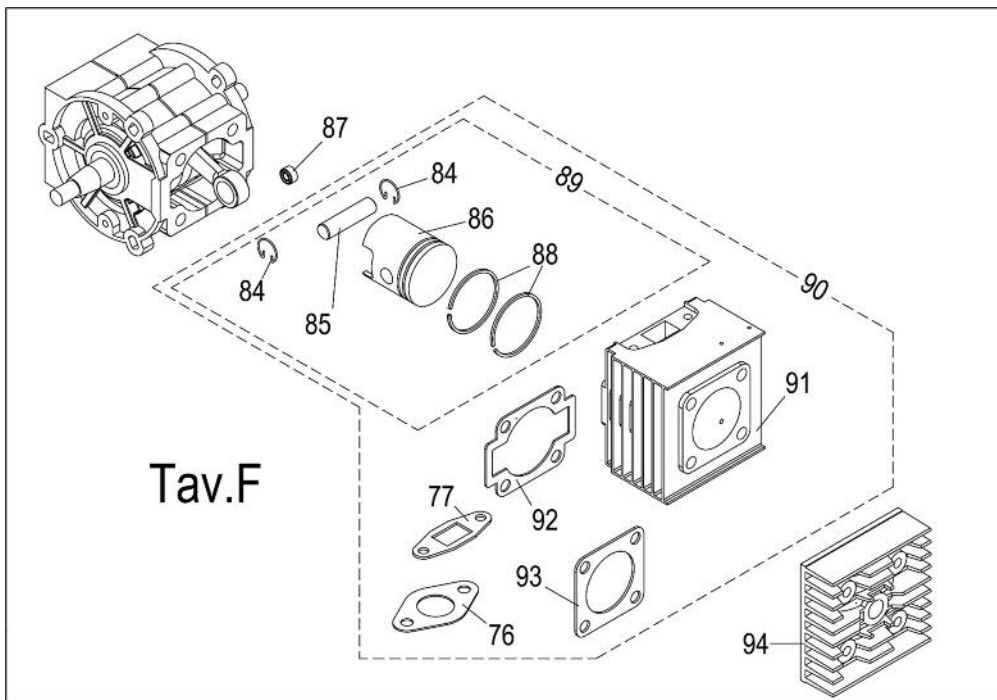
| Pos. | Code  | Q.tà | Description   |
|------|-------|------|---|
| 23   | 05215 | N. 1 | Oil hose for mixer                                  |
| 24   | 30096 | N. 1 | Pipe fitting for oil hose                           |
| 25   | 30031 | N. 2 | Vibration damper on dynamo side                     |
| 26   | 30032 | N. 2 | Vibration damper on engine side                     |
| 27   | 30033 | N. 1 | Shim for vibration damper                           |
| 28   | 30029 | N. 1 | Polyurethane insulation for bottom                  |
| 29   | 30037 | N. 1 | Muffler for engine                                  |
| 30   | 30001 | N. 1 | Bottom  |
| 31   | 05221 | N. 1 | Fairlead for gas pipe                               |
| 32   | 30099 | N. 1 | Fairlead for signal cable                           |
| 33   | 05222 | N. 2 | Fairlead for battery cable                          |
| 34   | 30038 | N. 1 | Service cover                                       |
| 35   | 30091 | N. 1 | Thermostat cable and gas pipe assembly              |
| 36   | 30093 | N. 1 | Internal gas pipe                                   |
| 37   | 05320 | N. 1 | Mate-N-Lok 2-pole connector body                    |
| 38   | 30092 | N. 1 | Wired cable for thermostat                          |
| 39   | 30094 | N. 1 | Protective sheath for gas pipe and thermostat wires |



| Pos. | Code  | Q.tà | Description                                 |
|------|-------|------|---|
| 15   | 30103 | N. 1 | Tank neck gasket                            |
| 40   | 30004 | N. 1 | Assembled heatsink                          |
| 41   | 05234 | N. 1 | M4 self-clinching screw                     |
| 42   | 05185 | N. 4 | M3 hexagonal spacer                         |
| 43   | 30005 | N. 1 | Heatsink only                               |
| 44   | 30013 | N. 1 | LPG solenoid valve                          |
| 45   | 30017 | N. 1 | Solenoid valve outlet fitting               |
| 46   | 30018 | N. 1 | LPG adjustment screw                        |
| 47   | 30016 | N. 1 | LPG inlet protection cap                    |
| 48   | 30015 | N. 1 | LPG inlet stainless steel fitting           |
| 49   | 30006 | N. 1 | Control electronic board                    |
| 50   | 05195 | N. 1 | 3A reed fuse                                |
| 51   | 02781 | N. 2 | 30A reed fuse                               |
| 52   | 30023 | N. 1 | Lubricant injector                          |
| 53   | 30020 | N. 1 | Mixer body                                  |
| 54   | 30025 | N. 1 | Gasket for mixer cover                      |
| 55   | 30022 | N. 1 | LPG injector                                |
| 56   | 05213 | N. 1 | O-ring 2.90 x1.78                           |
| 57   | 05214 | N. 1 | M 4x12 grub screw, cone stainless steel tip |
| 58   | 30027 | N. 1 | Shutter pin                                 |
| 59   | 30024 | N. 1 | Mixer cover                                 |
| 60   | 30019 | N. 1 | Complete mixer                              |
| 61   | 30074 | N. 1 | Complete oil tank                           |
| 62   | 30126 | N. 2 | Adhesive elastic shim                       |
| 63   | 30076 | N. 1 | Complete oil level gauge                    |
| 64   | 05320 | N. 1 | Mate-N-Lok 2-pole connector body            |
| 65   | 05238 | N. 1 | O-ring 11.11x1.78                           |
| 66   | 30075 | N. 1 | Oil tank                                    |
| 67   | 30087 | N. 1 | Screw cap for oil tank                      |
| 68   | 30083 | N. 1 | Square for oil pump                         |
| 69   | 30079 | N. 1 | Oil pump filter                             |
| 70   | 30081 | N. 1 | Filter lock ring                            |
| 71   | 05239 | N. 3 | O-ring 4.47x1.78                            |
| 72   | 30082 | N. 1 | Bushing for pump                            |
| 73   | 05318 | N. 1 | Mate-N-Lok 6-pole connector body            |
| 74   | 30084 | N. 1 | Wired oil pump                              |



| Pos. | Code  | Q.tà | Description            |
|------|-------|------|------------------------|
| 75   | 30042 | N. 1 | Engine frame           |
| 76   | 30088 | N. 1 | Engine exhaust gasket  |
| 77   | 30028 | N. 1 | Engine intake gasket   |
| 78   | 30041 | N. 1 | Dynamo-engine assembly |
| 79   | 30090 | N. 1 | Cooling fan            |
| 80   | 05223 | N. 1 | Thermostat 170°        |
| 81   | 05241 | N. 1 | Spark plug             |
| 82   | 30043 | N. 1 | Electronic ignition    |
| 83   | 05224 | N. 1 | Spark plug cap         |



| Pos. | Code  | Q.tà | Description                          |
|------|-------|------|--------------------------------------|
| 76   | 30088 | N. 1 | Engine exhaust gasket                |
| 77   | 30028 | N. 1 | Engine intake gasket                 |
| 84   | 30404 | N. 2 | Snap ring for piston pin             |
| 85   | 30403 | N. 1 | Piston pin                           |
| 86   | 30407 | N. 1 | Piston                               |
| 87   | 30421 | N. 1 | Conrod small end roller bearing      |
| 88   | 30420 | N. 2 | Piston ring                          |
| 89   | 30363 | N. 1 | Piston kit for engine                |
| 90   | 30272 | N. 1 | Cylinder kit with piston and gaskets |
| 91   | 30405 | N. 1 | Engine cylinder                      |
| 92   | 30317 | N. 1 | Cylinder gasket                      |
| 93   | 30318 | N. 1 | Head gasket                          |
| 94   | 30406 | N. 1 | Engine head                          |











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