

6. This warranty is not valid if customers install the SHAKTI FRIENDLY HEATER on his own. Installation and commissioning shall be carried out by the authorised company trained technician only.
7. This certificate of warranty should accompany the SHAKTI FRIENDLY HEATER if service under warranty period is required to be carried out the Authorised Company Service Centre.
8. This warranty does not cover the cost of transportation of the SHAKTI FRIENDLY HEATER from the place of installation to the service centre and return.
9. This warranty covers the SHAKTI FRIENDLY HEATER only.
10. This warranty is issued at Hyderabad and courts at Hyderabad have exclusive jurisdiction over matters covered by or flowing from this warranty.

PLEASE RETAIN THIS CERTIFICATE, IT WILL BE REQUIRED IF SERVICE UNDER WARRANTY BECOMES NECESSARY.

(Please complete in BLOCK LETTERS)

Date of Purchase : _____

Dealer's Name and Location : _____

Customer's Name : _____

Address & Contact Nos. : _____

Service centre remarks : _____

Please
affix
stamp &
mail



Shri Shakti Alternative Energy Ltd.

Corp. Off.: Venus Plaza, Begumpet, Hyderabad - 500016.
 Tel: 040-790 5050/5252/5353, Fax : 040 - 790 8989
 E-mail : ssael@shrishakti.com



Regional Office : B-11, Shivalik, (Near Malviya Nagar), New Delhi- 110 017.
 Tel: 91-011-669 2641, 669 2630, Fax : 91-011-669 2560, E-mail: ssael@ndb.vsnl.net.in
 URL: www.shrishakti.com/alternativeenergy



**Powerful & Safe Heaters
 Indoors or Outdoors;
 Ideal for hill stations**



INFRARED HEATER
 FH 4000 / KR 4000



**CATALYTIC
 ROOM HEATER**
 KC 2800



Sold worldwide as TIMSHEL

INSTRUCTION MANUAL

PART I (FOR CUSTOMER'S RECORD)

SHAKTI FRIENDLY HEATER

CERTIFICATE OF WARRANTY

MODEL NO. _____ **SERIAL NO.** _____

This certificate of warranty should be retained and produced when your SHAKTI FRIENDLY HEATER requires service under the terms of the warranty. Part II of the certificate should be returned/mailed to the company to register the warranty.

CONDITIONS OF WARRANTY

1. Within 12 months of the date of purchase, replacement will be made for component(s) found to be defective due to faulty workmanship or defective material and repairs will be done free of charge by Shri Shakti Alternative Energy Ltd. or its Authorised Distributors. Parts repaired or replaced are under warranty throughout the remainder of the original warranty period only. Repairs under warranty may also be carried out by the Authorised Distributors / Dealers / Service Centres of Shri Shakti Alternative Energy Ltd.
2. For the warranty to be valid, part II of this certificate duly completed must be received by Shri Shakti Alternative Energy Ltd. within 15 days of the date of purchase.
3. This warranty does not cover any form of damage resulting from accident, misuse, external injury or any usage contrary to the Operating Instructions supplied with the equipment.
4. Shri Shakti Alternative Energy Ltd. will not accept any responsibility for damage arising out of unauthorised modifications or alterations of any nature made to the Shakti Friendly Heater.
5. This warranty is not valid if the serial number of the Shakti Friendly Heater has been deleted, defaced or altered.

PART II (FOR COMPANY'S RECORD)

SHAKTI FRIENDLY HEATER

CERTIFICATE OF WARRANTY

MODEL NO. _____ **SERIAL NO.** _____

(Please fill this part in BLOCK LETTERS and mail it within 15 days -after fixing a stamp on the reverse)

I wish to register my Shakti Friendly Heater for 12 - months Warranty service. It was supplied to me on _____ . I have read the conditions of Warranty and will abide by them.)

Date of Purchase : _____

Dealer's Name & Location : _____

(Preferably with Stamp) _____

Customer's Name and Address : _____

Customer's Signature

About the Company that brings you Friendly Energy Solutions

Shri Shakti Alternative Energy Ltd. (SSAEL) is the latest enterprise of the **Shri Shakti Group**. The Shri Shakti Group has produced several winners such as **Shakti Gas, The Tulip Manohar, Family World, Machaan** (a unique tree-house restaurant), **Shri Shakti College of Hotel Management** and **Chirec Public School** among others.



Shri Shakti Alternative Energy Ltd. (SSAEL), is India's only energy service company marketing a range of energy efficient gas appliances from the world over. The International Finance Corporation, Washington, has 26% stake in the company under a special PVMTI program of the Global Environment Facility. SSAEL has a distribution network in most parts of North, North East and South India. In addition to **Shakti Friendly Heaters**, the other products currently available include gas operated **Shakti Friendly Geysers** (manufactured



Made in Spain by
FAGOR

by **Fagor Electrodomesticos** at their ISO 9001 plant in Spain, and carrying the CE mark for quality recognised all over the world), **Designer Fireplaces** (gas operated vent free fireplaces with fake logs that give authentic look and feel of woodfire without the smell or soot) from **Empire**



EMPIRE

Comfort Systems, USA. And, an unique LPG operated Mosquito Trap called **Mosquito Magnet** for outdoors (1/2 to 1 acre coverage) that does not use any chemicals or pesticides.



Friendly Lantern



Solar Radio with Torch



Solar Torch (water proof)



Solar Cool Cap

Also on offer are innovative **Solar Products** like Solar Cool Cap, Solar Torch, Solar AM/FM Radio with Torch, Solar Lanterns, Solar Battery Chargers and major systems like Solar Pumps, Solar Yard/Street Lights and Solar Power Packs/UPS.



Shakti Solar Power Plant



Dear Customer,

Thank you for your purchase of Shakti Friendly Heater; a quality product from **Shri Shakti Alternative Energy Ltd (SSAEL)**. Friendly Heaters are manufactured from CKD Kits supplied by Somolsa - a Spanish multinational researching and manufacturing a range of gas appliances. Friendly Heaters are assembled in an ISO 9002 certified Factory in India. Somolsa's products carry the '**CE mark**' - a guarantee for the quality of consumer appliances sold in Europe. We urge you to **fill out the warranty card**, and send it to us for your warranty to be effected in our records. This will help us give you quick and trouble-free assistance through our dealer or directly!

Shri Shakti's corporate mission is to improve the quality of life of Indian people., by providing **Friendly Energy Solutions – User-Friendly, Cost-Friendly and Eco-Friendly Energy Solutions**. Your **Shakti Friendly Heater** is one among our series of Friendly Energy Solutions. We also offer **Friendly Geysers** (That are independent of electricity and save 70% compared to electricity), **Designer Fireplaces** from **Empire Comfort Systems** a host of **Solar Products** including Friendly Lanterns, Solar Radios, Flashlight, Cool Caps and more. We also offer LPG operated **Mosquito Magnet** from **USA** that covers 1/2 to 1 acre area and gets rid off of biting mosquitoes effectively and permanently unlike temporary measures like repellants and fogging."

Friendly Heaters working on gas trace their roots to a wartime invention in Europe by Louis Lumiere (inventor of Photofilm) for the French Defence Ministry. Catalytic Gas Heaters were used in Worldwar I for heating aircraft hangars to enable quick starting of Aircraft Engines in case of enemy attack. At the same time, the Catalytic Heater did not cause any fire hazard in the hangar where fuels and lubricants are stored. Gas Heaters have also been used by Rauf Amundsen during his North Pole expedition.

Wishing you many, many years of happy service!

With warm regards,

DV Satya Kumar

Managing Director
Shri Shakti Alternative Energy Ltd.

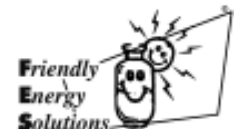


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**Please read this guide carefully before using
SHAKTI FRIENDLY HEATER**

KEEP THIS GUIDE FOR FUTURE REFERENCE

PLEASE REGISTER YOUR WARRANTY

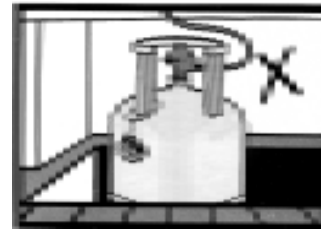
cannot be liquefied at normal temperatures. It burns clean and since it is composed of fewer components, the combustion is near complete.

Its advantages as motor fuel are that it has a high calorific value fuel with good combustion characteristics and with low exhaust emissions. It can as a result be used in internal combustion engines in confined spaces such as stores, terminals etc. Its near complete combustion also reduces contamination of lubricating oil and minimises engine corrosion.

It is used as an aerosol propellant because it is relatively cheap, light in weight, and by mixing Propane and Butane it can be produced with a variety of vapor pressures as required by the aerosol manufacturer. Unlike fluorocarbons, it does not contribute to the deterioration of the earth's fragile ozone layer.



A FEW FRIENDLY SAFTEY TIPS



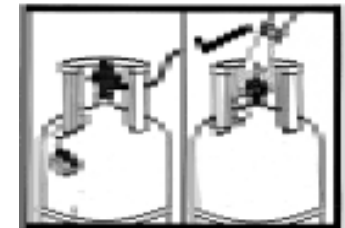
Do no place the cylinder
in a pit below floor level



Always keep your cylinder upright.
Do not tilt and use even when the
cylinder is getting emptied.



Never try to repair your gas
cylinder, yourself.
Call a Mechanic.



Retain safety cap. When the cylinder is not
connected or if there is a leakage, fix the
safety cap on the valve

L.P.G. SAFETY MANUAL

What is L.P.G. ?

L.P.G. is Liquefied Petroleum Gas.

Why is it called Liquefied Petroleum Gas ?

Because it is produced from Petroleum refining and can be liquefied at normal temperatures by the application of moderate pressure.

What is L.P.G. Composed of ?

It is a hydrocarbon (i.e. material whose molecules are composed of carbon and hydrogen atoms) which may be a pure component or a mixture of components. Generally it consists of Propane, Butane, Propylene or Butylene, or mixture of any of those four components. In India LPG composition is generally 70% Butane and 30% Propane or 50% Butane and 50% Propane.

What are Propane and Butane ?

Chemically they are members of the paraffin family which have the general chemical formula C_nH_{2n+2} where n is any number, C is a carbon atom and H is a hydrogen atom. For example the members of this family are:

	Chemical Formula	Component	Molecular Weight	Critical Temp °C
n=1	CH_4	Methane	16	-82
n=2	C_2H_6	Ethane	30	+32
n=3	C_3H_8	Propane	44	+97
n=4	C_4H_{10}	Butane	58	+152

Molecular weight is the comparative weight of the same volume of gas. Air has a molecular weight of about 28 and thus Methane (which is the major component of natural gas) is lighter than air, but all L.P.G. mixtures are heavier than air.

Critical temperature is the temperature to which gas must be cooled before it can be liquefied by the application of pressure. Thus Methane must be cooled to at least - 82°C before it can be liquefied, and therefore liquefied natural gas must be stored and transported in refrigerated containers.

Propane and Butane will liquefy at any temperature below 97°C and 152°C respectively, merely by the application of pressure.

Where does L.P.G. come from ?

L.P.G. may be separated from natural gas or from crude oil, or may be a by-product of an oil refinery or petrochemical plant.

What is L.P.G. used for ?

L.P.G. is used as a fuel for domestic and industrial heating or cooking, as an automotive fuel and as a propellant for aerosols. It is also used as a raw material in the production of petrochemicals.

What are the advantages of LPG?

Its advantages as a heating or cooking fuel are that it is readily transported and stored in a liquid form occupying a much smaller volume than natural gas, which

INTRODUCTION



INFRARED HEATERS-KR 4000/FH 4000

For outdoors – open spaces, tents, shamianas but can be used indoors too. Heats the objects in front of the heater. 4.0 KW peak capacity. Good enough for 400 sft area. Works on the same principle as Angeetis, Bukharis and electrical radiators but with high energy efficiency of over 99%.

CATALYTIC HEATERS - KC2800

For indoors. Heats the air in a room and circulates it through natural convection currents, much like the common electrical convectors but without any blower - i.e. no moving parts. And, much more powerful, 2.8 KW, good enough for a room of 250 sft. Homogeneous heating that gives comfort to all the people in a room, not just to those in front of the heater. Ideal for living rooms, dining hall and bedroom. Energy efficiency of over 99%.



Indoor Air quality that meets American and European Standards

Friendly Room Heaters are designed as vent free gas appliances. The combustion is so clean that it is not necessary to have an exhaust. The indoor air quality meets the standards of ASHRAE (American Society for Heating, Refrigeration and Air Conditioning Engineers) for healthy indoor living conditions. There are four crore similar such heaters in use all over the world and it's safety has been proven over several decades of use. Shakti Friendly Heaters are equipped with an Oxygen Depletion System (ODS) that continuously checks the ambient air and if the oxygen falls below the prescribed standard, it automatically shuts off the LPG flow thus switching off the heater. In addition, there is also a flame failure device consisting of a thermocouple that switches off the gas supply in case the flame goes off for any reason.

Dear Customer,

Congratulations! You are now owner of a Friendly Room Heater that works on gas and is truly in line with global standards for quality and reliability. The following information will help you in setting up the appliance, and deriving the maximum benefit out of its usage. The instructions are common to all the models except as specifically stated.

A. ASSEMBLY OF THE HEATER

To assemble the heater, please proceed as detailed below:

KC 2800 / KR 4000

1. Fit the heater base with castor wheels facing upwards.
2. Slide it between the rails.
3. Once the base is in place, insert the two screws inside the two holes, and fasten securely using the two wing-nuts.
4. Turn the heater and make it rest on the castor wheels.
5. Your friendly heater is now ready to be put into your service.

FH 4000

- 1) Fix the wheels (which are provided in a separate package): Gently thread each wheel into the nuts at the base of the Heater Housing
- 2) Turn the heater and make it rest on the castor wheels.
- 3) Your friendly heater is now ready to be put into your service.

B. INSTALLATION

1. Connect an approved (ISI marked) LPG regulator (for domestic service at low pressure) to a filled LPG cylinder.
2. Connect a rubber tube (of approved quality) between the regulator and the gas inlet of the appliance. The rubber tube should not be more than 15 inches long.
3. All the while, the regulator should be kept shut off / closed.
4. Switch ON the regulator. As on abundant precaution, check the rubber tube connections for any leaks using dilute soap solution.
5. Lift the cylinder on to the base plate, so that the entire unit can be transported on wheels as desired.
6. Fix the back-support plate with the hooks provided on each side of the main frame.

I. TECHNICAL SPECIFICATIONS

Model	KR 4000 / FH 4000 Infrared Heater			KC 2800 Catalytic Heater		
	Consumption (Kg / hour)	0.291	0.182	0.109	0.203	0.167
Power (watts)	4000	2500	1500	2800	2380	1600
Gas	LPG as per IS : 4576, ASTM D-1267					
Pressure	300 mm WC / 28 mbar					
Dimensions	690x430x190 / 690x430x380 (mm)			690 x 430 x 190 (mm)		
Weight	12.5 Kg			9.6 Kg		
Ignition	Piezoelectric			Piezoelectric		
Flame Failure Device	Thermocouple based					
Indoor Air Quality Control	Oxygen Depletion Sensor based					

J. EMERGENCY PROCEDURES

IN CASE OF A GAS LEAK

Your Friendly Heater has several safety interlocks, However you cannot rule out certain emergencies due to failure of rubber tube or gas leakage from the valve or regulator. In case you detect gas leakage, PLEASE DO NOT PANIC. Follow the following guidelines for your safety.

1. Turn off the manual service valve (Regulator).
2. Ensure there are no sources of ignition (naked flame) near the HEATER.
3. Turn off the ignition.
4. If you are unsure or the leak does not stop, then call your nearest authorized Shakti Friendly Heater installer.

Note : LPG is heavier than air and in the absence of dispersal wind, tends to accumulate in low-lying areas.

3. *What happens to the CO₂ produced due to burning of gas?*

Yes, any combustion process produces Carbondioxide (CO₂) and Carbonmonoxide (CO). Due to the near complete combustion (high efficiency of 99.9%), there is no production of CO which is very harmful. The indoor air quality with vent free gas heaters and fire places meets the stringent standards specified by European and American standards for healthy living conditions.

4. *Is it safe to use in the bedroom / living room?*

Yes, absolutely. There are several millions of heaters being used all over the world. Generally, houses in India even in the hill stations are not tightly insulated and therefore there is sufficient infiltration of cold fresh air from outside to meet indoor air quality standards. Yet, it is recommended that when the gas heater is used in a bedroom, the door to the connecting corridor or living room is kept partially open or about 50 square centimeters of ventilation is provided to the room. The gas heaters can also supplement the central room heating systems.

5. *Does the oxygen level go down in the room ?*

Normally, the level of oxygen in the atmosphere is 22%. Experience worldwide and extensive testing has demonstrated that even in tightly insulated houses, the CO₂ level; with gas heaters never exceeds the limit specified by indoor air quality standards. In the rare case that the level of O₂ goes down below 18% then the Oxygen Depletion System (ODS) device shuts off the gas supply to the heater and the unit switches off, thus ensuring there is no suffocation.

6. *Don't you think heating with electricity is a lot more convenient?*

May be it appears like that. We can examine all the facts. Most places in India suffer from low voltage especially in the winters in North India because of which the efficiency of the electric heater goes down - sometimes you hardly get any heat. Moreover, the electricity supply may be out if there is heavy snow fall and you can't get heat when you need it the most.

7. *What is catalytic heating and is it safer for Indoors?*

In a catalytic heater, the combustion of gas takes place at a low temperature, around 350° C (without an open flame). The temperature of combustion is lower than the flammability limit of petrol, paper and cloth and hence these materials do not catch fire even if they fall on the heater accidentally. Therefore, catalytic heaters are safer for indoor use.

C. SWITCHING ON

1. Switch ON the regulator.
2. Standing in front of the appliance, press the Control Knob downward from the position marked "●", and turn it anti-clockwise to the position marked with "maximum flame position"; keep the knob pressed down for about 30 seconds.
3. There will be a distinctive "click" sound with a spark, and the lighted-up pilot flame will appear through the pilot flame viewing window.
4. Release the knob after 30 seconds after the flame stabilises.
5. If the pilot flame does not come up (or is extinguished once you release the knob), then rotate the knob back to "●" position, and repeat the whole exercise (from steps 2 to 4).
6. You may smell LPG (due to the odurant mixed with the gas) for a little while when the unit is switched ON. This is quite normal and need not be mistaken for a leak.

D. SELECTING POWER SETTINGS

1. For KC 2800 the heater starts off at "maximum flame position"; to set it at other heat settings, lightly press down the Control Knob, and turn further anti-clockwise, to "medium flame position" and "minimum flame position" respectively.
2. For KR 4000 and FH 4000 the heater starts off at "minimum flame position". At this setting, the only one burner-plate is energized. This will give off a bright orange-red glow, radiating heat. To set it at other heat settings, lightly press down the Control Knob, and turn further anti-clockwise, to "medium flame position" (two burner plate) and "maximum flame position" (all the three burner plates) respectively.
3. For your benefit, the various power settings and corresponding LPG consumption-figure (per hour) of each model of Shakti Friendly Heater are given in Section - I Technical Specifications.
4. Even if the heater is to be operated in a location having an existing central heating arrangement. It can still be used as a supplemental heating device by providing homogenous heating in the entire space.

E. SWITCHING OFF

1. To switch off, press down the Control Knob lightly, and turn completely clockwise to "●" position.
2. Turn off the LPG supply by shutting off the regulator valve.

F. TROUBLE-SHOOTING

1. *First-time operation is difficult – pilot flame extinguishes as soon as Control Knob pressure is released.*

When using the appliance for the first time (or after a prolonged interval), the air present in the pipeline may make lighting of the pilot flame an initially difficult operation. To solve this, repeat the operation described under F.2 to 4, and press down the Control Knob for between 30 to 60 seconds. This will purge the air / moisture from the tube.

2. *During initial lighting-up period, I sometimes smell gas. Is it because of gas-leaking?*

This is not something to be unduly worried about. The initial purging operation may be associated with a minute amount of LPG getting exposed into the room. Once the pilot flame is ignited, there is no possibility of any further gas-escape. Please read the “Frequently Asked Questions (FAQs)” listed in Section- H of this booklet to know more about how safe your appliance is.

However, AS A GENERAL RULE OF SAFETY, ALWAYS check the rubber tube and valve for a leak whenever you smell gas. As a LPG user for cooking, you are well versed with the norms of safe usage of LPG in your kitchen - just extend them to your new Shakti Friendly Heater. Please read Section - J on EMERGENCY PROCEDURES.

3. *I've been told about ODS, a feature in this heater that senses if oxygen level in room is low, and consequently shuts off the gas supply. How does it actually work?*

You are right – ODS (Oxygen Depletion Sensor) is one of the many features that makes your Shakti Friendly Heater stand out from among many other heating appliances commonly available in the market and make it absolutely safe. Here, we will explain how it functions.

Oxygen is required for any combustion. The ODS in the Friendly Heater ensures that the oxygen level in the room never falls below a level that is specified by standards for good indoor air quality. In normal circumstances, when you light the heater, the concentration of carbon dioxide (CO₂) in air is low, and there is the normal concentration of oxygen (22.5%). During combustion, the gas enters through the injector and the air enters through the inlet hole. Both are mixed in the venturi. This mixture comes out through the nozzle. The spark of the piezoelectric lighter, which comes out when you switch on the Control Knob, ignites

this mixture at the mouth of the nozzle, producing the flame. The flame heats a thermocouple (located close to the nozzle), which actuates an electromagnet, which in turn keeps the gas-valve open.

When the concentration of Co₂ increases to around 1.3 to 1.5% in the atmosphere, the air with this high concentration of Co₂ enters through the inlet hole. Then the mixture in the venturi is very poor, and the flame tries to “fly”, seeking adequate oxygen at a higher level, and causing the combustion to take place not at the nozzle but at this higher level. As a result, the flame loses contact with the nozzle and does not heat the thermocouple. This prevents the electromagnet from working, and the gas-valve closes, causing a shutdown of the gas supply. This system of ODS makes the heater absolutely safe and ensures that the indoor air quality meets the standards at all time. “

G. MAINTENANCE

1. Periodically check the rubber tube for wear and tear; replace once every year.
2. Clean the exteriors only with moist cloth; do not spill liquids on the heating plates.
3. When not in use, dismantle it and store inside the carry-case provided, taking care so that dust does not get into the appliance.

H. FREQUENTLY ASKED QUESTIONS (FAQS)

1. *Does the room become dry?*
No, Very much unlike electric heaters. On the contrary, the humidity level in the room goes up as the combustion of gas produces water vapour.
2. *Are there any chances of gas leaking ?*
Not at all. Unlike the common cooking stove, if the flame goes off by any chance, the gas supply cuts off (within 30 seconds) even though the regulator on the cylinder may be on. This happens because of a thermocouple safety device that senses that there is no heat when the flame goes off and shuts off the gas control valve within 30 seconds. Of course, you have to follow the standard recommendations of your gas company while changing a cylinder to ensure that the cylinder valve or regulator or the rubber tube are not leaking and periodically check this equipment.