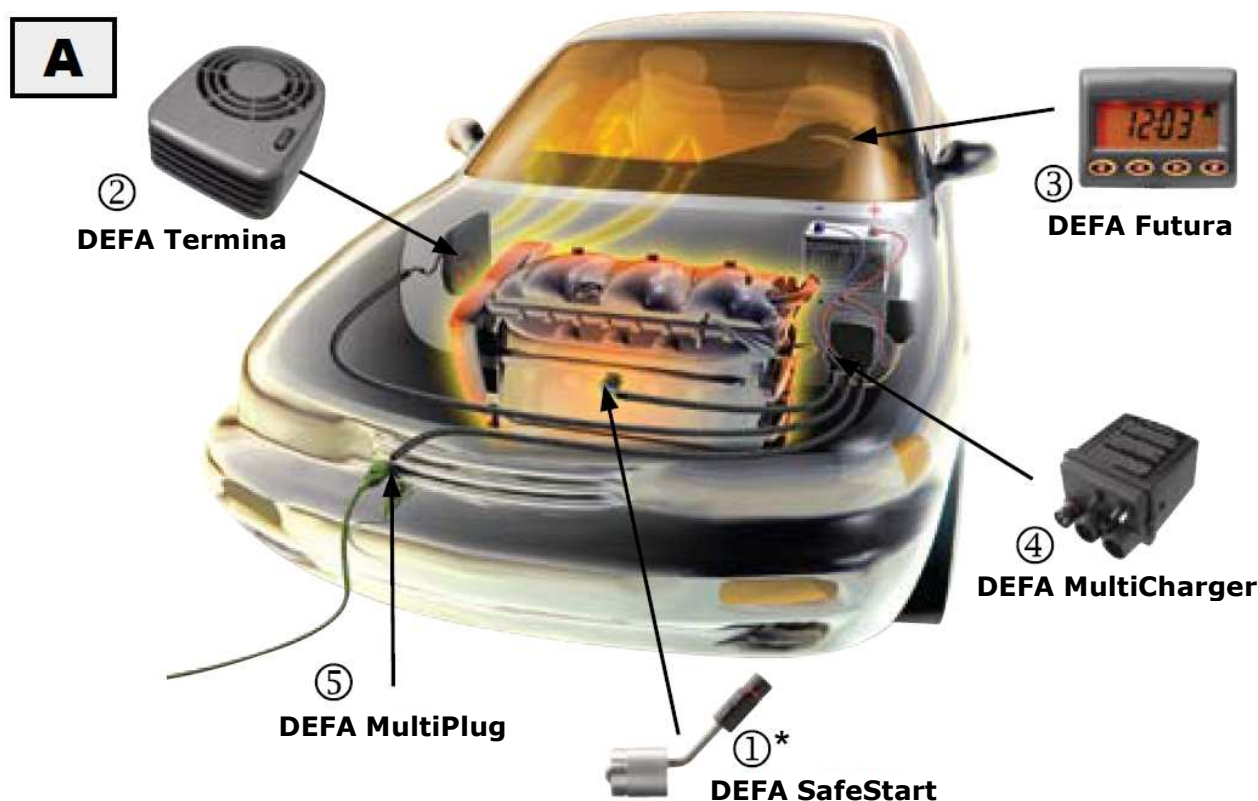


Congratulation on your new DEFA WarmUp system

DEFA WarmUp warms the car and makes it easy to start, just as if it had already been driven a few miles. In a convenient, safe and efficient way, DEFA WarmUp ensures that warm, happy drivers are also safe and environmentally friendly - Two important factors that have helped make us world leaders on the market.

DEFA WarmUp is a simple, user-friendly system, operated by a control unit. By pressing a few buttons, the driver can make sure the car is easy to start, the temperature inside is comfortable and that the battery is always fully charged throughout the winter.

Environmentally friendly cars are becoming increasingly important to manufacturers and environment-conscious car owners. Regardless of its quality, if an engine is cold, it will produce higher exhaust emissions and consume more petrol. Only a preheated engine can quickly heat up the catalytic converter and reduce emissions to any significant degree. As an added benefit, a preheated engine uses far less petrol, is easier to start and is less subject to wear and tear.



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A**DEFA WarmUp custom tailored car heating.**

DEFA WarmUp is a 230V module-based vehicle heating system consisting of an engine heater (SafeStart), an interior heater (Termina), a battery charger (MultiCharger 1203) and a control unit/timer (Futura).

1. Engine heater - Warms the engine, both saving money and protecting the environment. Warm engines use less petrol and emit considerably less CO₂ than cold engines. The engine heater is unique for your vehicle and must be ordered separately.

2. Interior heater - Ensures a comfortable cabin temperature and ice free windows.

3. Control unit - Easy to program, starts your DEFA WarmUp at the time you want, thus saving energy. The outside temperature can guide the starting time in Auto mode.

4. Battery charger - Ensures that the battery is fully charged at all times. All the energy consuming equipment of most modern cars – electrically heated rear windows, heated seats, heated mirrors, car stereo etc. – means that the time spent driving to and from work is often not sufficient to charge the battery.

DEFA MiniPlug - The whole system is connected via the **DEFA MiniPlug**.

Termina - Interior heater.

DEFA WarmUp is available in two Termina versions. Termina 1400W and Termina 2000W interior heater. Both interior heaters got a 3 step power switch. Off, Step I and Step II.

The interior heater uses a PTC (PTC= Positive Temperature Coefficient) heating element, which adjusts the output depending on the temperature of the incoming air. As the interior warms up, the output is reduced and as a result the power consumption is also reduced. The interior heater has an automatic overheating fuse. If this fuse cuts out, it can be reset by unplugging the heater and leaving it disconnected until it cools off (approximately 30 minutes). There is also a regular fuse for additional safety.

If this fuse melts, the heater must be returned to the factory for repair. To determine which fuse has been activated, please refer to the troubleshooting table. The interior heater is mounted inside the car with a specially designed mounting bracket. The interior heater can easily be removed from its bracket by pulling it in the direction of the airflow. It is mounted by pushing the round rear of the interior heater onto the bracket.

MultiCharger 1203 - Battery charger.

The electronic battery charger has the following characteristics:

- Charging current 3A at 12V.
- Power distribution to engine and interior heater.
- Advanced, battery friendly technology allows continuous operation.
- Integrated relay for switching engine and interior heater on and off.
- Temperature compensated charging voltage.
- Splashproof (IP 44).
- Light indication during charging.

The battery charger functions independently of the start timer for the car heating system. The charger switches to maintenance mode when the battery is fully charged. It can also be used to advantage in the summer. The LED at the top of the charger is illuminated when the charger is charging with full effect. It is not illuminated during maintenance mode. The LED blinks when switching from charging to maintenance mode. This means that the LED will be illuminated when connected to 230V if the battery has been without charge for approximately 10 minutes.

Using the Futura control unit.

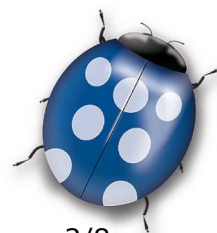
The control unit in the DEFA WarmUp ensures that the car is warm at the required time. The unit has 2 individual **pick-up times** for every 24-hour, suitable for car owners using the car at the same time every day.

In addition to being an advanced control unit for the DEFA WarmUp, the unit is equipped with a number of other functions. The control unit displays the outside temperature, it has an ice warning device and it shows the battery voltage/charging voltage.

The display lighting on the unit is lit when the engine is running or when one of the buttons is pressed.



Pick-up times is the time the car will be used.



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B Function of the buttons - Function button *

For each hit on the button the unit displays:

- 24 hour clock.
- * Battery voltage.
- Drive-away time I - Default 08:00.
- * Outside temperature in °C
- Drive-away time II - Default 16:00

- If the battery voltage and outside temperature are not displayed, an outside temperature sensor is not installed. In this case, the time-program controller will alternate between 24 h clock, departure time I and departure time II each time the * button is pressed.

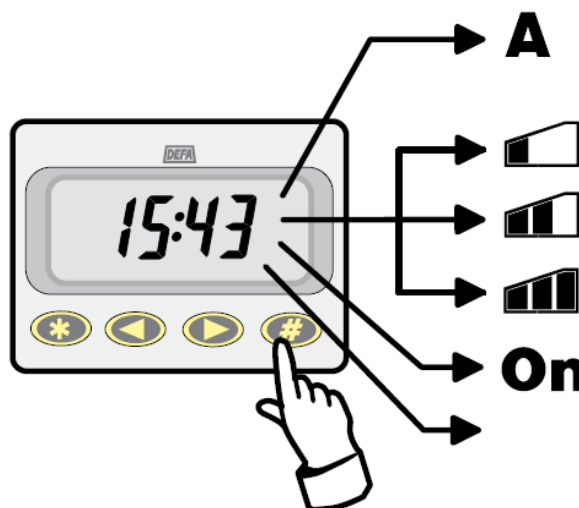


Arrow buttons ◀ ▶

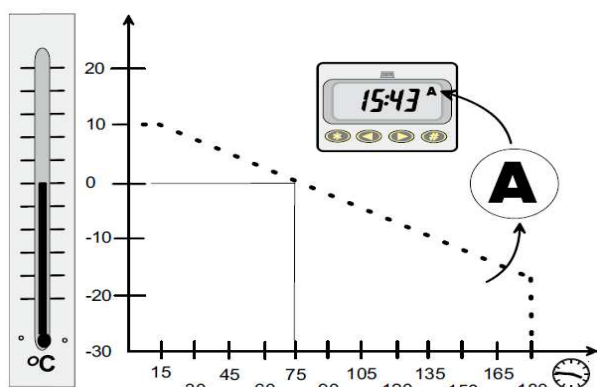
Used for setting the time and programming the drive-away times. Pressing both arrow buttons at the same time puts the control unit into programming mode and the display digits blink. The left arrow button adjusts the time backward and the right arrow button forward.

C Heat button

The heat button is used to choose between several pre-programmed heating programs. For each hit on the button the control unit varies between the following heating programs:

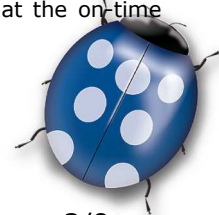


A	Automatic switch-on controlled by the outside temperature.		ON time 3 hours before selected drive-away time.
	ON time 1 hour before selected drive-away time	On	DEFA Warm Up ON .
	ON time 2 hours before selected drive-away time.		DEFA Warm Up OFF (no symbol in the display).



D Temperature-controlled automatic switch-on.

When Automatic switch-on is selected, the sensor will take the outside temperature and decide the correct switch-on time in relation to the programmed drive away time. Lower temperatures require longer warming up periods to reach the required engine and interior temperatures. The graph **D** shows the on-time in minutes at different outside temperatures. Note that the on-time is always related to programmed drive away time.



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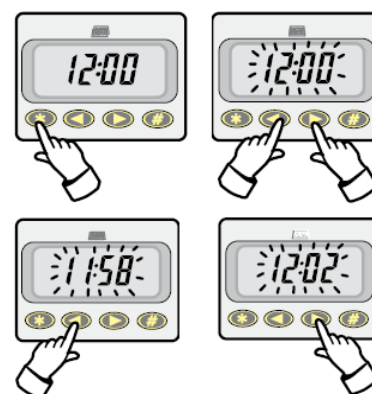
EXAMPLE 1	EXAMPLE 2
At 0°C the control unit switches on the DEFA WarmUp 75 minutes before drive away time. During this period the engine temperature increases by approximately 30°C	At -17°C or colder the DEFA WarmUp is switched on 180 minutes before drive away time and the engine temperature increases by approximately 50°C.

If the vehicle is not started at the programmed drive away time, the on-time is automatically extended by 2 hours (Oversleep function). After that the system switches itself off and remains switched off until it is time to switch on for the next drive away time. This is valid whether 1, 2 or 3 hours on-time has been selected. When the car is started the remaining on-time and the oversleep function are automatically erased.

 It is recommended to program the control unit to Automatic switch-on, as this is most economical.

E Programming the time.

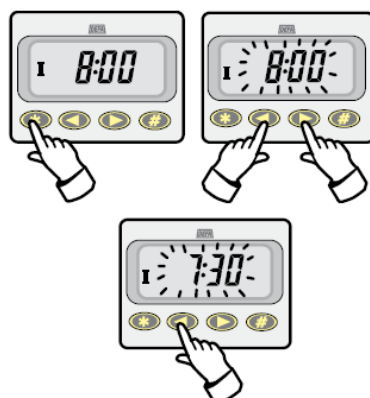
1. Press  until the display shows the time.
2. Press both arrow buttons   simultaneously. Time starts to blink 12:00.
3. For each hit on  time is set back by 1 minute. If the button is held down, the time is set back 2 minutes per second for 5 seconds. After this the step is increased to 10 minutes per second. Use  in the same way to set the time forward. To save the set time – wait for 5 seconds until the blinking stops.



F

Programming drive away time I.

1. Press  until the display shows Drive away time I.
2. Follow the instruction for setting the time from point E 2.



G

Programming drive away time II.

1. Press  until the display shows Drive away time I
2. Follow the instruction for setting the time from point E 2

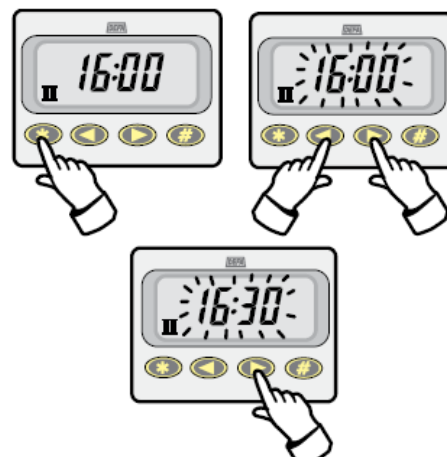
If you only want one drive away time, program I and II so that they coincide.

When the control unit switches on the DEFA WarmUp, the 'On' symbol blinks on the display.

Temperature calibration.

The temperature sensor is mde for optimal precision. If necessary you can calibrate the temperature:

1. Push  until the display shows the temperature.
2. Push both arrow buttons   at the same time.
3. Adjust the temperature +/- 3 degrees using the arrow  button and .



0-condition warning.

The control unit is equipped with a 0-condition warning, which will warn you when the vehicle enters an area where slippery

conditions are likely. An outside sensor must be fitted for this function to work. If the vehicle enters an area where the temperature sinks below 4°C or raises past - 4°C, the light on the display and the buttons blink rapidly for approximately 6 seconds. At the same time the temperature is shown for 15 seconds. The control unit can not be otherwise used when this ice-warning is active.

Starting the engine.

When the engine is started any remaining on-time is erased and the "On" symbol in the display is extinguished. The control unit carries out an information sequence that displays: Battery voltage before start, charging voltage after start and outside temperature (approximately 2 seconds for each function). At the end the control unit returns to the function selected before the information sequence.

Switching off the engine.

When the engine is switched off, the control unit carries out an information sequence showing drive away time I and drive away time II before returning to the function selected before the information sequence.

Futura - Display illumination.

The illumination of the control unit display will always be turned on when one of the buttons is pressed. The display will be illuminated for approximately 1 minute after the last button is pressed. Depending on the usefulness of the information displayed by the control unit, the illumination can be turned ON or OFF during driving.

Display light turned on during driving	Display light turned off during driving
Press  for up to 3 seconds. The display light will blink to confirm that the light will come on every time the engine is started	Press  for up to 3 seconds. The display light will blink to confirm that the light will be turned off during driving.



Safety / Technical specifications.**PlugIn/ MiniPlug - Leads and cables.**

Only original DEFA connector kits with original DEFA MiniPlug may be used. The lead may only be connected to an earthed power socket. The lead must be handled with care to avoid damage by doors, engine hood or by sharp objects pressing against the lead damaging the insulation. The protective cover must always be fitted when the plug is not in use. A new cover for the connector lead can be ordered from DEFA dealers under part number 1210283.

**Termina - Interior heater.**

When used in a vehicle, the interior heater must always be connected to an earthed power socket mounted in the passenger compartment and connected to a power outlet outside. Return the interior heater to your local DEFA dealer if the heater or cable is damaged. The interior heater satisfies the standards: 60335-1, 60335-2/NEK 554. The outputs are measured at -25°C.

	Step	Engine Heater (W)	Fuse (A)
Termina 1400	0	600	3
	I: 800W	600	6
	II: 1400W	600	10
Termina 2000	0	600	3
	I: 1100W	600	8
	II: 2000W	600	13

**MultiCharger - Battery charger.**

Avoid charging batteries in an enclosed area, as there is a potential danger of explosion. The temperature of the battery may not exceed +40°C during charging. The control voltage for the relay is 12V nominal, minimum 9V. Consumption of current is max. 70mA. The battery charger gives a maximum of 3A at 12V and 5A at 2V. The charging voltage is 14.4V at 25°C. The battery charger is protected against short circuits and wrong polarity. The battery charger satisfies the standards: EN 60335-1; EN 60335-2-29 and NEK 599. Also the EMC requirements: EN 50081-1 and EN50082-1.

**Futura - Timer.**

Operating voltage: 8 - 18V Relay output: max. 120 mA
Current consumptions: Less than 3mA when the relay and the display light are not activated.

SafeStart - Engine heater.

The effect of DEFA engine heaters varies from 400 – 2000 W depending on the size of the engine they are designed to heat. Engine heaters consist of a heating element that, with the exception of oil heaters and contact heaters, has a temperature sensitive cut-out. This is the heater's safety valve. DEFA engine heaters satisfy: EMKO-TUB(61)NO 293/91 and EMKO-TSB(61)NO293A94.

Fuse.

Fuses when an interior heater is used in combination with a standard 600 W engine heater at 230V and -30°C. See table at page 3.



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Trouble shooting.

General.

Two important points should be checked before going any further:

1. Is the power socket where you connected the DEFA WarmUp okay? If the fuse is blown, check if the circuit can take the total current drain it is subjected to.
2. Check the settings in the control unit.

The tables below indicate reason and corrective measure for faults that may occur on a DEFA WarmUp.



Termina - Interior heater.

ERROR	REASON	CORRECTION
The interior is cold, the heater is not working	*The automatic overheating protection has disconnected the heater.	Pull out the plug for the interior heater, wait for 5 minutes and connect it again.
	The Futura control unit is not correctly set.	See the instruction for use on the control unit
	*The fuse in the interior is blown	Send or deliver the interior heater to your dealer/supplier



The fan speed is the same in steps I and II, but the effect is different.

*To determine whether it is the automatic overheating fuse or the regular fuse that is at fault, look to see if the fan moves (only just) at the time when you put the plug in the socket. If the fan moves, it is the automatic overheating fuse that is faulty. Pull out the plug and wait 30 minutes to plug it in again.



MultiCharger - Battery charger.

ERROR	REASON	CORRECTION
The charging indicator lamp on top of the charger is not lit	The charger has switched to maintenance charging.	This is normal if the charger has been working for a while and the battery is fully charged.
The battery charger does not work	The fuse between the charger and the battery has blown.	Check for possible error and replace the fuse if necessary.
LED is constant enlightened	The charger is only charging in Boost mode	Short circuit in a battery cell. Check the battery cells acid gravity



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Futura – Timer

ERROR	REASON	CORRECTION
The control unit is dark, no indications in the display.	The fuse between the battery and the charger has blown.	Check for possible error and change the fuse
	The white plug on the Futura cable is not properly inserted.	Control the cable/plug
	The timer is blocked	Disconnect the fuse for at least 2 minutes
The display is not illuminated when the vehicle is started	Futura display light is Off	See Futura Display illumination at page 26
WarmUp is not activated at the required "pick up" /drive away time	The Futura timer is in OFF mode. Futura is in A mode (Auto) and the outdoor temperature is higher than +10°C	Set correct pick-up time. See page 26
	The blue cable is connected constant to +	***Check the blue cable connection. It should have +12V only when the engine is running and 0V when the ignition is OFF
	The pick-up times are wrong.	Set correct time and pick-up times. See page 26.
The display light are blinking during driving.	0-condition warning indicating slippery conditions when the temperature is between +4°C and -4°C.	This is normal. The blinking lasts for 6 sec.
WarmUp remains ON when the vehicle is parked, even if it is a long time to the next pick-up time	The timer will normally switch OFF remaining heating time after the engine has been started. This is registered through an ignition signal via the blue cable	*** Blue cable
The timers pick-up times are not functioning. Only in ON mode	The blue cable is not connected correctly	
The timer does not show the outdoor temp. or the voltage	The temp.sensor is either not installed or it is defect	Ensure that the temp .sensor is installed. If it is - Install a new sensor

Applications:



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