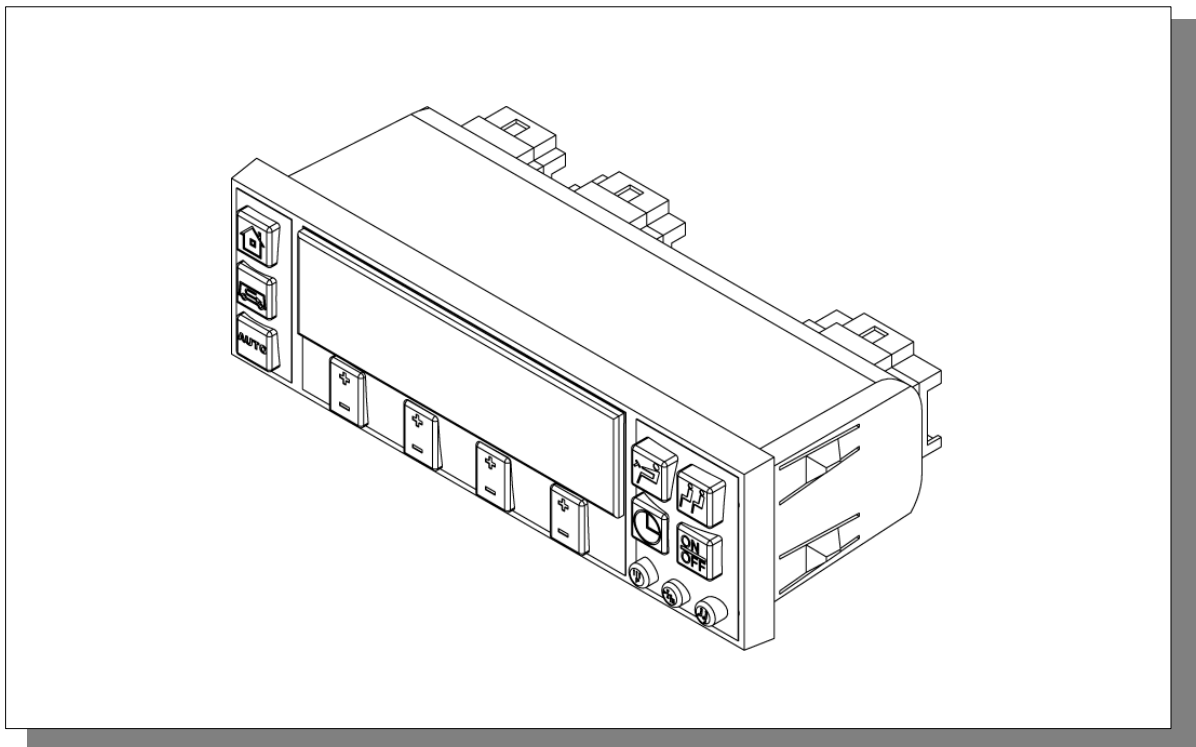




# User instructions

## Viper 2000



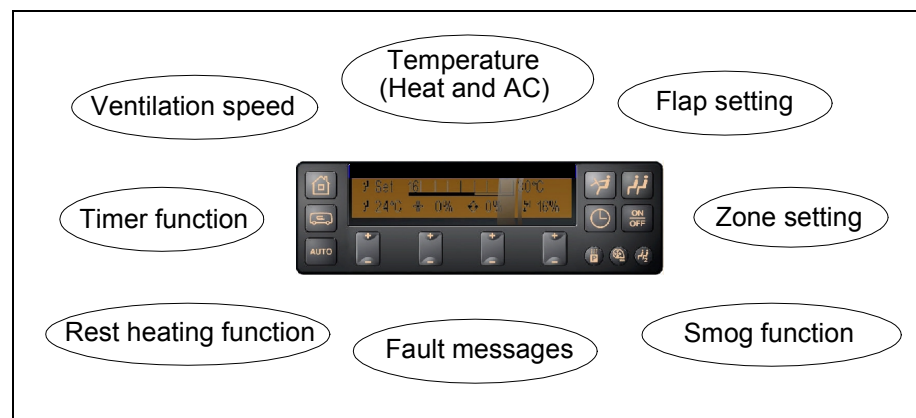
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## Introduction

### Automatic climate control

The Viper 2000 control unit is used for the automatic control of climate systems in larger vehicles. It can control heating and air conditioning, fans, air flaps and parking heating. It can also control the climate in several zones within a bus, for example the driver's zone, as well as front and rear passenger zones.



### The Viper 2000 is simple to operate

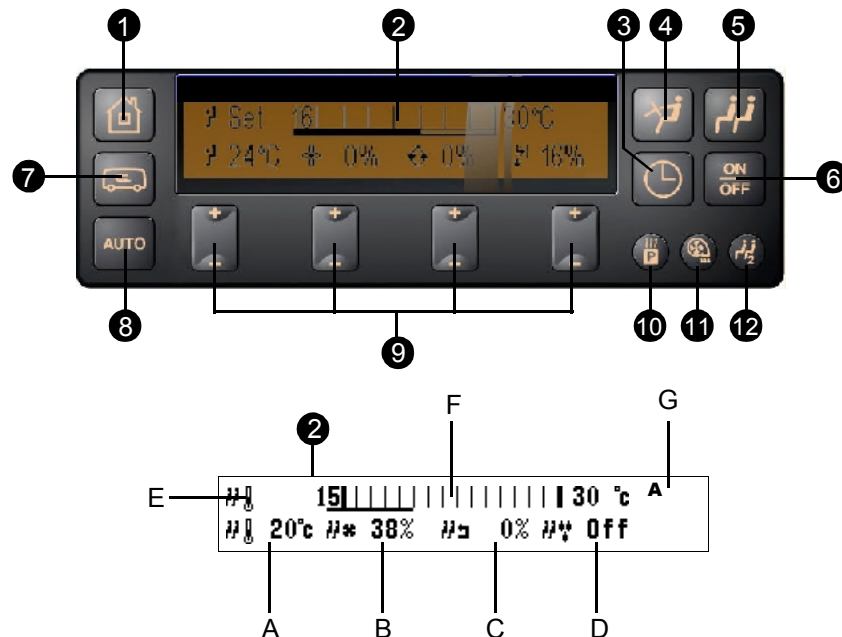
If you press the "AUTO" button the climate in the bus is controlled automatically by the Viper 2000. As a driver that's all you really need to do. The temperature is controlled to match the temperature at which it was most recently set, but this can easily be changed if required. At the same time more advanced users can control the climate in the bus manually, by means of such functions as increasing or reducing the ventilation speed, changing the slide valve positions, dehumidification, etc.

### Other refinements

Besides its basic functions the Viper 2000 has a number of additional refinements. One example is the parking heating function, which lets you program the departure time for every single day of the week. The bus can then be warmed up in good time, depending on the outside temperature. There is also a so-called SMOG function, which means that all fresh air is cut off at the press of a button.

One of the major benefits of the Viper 2000 is also its capacity to be able to control various zones of the bus individually, which can be used if the driver perhaps wants the driver's place to be slightly warmer than the passenger area. The Viper 2000 has a large display and buttons in different shapes to make it easier to find the right button.

## Front panel - overview



### Explanation of symbols

#### ① Home page



This function means that the display shows customised settings, see the section about configuring the home page.


#### ② Display

The display contains various items of information, depending on the setting selected. The default display shows the day, time, outside temperature, and four different functions that can be set. When setting values the following display appears:

- A) function 1, set by the appropriate function button (9)
- B) function 2, set by the appropriate function button (9)
- C) function 3, set by the appropriate function button (9)
- D) function 4, set by the appropriate function button (9)
- E) shows which zone/function is selected for setup
- F) scale for the current setup
- G) indicates the current climate system mode

**A** = fully automatic control indicator

 = active parking heating, flashing  when engine is off means that parking heating is programmed

 = active rest heating

 = SMOG function activated

**③ Clock/Auxiliary heater**

Day and time setup, and manual activation of auxiliary heater.

**④ Driver's place**

Setup of temperature, ventilation, etc. for the driver's place.

**⑤ Passenger area 1**

Setup of temperature, ventilation, etc. for the passenger zone/front passenger zone (if the bus is equipped for several passenger zones).

**⑥ ON/OFF**

Enables activation/deactivation of various climate zones in the bus.

**⑦ SMOG**

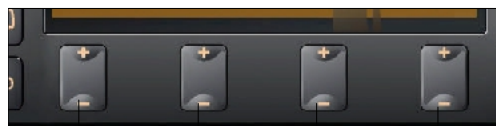
Press the button to close all fresh air intakes.

**⑧ AUTO**

Restores all settings to automatic mode.

**⑨ Function buttons**

The increase/decrease function buttons have different functions depending on which setting is selected.



Function button 1    Function button 2    Function button 3    Function button 4

**⑩ Auxiliary heater**

Function that enables the user to program the auxiliary heater.

**⑪ Blower**

For manual setting of the blowers in the bus.

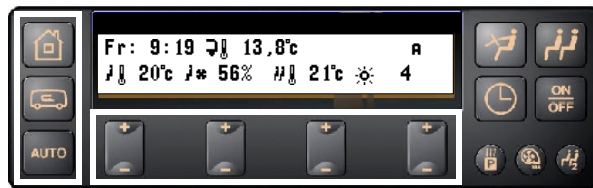
**⑫ Passenger area 2**

Setting of temperature that is different from that of the passenger zone, ventilation, etc. for the rear passenger zone (if the bus is equipped with several passenger zones, e.g. articulated buses or double-deckers).

## Driver's instructions

### Introduction

In this section you will find instructions covering the needs of most drivers, i.e. setup via the home page. If you as a user will be programming the heating up facility for specified departure times or manually controlling the climate system, that information may be found in the next section. This section will only deal with a fraction of the control unit's features, and here we will only be using the following buttons:




### How to start automatic climate control

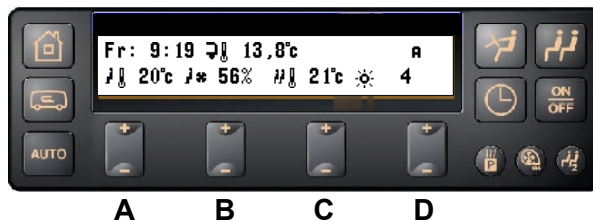
To obtain automatic control of the climate, proceed as following:

1. Switch on the main circuit breaker  
This starts communication of the control system
2. Start the engine  
This starts the automatic climate control

### Setting the climate via the default menu (home page)

NOTE! The description below is based on an example of what a home page can look like.

1. Press button   
All settings are now set to automatic control and the home page is shown.
2. Set the required climate using the following buttons:

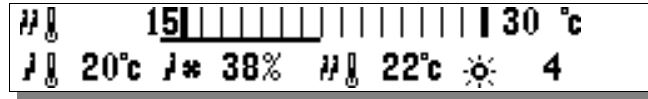



- A. Temperature setup, driver's place
- B. Defroster fan speed setup, driver's place
- C. Temperature setup, passenger area
- D. Lighting intensity setup, LCD display

For information about setting these parameters, see instructions below.

### Temperature setup, passenger area

1. Press function button 3  and the following display appears:




2. You can now use the function button to increase or reduce the required temperature within the range 15-30°C.
3. Press  to return to the home page.  
Note that Viper 2000 will return to the latest display after 10 seconds, even if you don't press any button.

### Temperature setup, driver's area

1. Press function button 1  and the following display appears:

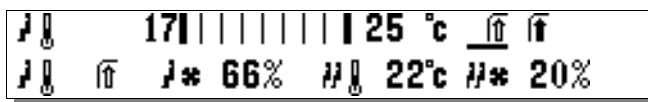


2. You can now use the function button to increase or reduce the required temperature for the driver's place within the range 17 to 25°C. The two highest temperatures are intended for de-icing, see description below. In the lower left-hand corner of the display you can see the required temperature for the driver's place.
3. Press  to return to the home page

### De-icing the windscreen

If the windscreen is covered in ice or misted over, you need extra warm air for the defroster. A special de-icing function is available by increasing the temperature in the driver's place as follows:

- By increasing the temperature to the second highest in the scale you obtain half de-icing (high temp, fan speed 2):



- By increasing the temperature to the highest in the scale you obtain full de-icing (highest temp, fan speed 3):



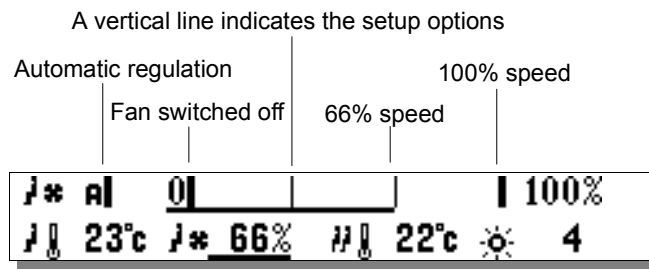
- Press  to return to the home page



## Increase or reduce defroster ventilation speed


You can increase or reduce the defroster ventilation speed manually. This is done as follows:

1. Press function button 2  and the following display appears:



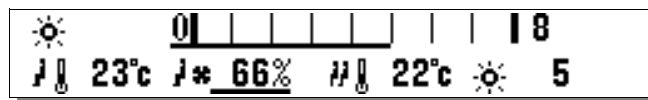
2. You can now use the function button to increase or reduce the required ventilation speed from 0-100%. To achieve automatic regulation, move the cursor to "A".

NOTE: If the AC is in operation or has been in operation recently, it is impossible to shut the fans off.

3. Press  to return to the home page

## Display lighting intensity setup

1. Press function button 4  and the following display appears:




2. You can now use the function button to increase or reduce the lighting in the of range 0 to 8.

3. Press  to return to the home page

### **SMOG button**

When driving in areas with poor air quality, e.g. in traffic jams, the driver can press a button to prevent any fresh air from entering the compartment. Do as follows to obtain the SMOG function:

1. Press 

The air intake flaps close, preventing poor quality air from entering the compartment. The symbol  is now indicating on the display.

The SMOG function will remain active until you give other command. To return to automatic air flap regulation, do as follows:

1. Press . You can also press  to deactivate the SMOG function, but then you should know that all settings are reset to automatic regulation.

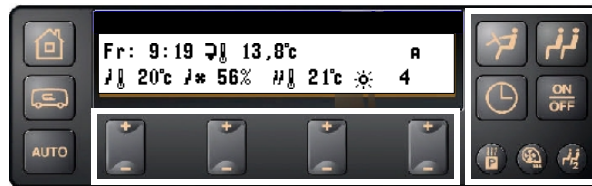
### **Instructions to stop automatic climate control**

To shut off the automatic climate control, do as follows:

1. Shut off the engine and turn the key to OFF position.

## Instructions for advanced users

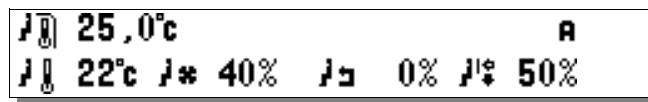
The previous section contained descriptions of the functions that most drivers will need to know about. If, however, you want to be able to control all components manually, switch off regulation or program parking heating, this section contains the instructions that you will need for these functions. In this chapter we will be using the following buttons:



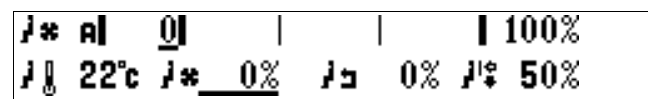
### Manual control of components

Example: You want to switch from automatically controlled ventilation speed to manually controlled speed for the driver's place:

1. Press and the following display appears:

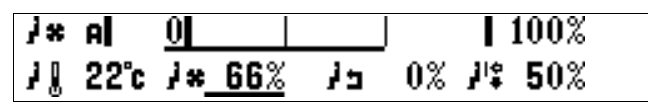


2. Change to manually deactivated defroster fan by pressing function button 2 until the display appears:



NOTE: If the AC is in operation or has been in operation recently, it is impossible to shut the fans off.


3. Change to manually activated by pressing function button 2 several times until the display appears:

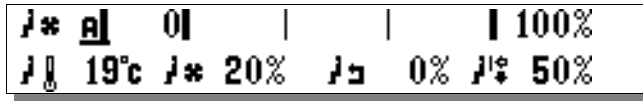


Note that manually controlled components are displayed with a line under the component value (see above diagram).

4. Press to return to the home page


### Switch to automatic setting

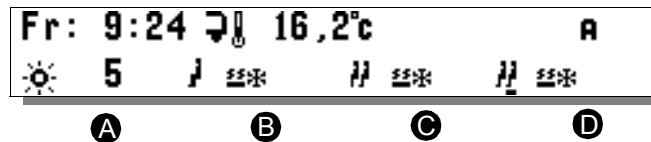
If you have defined manual settings and want to return to automatic setting, move down using the minus side of the function key to “A” or press the  button. Note that the temperature that you have set is not changed. The following display appears, note the line below “A”:



### Start/stop

NOTE! This function does not need to be used to start or stop the unit, but it is very useful when you want to switch off one or more climate zones when having a generator failure etc.

- To activate/deactivate regulation of various functions, press  and the following display appears:

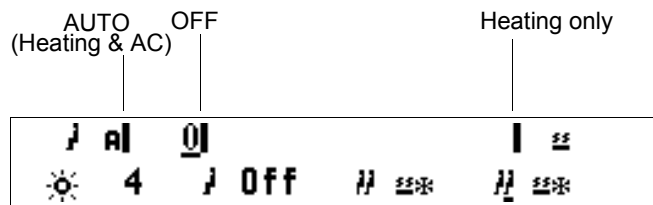



- Select according to the following:

NOTE! In this example there are two passenger zones; if there is only one zone, passenger zone 2 is switched off.


- Lighting, LCD display intensity 0-8
- Driver’s place climate, AUTO, OFF or heating
- Passenger zone 1 climate, AUTO, OFF or heating
- Passenger zone 2 climate (option), AUTO, OFF or heating

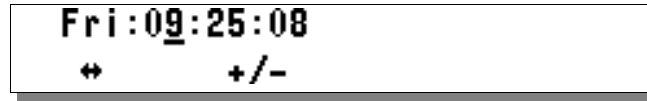
Activate/deactivate the relevant function by pressing the function keys according to the following picture:




- Press  to return to the home page.

## Setting the day and time

1. To set the correct day of the week and time, press  for 5 seconds, and the following display appears:




**A**                      **B**                      **C**                      **D**

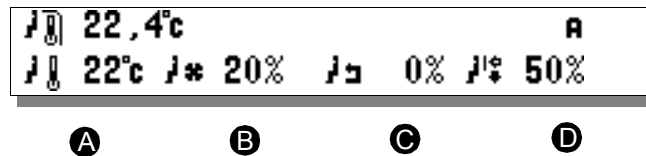
2. Select according to the following:
  - A. Used to “jump“ between day and time setting.
  - B. Used to change the day of the week and the time (24h)
  - C. Not used
  - D. Not used.
3. Press  to return to the home page.

## Climate setup, driver's area

The following parameters can be set:

- temperature (man)
- ventilation speed (man/auto)
- air intake selection (man/auto)
- air channel selection (man)

1. To set the required climate for the driver's place, press  and the following display appears:




2. Select according to the following:

A. Temperature setup in the range of 17 to 25°C is set manually. Note that the two highest temperatures are intended for de-icing, see description below.

B. Ventilation speed setup, Auto or 0-100%.

C. Air intake selection, Auto or manual selection of fresh air/recirculated air. 100% means all recirculated air, 0% means all fresh air (basic setting).

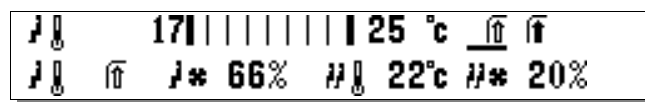
D. Air channel selection: floor/defroster. 100% means that all air is channelled to the driver, 0% means that all air is channelled to the windscreen (basic setting).

3. Press  to return to the home page.

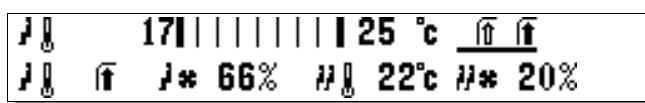
## De-icing the windscreen


If the windscreen is covered in ice or misted over, you need extra warm air for the defroster. A special de-icing function is available by increasing the temperature in the driver's place as follows:

- By increasing the temperature to the next highest in the scale you obtain half de-icing (high temp, fan speed 2):



- By increasing the temperature to the highest in the scale you obtain full de-icing (highest temp, fan speed 3):




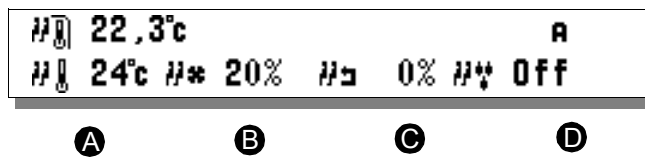
- Press  to return to the home page.


## Climate setup, passenger area

The following parameters can be set:

- temperature (man)
- ventilation speed (man/auto)
- air intake selection (man/auto)
- dehumidification: reheat (man)

1. To set the required climate for the passenger area, press  and the following display appears:

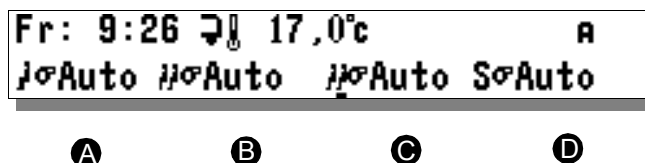



2. Select according to the following:
  - A. Temperature setup is set manually within the range 15-30°C, for more information see page 5.
  - B. Ventilation speed setup, Auto or 0-100%.
  - C. Air intake selection, Auto or manual selection of fresh air/ recirculated air. 100% means all recirculated air, 0% means all fresh air (basic setting).
  - D. Dehumidification function, so-called reheat. 0-60 minutes.
3. Press  to return to the home page.

## Door blower setup

By each door there is usually a blower that is activated when there is a need for extra heating. This can be set at Auto or manually as follows:


1. Press  and the following display appears:

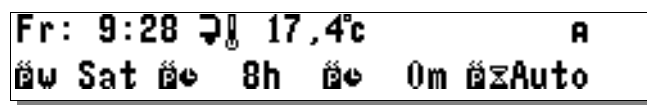



2. Select according to the following:
  - A. Blower setup, driver's place
  - B. Door blower setup, passenger area 1.
  - C. Door blower setup, passenger area 2.
  - D. Door blower setup, travel guide
3. Press  to return to the home page.

## Parking heating, general settings

If you want the bus to be warm for a set departure time, you can use the parking heating function. You can set one departure time per day according to a weekly program, and the control system will then start the heating function at the appropriate time with regard to the outside temperature. If for any reason you want to override the weekly program you can select another departure time by following the instruction below.

1. To set the parking function, press  and the following display appears:




2. Select according to the following:
  - A. General parking function settings:
    - AUTO, the auxiliary heater starts according to the weekly program, see below
    - OFF, parking function switched off
    - "1", override the weekly program which automatically activates the auxiliary heater for the next day according to the time set below
  - B. Departure time setup, override of weekly program (hour)
  - C. Departure time setup, override of weekly program (minutes)
  - D. Warm-up time, next day (AUTO, OFF, 30-60-90-120 min.)
    - AUTO (calculated warm-up time with regard to outside temp)
    - OFF (parking heating function switched off)
    - Manually set warm-up time, max 120 min.
3. Press  to return to the home page.

NOTE! When the overriding (next day) programming is through, the week program will be active again.



## Parking heating, programming of weekly program


As mentioned above, you can program various departure times for every day of the week, or have the same departure time every day.

1. You set the weekly program by pressing  for approx. 5 seconds, and the following display appears:




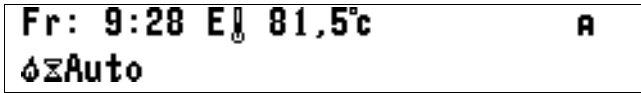
Change Default Endtime  
D ↗Sat H 08 M 00 ⏸ Auto

**A**                      **B**                      **C**                      **D**


2. Select according to the following:
  - A. Select day for programming
  - B. Set departure time, hours
  - C. Set departure time, minutes
  - D. Warm-up time (AUTO, off, 30-60-90-120 min.)
    - AUTO (calculated warm-up time with regard to outside temp)
    - OFF (parking heating function switched off)
    - Manually set warm-up time, max 120 min.
3. Press  to return to the home page.

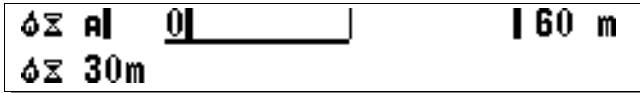
## Auxiliary heater, manual activation

1. If you need to start the auxiliary heater while driving or during a brief stop, the easiest way is to press , and the following display appears:




Fr: 9:28 E 81,5°C                      A  
⏸Auto

2. Now select how long the heater should be switched on by pressing function key 1 , and the following display appears if you select 30 minutes' activation:



⏸ A | 0 |                      160 m  
⏸ 30m

NOTE! If the function is started while you are driving, the timer is reset as soon as the motor is switched off.

3. Press  to return to the home page.

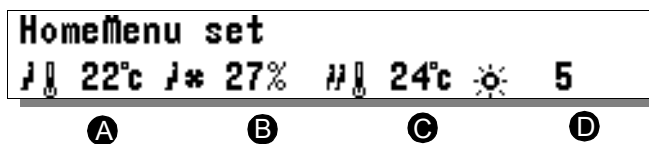
## Configuration of home page


### General about the home page

You can use the “home page“ function to create a display with your favourite settings. This makes it easier for the driver, who does not then need to browse through a number of displays to select the most common settings.

**CAUTION:** It is very important that the home page is the same for all buses in a company. Otherwise there is a significant risk that drivers will find it difficult to set the required climate. If you are unsure, do not change the home page!

Before changing the settings, press  for approx. 5 seconds, until “home menu set“ appears on the display. You can then define your favourite settings by pressing -/+ until you obtain the desired function.



Then press  to return to home page.























**If you are unable to change the home page, this depends on that the home page is locked by the workshop personnel. The home page can be locked up with help of separate workshop instruction.**


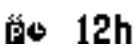

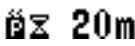

The various fields in the display are divided up as follows:

- A. Field 0
- B. Field 1
- C. Field 2
- D. Field 3

In each field you can choose from 24 different settings (items):

Setting	Symbol	Function
0	 23	Temperature, driver's place
1	 20%	Ventilation speed, driver's place

Setting	Symbol	Function
2	 0%	Fresh air/recirculated air flap, driver's place
3	 50%	Air channel flap, windscreen/floor
4	 22	Temperature, passenger circuit 2
5	 100%	Ventilation speed, passenger circuit 2
6	 0%	Fresh air/recirculated air flap, passenger circuit 2
7	 0m	Dehumidification, passenger circuit 2
8	 22°C	Temperature, passenger circuit
9	 21%	Ventilation speed, passenger circuit
10	 0%	Fresh air/recirculated air flap, passenger circuit
11	 0m	Dehumidification, passenger circuit
12	 5	Brightness, display
13	 22%	Regulation, driver's place, ON/OFF
14	 22%	Regulation, passenger area, ON/OFF
15	 22%	Regulation, passenger area 2 ON/OFF
16	 Auto	Ventilation speed, Whisper, driver's place
17	 Auto	Ventilation speed, Whisper, passenger area
18	 Auto	Ventilation speed, Whisper, passenger area 2
19	 Auto	Ventilation speed, Whisper, travel guide

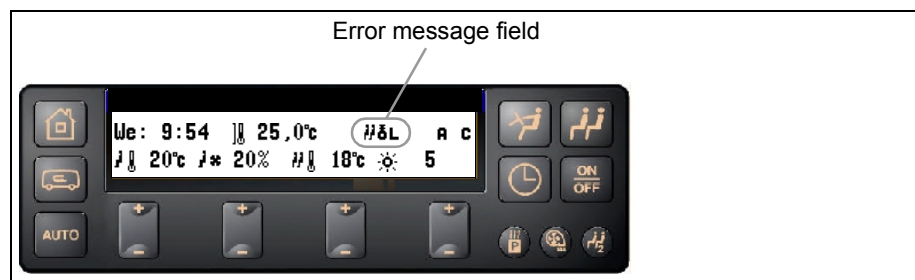
Setting	Symbol	Function
20	 Thu	Programming of parking heating
21	 12h	Parking heating, departure time
22	 0m	Parking heating, departure time, minutes
23	 20m	Warm-up time, parking heating
24	 0m	Manual activation of auxiliary heater

## Error messages

### General about fault procedures, Viper 2000

The control system is designed to as long as possible maintain controlling of the climate system even with faults like communication interruption, sensor faults, etc. However the error is recorded and will be displayed as an alarm on the drivers display to enable check and trouble shooting.

When there is an error recorded by the Viper 2000, an error message comes up in the right part of the display, see figure.



## List of error messages

Symbol	Error	Condition	Consequence	Measure
<b>##E</b>	Communication to node interrupted.	Comes up directly when CANBUS communication is lost.	The control system is trying to restore communication.	Troubleshoot communication system at repeated faults.
<b>##X</b>	Communication to node lost.	Long CANBUS error, i.e. more than 15 sec.	The node will continue to control internally against 22°C.	Troubleshoot communication system.
<b>##V</b>	Low voltage.	Battery voltage <21,2V in more than 30 sec.	Heat system is still controlled, maximum fan speed 1. AC is blocked.	Look for low voltage faults acc. to bus manual.
<b>##I</b>	Ice warning.	Ice thermostat, evaporator, switched off for more than 30 seconds.	Compressor stopped, condenser remains on. 30 sec start interlock after ice warning.	Wait until AC-system is automatically started.
<b>##O</b>	High temperature compressor.	Too high temperature compressor recorded.	Compressor is stopped, condenser proceeds cooling. Compressor is started 90 sekunder after normal temp is reached.	Troubleshoot AC system according to separate document.
<b>##L</b>	Low pressure, AC system.	Too low pressure recorded AC circuit.	No consequence.	Refill cooling agent.
<b>##H</b>	High pressure, AC system.	Too high pressure recorded AC circuit.	Compressor is stopped, condenser proceeds cooling. 3 min start interlock after fault.	Troubleshoot AC system according to separate document.
<b>##X</b>	Compressor blocked.	High pressure fault 6 times.	AC system blocked. Can be reset by shutting the bus off.	Troubleshoot AC system according to separate document.
<b>NC</b>	No connection, sensor cable.	Connection to sensor broken.	Depends on which of the sensors affected.	Troubleshoot sensor and cabling.
<b>SH</b>	Short circuit, sensor cable.	Short circuit recorded.	Depends on which of the sensors affected.	Troubleshoot sensor and cabling.