

BUS BODY ELECTRONICS

SC1000 IVECO

Operating Instructions
– Bus Driver

NOT PUBLISHED

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1. Introduction

1.1 Intended Use

The SC1000 is a device designed to control HVAC components (heating, ventilation, air-conditioning) for buses, e.g. roof-top air-conditioning systems, heaters etc. It comprises always of a control panel (control device with human-to-machine interface) which is integrated into the dashboard, and of one or more substations, which are controlled by means of the control panel. The communication between control panel and the respective substation is done via CAN bus.



Figure 1 - SC1000 Control Panel Basic Version



Figure 2 - SC1000 Control Panel HVAC Version

A substation is a control device with power outputs for the control of all the components integrated in the AC unit.

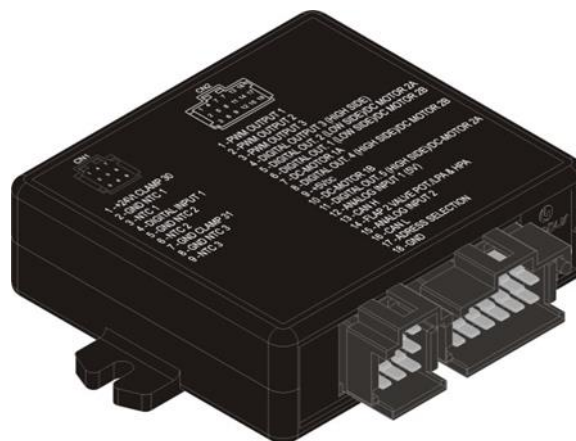


Figure 3 - SC1000 Substation

1.2 Symbols used



Note

1.3 Description of the control panel



Figure 4 - SC1000 Control Panel Basic Version

Driver's seat

1. Fresh air / air recirculation button
2. Air direction control
3. Blower speed control
4. Temperature control

Passenger compartment

7. Heater button
8. Timer button heater
10. AUTO button
11. Temperature button
12. UP/DOWN button
13. Display

1.4 Description of the control panel HVAC version

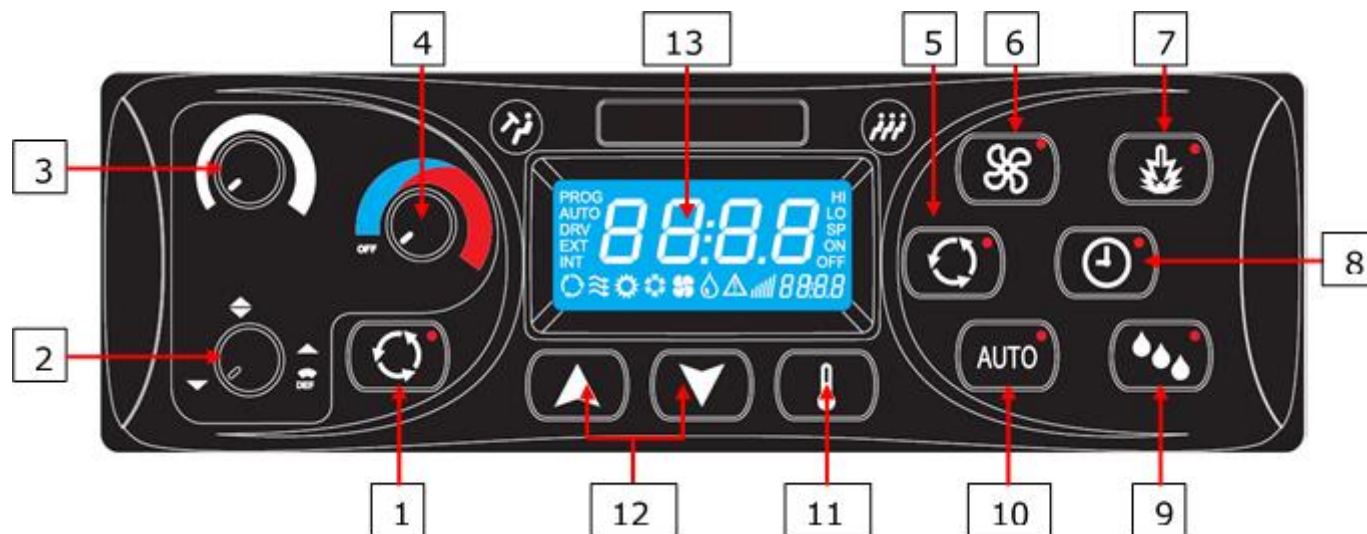


Figure 5 - SC1000 Control Panel HVAC Version

Driver's seat

1. Fresh air / air recirculation button
2. Air direction control
3. Blower speed control
4. Temperature control

Passenger Compartment

5. Fresh air / air recirculation button (optional)
6. Blower speed button (optional)
7. Heater button
8. Timer button heater
9. Reheat (dehumidify) button (optional)
10. AUTO mode button
11. Temperature button
12. UP/DOWN button
13. Display

1.5 Display description

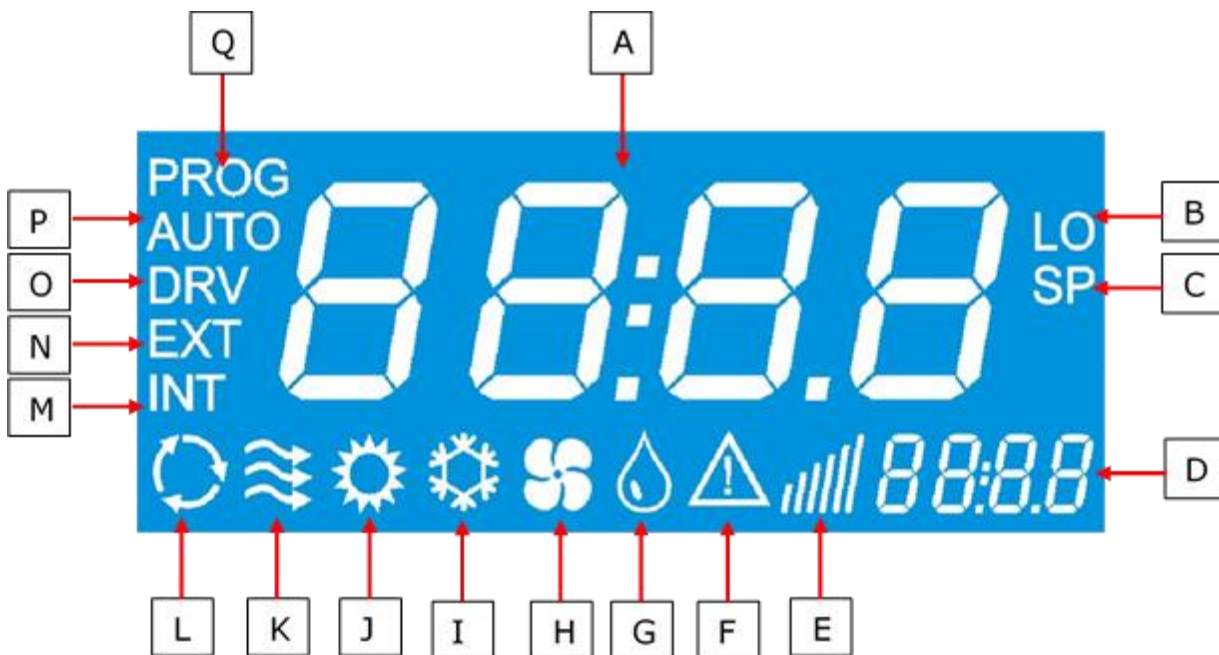


Figure 6 - SC1000 Display Screen

- | | |
|---|---|
| A. Indicated value | J. Heater is on |
| B. Appears if the lowest adjustable room temperature is reached | K. Fresh air flaps open |
| C. Is indicated with the setpoint temperature (passenger compartment) | L. Air recirculation is on (HVAC version only) |
| D. Time | M. Is indicated with the current room temperature |
| E. Blower speed level | N. Is indicated with the current outside temperature |
| F. Error icon | O. Is displayed during blower speed adjustment at the driver's seat |
| G. Reheat (dehumidification) active (HVAC version only) | P. AUTO mode active |
| H. Blower is on (HVAC Version only) | Q. Is displayed during start time adjustment of the preheater |
| I. Cooling is activated | |

2. Usage

2.1 Turn ON

- Switch on the ignition.
- The control panel starts automatically.
- The current software version (1.0) and the current release appear on the display (Fig.7).
- After four seconds the default screen is displayed. (Fig.8).



Figure 7 - SC1000 Release

2.2 Turn OFF

- Switch off the ignition.
- The system powers down.



Figure 8 - SC1000 Standard Screen

2.3 Driver's workplace functions

2.3.1 Adjust Temperature



Note

Neither the current temperature, nor the setpoint temperature for the driver's workplace, are shown in the display. The temperature can be adjusted in nine steps. At level 0 (the knob is in the left-most position) there is no regulation of temperature, at level nine (the knob is in the right-most position) the heater operates at maximum power.



Note

If a climate evaporator is installed in the front box, the cooling is always on at the driver's seat whenever the compressor is on. In order to achieve a warmer temperature, the driver must heat it up to counteract the cooling.

2.3.1.1 Cooling (if the roof-top air-conditioning unit is in cooling mode only)



Rotate the knob (Fig.5, No.4) counterclockwise into the blue area

2.3.1.2 Heating



Rotate the knob clockwise into the red area.

2.3.2 Adjust blower speed



Note

The blower can be set from 20 to 100 in steps of 10. 20 is the smallest blower speed, on level 100 the blower runs at full speed. If the knob is turned counterclockwise to its most left position, on the screen displays "OFF" and the blower is switched off.



Figure 9 - SC1000 Current Blower Speed Level

2.3.2.1 Increase blower speed



Turn the knob (Fig.5, No.3) clockwise to 5 o'clock position.

- Blower speed increases incrementally by 10.
- The current blower speed level is shown in the display (Fig. 9).

2.3.2.2 Reduce blower speed



Turn the knob counterclockwise to 7 o'clock position to decrease blower speed level.

- Blower speed decreases incrementally by 10
- The current blower speed level is shown in the display (Fig. 9).

2.3.3 Adjust air flow direction /defrost function

2.3.3.1 Adjust air flow direction



Rotate knob (Fig.5, No.2) counterclockwise into 7 o'clock position

- air flow onto the floor



Rotate knob clockwise into 12 o'clock position

- air flow against the wind screen and the floor



Rotate knob clockwise into 2 o'clock position

→ air flow against the wind screen



Rotate knob clockwise into 4 o'clock position

→ air flow against the wind screen.

2.3.3.2 Defrost function



Rotate knob clockwise into 5 o'clock position

→ air flow is directed against the wind screen. The water valve opens to generate heated air and the blower runs with maximum speed.

2.3.4 Toggle between fresh air and air recirculation



Note

The air recirculation mode is not limited in time. The air recirculation mode for the driver's seat starts automatically whenever the air recirculation mode for the passenger compartment is turned on. If the air recirculation mode for the passenger compartment is active, it cannot be deactivated for the driver's seat.



Press button (Fig.5, No.1), to toggle between fresh air and air recirculation modes.

- Fresh air: the LED next to the fresh air / air recirculation button is not lit.
- Air recirculation: the LED next to the fresh air / air recirculation button lights up.

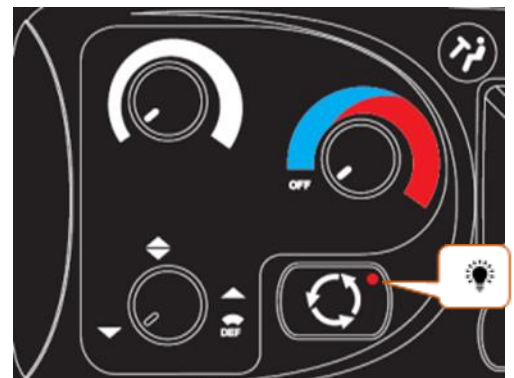


Figure 10 - SC1000 Air Recirculation Mode Driver's Seat Active

2.4 Passenger compartment functions



Note

Air-conditioning system and heater are activated only in the AUTO mode!

To use all modes in full, activate the AUTO mode after turning on the control panel and make sure that the doors are closed.

To save energy, you can switch to manual mode (simply deactivate the AUTO mode), here the temperature can be manually changed by adjusting the blower speed.

2.4.1 AUTO mode



Note

The AUTO mode can be activated only when the engine is running.

2.4.1.1 Activate



Press button (Fig.5, No.10) shortly.

- Mode is activated.
- the LED next to the button lights up, "AUTO" appears on the display.

2.4.1.2 Terminate



Press button shortly.

- Mode deactivated.
- the LED next to the button goes out, "AUTO" disappears from the display.

2.4.2 Set temperature

2.4.2.1 Adjust temperature



Press button.

- Temperature +1°C.

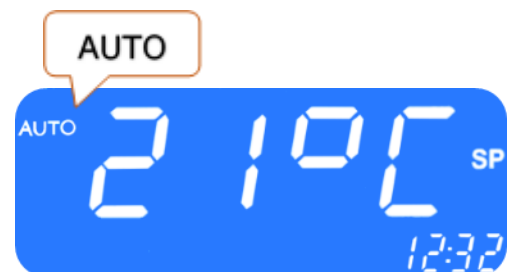


Figure 11 - SC1000 AUTO Mode Active

 Press button.


→ Temperature -1°C.




Note

The temperature can be varied between the values 15°C and 28°C.

2.4.2.2 Display the current room or outside temperature

 Press button.

→ “INT” and the current room temperature are shown on the display (Fig.12).


 Press button again.

→ “EXT” and the current outside temperature are shown on the display.



Figure 12 - SC1000 Current Room Temperature

2.4.2.3 Terminate

→ Terminate the display by pressing the  button or by timeout automatically after 3 seconds.

→ Standard display screen appears.

2.4.3 Adjust blower speed level (HVAC version only)



Note

The blower can be set from 10 to 100 in steps of 10. 10 is the smallest blower speed, on level 100 the blower runs at full speed. The adjustment can only be made if the engine is running.

2.4.3.1 Activate

 press button (Fig. 5, No.6).

→ Manual blower speed level adjustment active.

→ The LED next to the button lights up and the current blower speed level can be read on the display (Fig.13).

→ Blower speed can be changed.

2.4.3.2 Change blower speed level


 Press button.




Figure 13 - SC1000 Blower Speed Level

- Blower speed level is increased.
- The current blower speed level can be read on the display

▼ Press button.

- Blower speed level is decreased
- The current blower speed level can be read on the display.

2.4.3.3 Exit

By pressing the  button or automatically after 3 seconds of inactivity.



Note

It is not possible to check the setting again. If after leaving the mode the blower button is pressed again, the set value is displayed, then deleted and the blower is controlled automatically again.

2.4.4 Toggle between fresh air / air recirculation (HVAC version only)



Note

The air recirculation mode is limited to 10 minutes. After this time the fresh air ducts are automatically regulated.

2.4.4.1 Manual operation of the fresh air flaps

⊙ Press button (Fig 5, No.5) when the automatic air recirculation is active.

- The LED next to the button lights up and the air recirculation icon (Fig.14) appears on the display.

⊙ Press the button when the manual operation of the fresh air flaps is active.

- The fresh air flaps are operated automatically again.
- The LED next to the button lights up and the air recirculation icon disappears from the display.

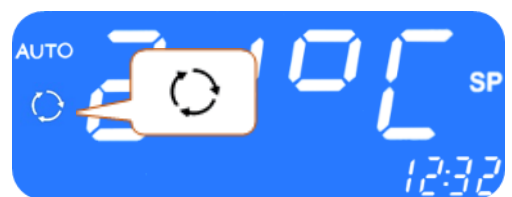


Figure 14 - SC1000 Air Recirculation Mode Active

2.5 Preheating



Note

Programming, operating the heater and setting up the timer of the heater is the responsibility of the driver.

He must ensure that at the start time the circumstances and the parking situation are suitable.

For security reasons it is only possible to program the timer for the same and the next working day. The Start time delay for Monday is already possible on Friday. To activate the preheating function the engine must be off.

The pre-heating function will only be executed if no low voltage (<22V) is present. Otherwise, the function is automatically terminated after 10 seconds.

2.5.1 Set date and time



Note

Day and time are set in the following order: hours – minutes – day of the week.

The position to be set is flashing.



Press button (Fig.5, No.8) for 3 second.

→ "Pre" appears on the display (Fig. 15).

Press button  or  (Fig.5, No.12) once.

→ "hour" appears on the screen (Fig. 17) and the hour digits flash.



Press button to increase the number of hours (0-23 h).



Press button to decrease the number of hours (0-23 h).



Press button to confirm value.

→ Minute digits flash.

Now proceed exactly as described for setting the number of hours to set the number of minutes.

→ Now the week days are displayed (Fig. 18).



Figure 15 - SC1000 Preheat





Figure 16 - SC1000 ti-A




Figure 16 - SC1000 Number of Hours



Figure 17 - SC1000 Week Day

Set the week day (Mo, Tu, We, Th, Sa, Su) using the   buttons.

 Press button to confirm the day.

→ The default screen appears.

2.5.2 Activate heating (without start time delay)

 Press button (Fig 5. No 7.).

→ The button's LED lights up and the heating icon appears on the screen (Fig.19).



Figure 18 - SC1000 Heating Icon

2.5.3 Programming the timer



Note

Prior to using the timer, the correct time must be set. The timer allows you to heat up the passenger compartment without having to start the engine. By using the timer, the starting and operating time can be selected individually. Up to 7 start times can be set in parallel (PRE1-7).



Press button 3 seconds.

→ "PrE" appears on the screen (Fig.20).



Figure 19 - SC1000 PrE



Note

You have seven memory locations (PrE 1-7) available for storing different start times. The system starts the pre-heating mode at the respective times.

2.5.3.1 Choose start time



Press button to display the memory locations.

→ "PrE1" appears on the display (Fig.21).



Press buttons to scroll through memory locations PrE1-7 and select one of them.






Figure 20 - SC1000 Memory location



Press button to confirm selection.


- "00:00" and "hour" appear on the screen (Fig. 22).
- If the start time was already programmed before, it appears instead of "00:00".
- The hour digits flash.


-  Press button to increase number of hours.
-  Press button to decrease number of hours.
-  Press button to confirm value.
 - Minute digits flash.

Now proceed exactly as described for setting the number of hours to set the number of minutes.

- Now the weekdays are displayed (Fig. 18).

Set the week day (Mo, Tu, We, Th, Sa, Su) using the 

 buttons.

 Press button to confirm the day.

"0'" appears on the screen (Fig.24).


2.5.3.2 Laufzeit einstellen




Note

The operation time can be set in steps of 5 between 5 and 60 minutes.


  Press buttons to set operating time.

 Press button to confirm operating time.

2.5.3.3 Activate pre-heating mode

 Press button to activate the pre-heating mode with the chosen start and operation time.

2.5.3.4 Terminate

 Press button to exit the menu.



Note

If more than one preheating time is programmed, pre-heating is done at all programmed starting times.



Figure 21 - SC1000 Hour Display



Figure 22 - SC1000 Display Week Day



Figure 23 - SC1000 Operation Time

2.6 Reheat (HVAC version only)



Note

The reheat mode can only be activated in the AUTO mode (when the engine is running) and at at least 8°C outside temperature. After 10 minutes the reheat mode is terminated automatically.

2.6.1 Activate



Press button (Fig. 5, No.9).

- The button's LED lights up and the heating icon appears on the screen (Fig.25).

2.6.2 Terminate



Press button.

- The button's LED turns off and the heating icon disappears on the screen (Fig.19).

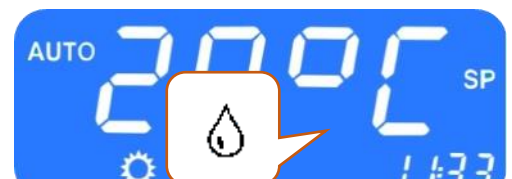


Figure 24 - SC1000 Entfeuchten aktiv

2.7 Errors



Note

If an error occurred, the error icon (Fig.6, F) appears on the display. You can see which kinds of error exist in the error code table in the section „Error description“.

2.7.1 Error display

Wenn ein Systemfehler vorhanden ist, blinkt das Warnsymbol für die Fehlermeldung in der Anzeige (Figure 26).

2.7.2 Error read out

2.7.2.1 Activate



Press button (Fig.5, No.1) at driver's workplace for 2 seconds until "E1:XY" appears on the display.



- The menu for system fault analysis opens.



Figure 25 - SC1000 Error Display

→ The count (Fig.27) shows the current frequency of occurrence of the error.

2.7.2.2 Error messages

  Press buttons to scroll through error messages.

2.7.2.3 Terminate

 Press button (Fig.5, No.1) at the drivers's seat until the standard screen appears.




Figure 26 - SC1000 Error read out



Note

If it is a currently existing error, this is indicated by a dot between the third and fourth digit of the error code on the display (Fig.26). If the error is corrected, the point disappears and the count increases.

2.7.2.4 Erase error

 Press the button 6 seconds:

- The error stops being displayed.
- If the error has not been corrected, it appears again with a dot between the third and fourth digit of the error code within the error messages (Fig.28).



Figure 27 - SC1000 Current Error



Note

Servo/ Motor 0 -> Floor water valve
 Servo/ Motor 1 -> Foot area flap
 Servo/ Motor 2 -> Wind screen flap
 Servo/ Motor 3 -> Fresh air flap

2.7.3 Error message overview

Error message displayed	Description	Cause/remedy
00	No error message	-
01	Hot water valve failure in the frontbox	1. Check plug connections - Electrical and visual check of all plug connections 2. Replace component 3. Replace control unit
02	The air distribution flap actuator (foot area) of the frontbox has failed	

Error message displayed	Description	Cause/remedy
10	Note: Further errors can arise in conjunction with this error message. They are to be ignored until error 10 is corrected. Communication to the substation is interrupted (substation 1).	1. Verify the substation is active <ul style="list-style-type: none"> - Check plug connections - Replace substations - Replace control unit
12	Hot water valve has failed (roof) (substation 1)	1. Check plug connections <ul style="list-style-type: none"> - Electrical and visual check of all plug connections 2. Replace components 3. Replace control unit
20	Note: further errors can arise in conjunction with this error message. They are to be ignored until error 20 is corrected. Communication to the substation is interrupted.	1. Verify the substation is active <ul style="list-style-type: none"> - Check plug connections - Replace substation - Replace control unit
21	Motor 0 of the convector water valve has failed (substation 2 front)	1. Check plug connections <ul style="list-style-type: none"> - Electrical and visual check of all plug connections 2. Replace components 3. Replace control unit
22	Motor 1 of the convector water valve has failed (substation 2, rear)	3. Replace control unit
A0	Outside temperature sensor - fault	1. Check by means of the block diagram in the chapter "Check system components", where the respective component is connected, and replace the affected control device. 2. Visual check of all plug connections <ul style="list-style-type: none"> - Replace sensor
A1	Passenger compartment sensor - fault (front)	
A2	Passenger compartment sensor - fault (rear)	
A3	Roof duct temperature sensor - fault	
A4	Ice sensor - fault	

Error message displayed	Description	Cause/remedy
A5	Convactor temperature sensor – fault (rear)	
A6	Convactor temperature sensor – fault (front)	
B0	High-/Low pressure → The clutch will be activated after three minutes if the pressure falls.	<ol style="list-style-type: none"> 1. Check whether B1 occurred, if this is the case see B1. 2. Short-term overload of the airconditioning system due to high engine speed at high ambient temperature. → The air-conditioning system turns off for three minutes.
B1	High-/Low pressure (The error message B0 occurred more than three times since the last start of the control unit)	<p>The air-conditioning system is switched off completely. Turn the ignition off and then on again to initiate a reboot of the system. It is not enough to turn off the engine and then on again, because a reboot of the control unit is required. Can an overload caused by high engine speed at high ambient temperature be excluded, the following must be checked:</p> <ul style="list-style-type: none"> - Check the wiring of the compressor pressure switches - Replace the pressure switch - Check the wiring of the solenoid valve - Replace the solenoid valve - Check the wiring of the condenser fan - Replace the condenser fan - Check refrigerant charge (too much / too little). If there is too little a leak test must be performed - Examine the roof-top airconditioning unit for soiling and check the function of the fans - Replace substation
B2	Ice formation at the evaporator	<p>Temporary shutdown of the airconditioning unit. If this message appears frequently, these steps must be followed:</p> <ul style="list-style-type: none"> - Examine air duct for soiling - Check evaporator fan wiring

Table 1 - SC1000 Error Messages

