

BUS BODY ELECTRONICS

SC1000 TEMSA INTELLIEDGE

Operating Instructions
– Bus Driver

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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

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

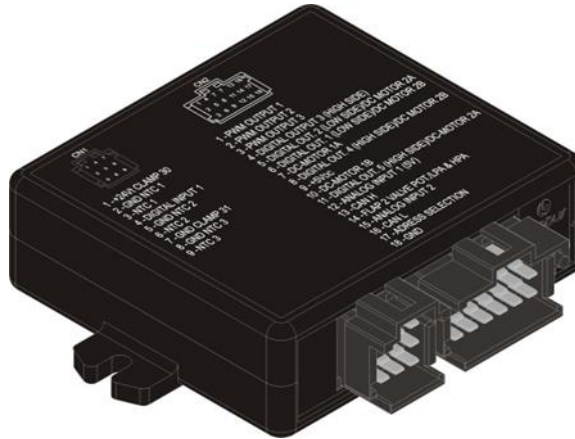


Figure 2 - SC1000 Substation

1.2 Symbols used

 **Note**

1.3 Description of the control panel

The components of the control unit are represented and described in the following figure:

1-4 climate control of driver's workplace

5-12 climate control of Passenger compartment



Figure 3 - SC1000 Control panel components

Driver's workplace

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
6. Blower speed -button
7. Immediate heating - button
8. Pre-selection timer-button
9. Dehumidify- button
10. AUTO mode - button
11. Temperature - button
12. UP/DOWN - button
13. Display

1.4 Display description

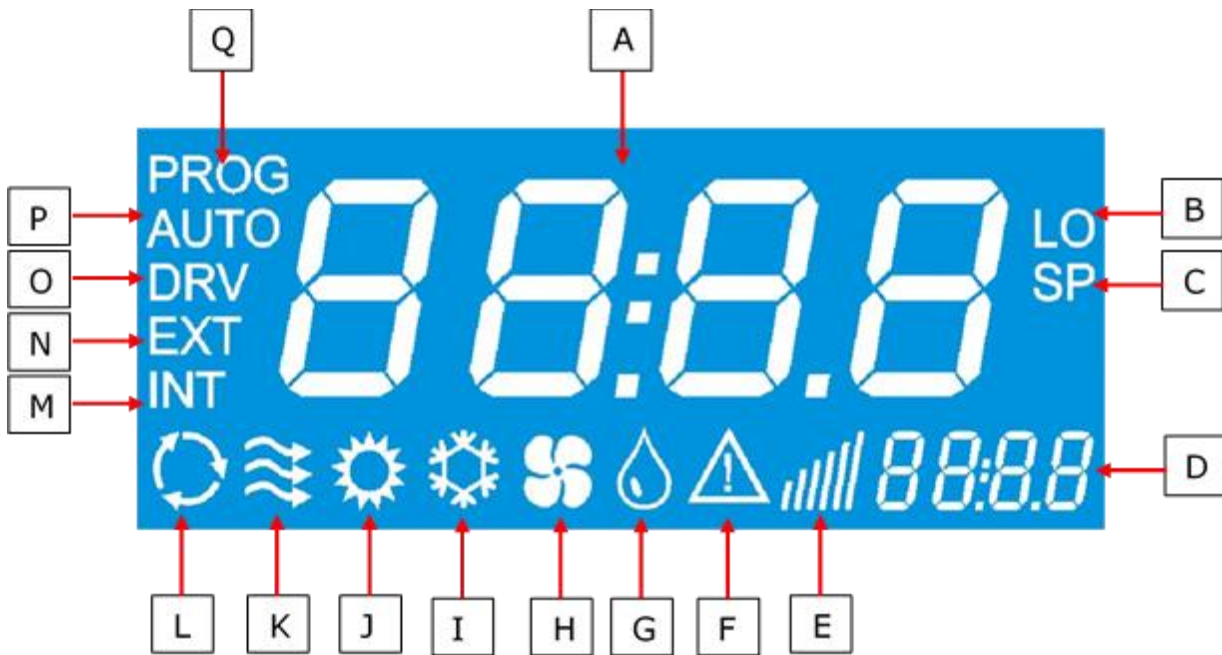


Figure 4 - SC1000 Display screen

- | | |
|--|---|
| A. Indicated value | J. Heating is on |
| B. Appears if the lowest adjustable room temperature is reached | K. Fresh air flaps open |
| C. Is indicated with the set temperature (passenger compartment) | L. Air recirculation is on (HVAC - version) |
| 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. dehumidification active (HVAC - version) | P. AUTO mode active |
| H. Blower is on (HVAC - version) | 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 element starts automatically.
- The current software version (here 1.4) and the current release appear on the display (here r-02). (Fig.5).
- The standard display appears after 4 seconds. (Fig.6).

2.2 Turn OFF

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

2.3 Driver's workplace functions

2.3.1 Adjust Temperature



Note

The temperature for the driver's seat is not able to be adjusted. The temperature control for the driver's workplace does not control the temperature, but the degree of opening of the hot water valve. This results in an uncontrolled outlet temperature.

2.3.2 Adjust blower speed



Note

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

If the defrost function is active, the blower runs on maximum speed.



Figure 5 - SC1000 Release



Figure 6 - SC1000 Standard Screen

2.3.2.1 Increase blower speed



Turn the knob (Fig.3, 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. 7).



Figure 7 - SC1000 Current Blower Speed Level

2.3.2.2 Reduce blower speed



Turn the control dial to the left.

- Blower speed decreases incrementally by 10.
- The current blower speed level is shown in the display (Fig. 7).

2.3.3 Adjust air flow direction /defrost-function

2.3.3.1 Adjust air flow direction



Rotate knob (Fig.3, 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 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.



Press button (Fig.3, No.1), to toggle between fresh air and air recirculation modes.

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

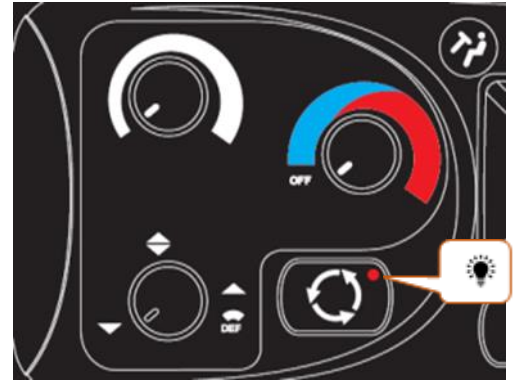


Figure 8 - SC1000 Air recirculation mode driver's workplace active

2.4 Passenger compartment functions



Note

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

To use all modes' functions 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), where the temperature can be manually changed by adjusting the blower speed.

2.4.1 AUTO mode



Note

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

2.4.1.1 Activate



Press the button (Fig.3, No.10), when the AUTO mode is deactivated.

- Mode is activated.
- the corresponding status light is on, "AUTO" appears on the display (Fig.9).

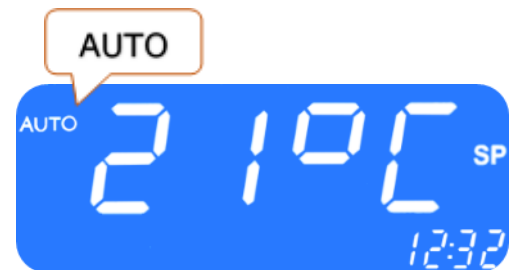



Figure 9 - SC1000 AUTO mode active

2.4.1.2 Terminate

 Press the button when the AUTO mode is activated.

- Mode is deactivated.
- the corresponding status light is off, "AUTO" disappears from the display.

2.4.2 Adjust temperature



Note

The nominal temperature is able to be varied between 18 °C and 28 °C.


 Press button.

- Nominal temperature +1°C.

 Press button.

- Nominal temperature -1°C.


2.4.2.1 Display the current room or outside temperature

 Press button.

- "INT" and the current room temperature appears on the display (Fig.10).



Figure 10 - SC1000 Current room temperature

 Press button again.


- "EXT" and the current outside temperature appears on the display (Fig. 11).
- Terminate the display by pressing the  button or by timeout automatically after 3 seconds.
- Standard display screen appears.



Figure 11 - SC1000 Current exterior temperature

2.4.3 Adjust blower speed level



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.

For operation the following conditions apply:

- If the engine is not running, the speed of the blowers will reset to a certain value.
- If the doors are opened, the speed of the blowers is reset to the above mentioned value.
- In cooling mode it is not possible to turn off the blower completely. It goes automatically at least at xy-%.

2.4.3.1 Activate



press button (Fig. 3, No.6). Corresponding status light is on.



Press button.

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



Press button.

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

The current blower level appears on the display (Fig. 12).

2.4.3.2 Terminate

By pressing the  button or the mode is automatically exited 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 again automatically!



Figure 12 - SC1000 Manual Blower Speed Level


2.4.4 Toggle between fresh air / air recirculation



Note

The air recirculation mode is limited to 10 minutes. After this time the fresh air ducts are automatically regulated depending on the room temperature setpoint, the duct temperature and the current outside temperature.

2.4.4.1 Activate

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

- The air recirculation icon (Fig.13) appears on the display.

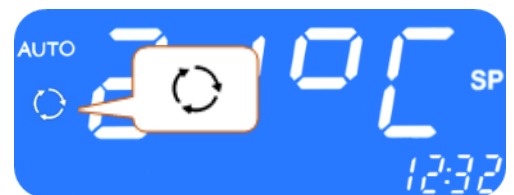



Figure 13 - SC1000 Air Recirculation Mode Active

2.4.4.2 Terminate

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

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

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 (<28V) is present. Otherwise, the function is automatically terminated after 10 seconds.



Figure 14 - SC1000 Preheat

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.



Figure 15 - SC1000 ti-A




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

→ "Pre" appears on the display (Fig. 14).

Press button  or  (Fig.3, No.12) once.

→ "ti-A" appears on the screen (Fig. 15)

→  Press button to confirm.

→ "hour" appears on the screen (Fig. 16) 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 number of hours.


→ Minute digits flash.




Figure 16 - SC1000 Number of Hours

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

→ Now the week days are displayed (Fig. 17).

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 3. No 7.).

→ The button's status lights up and the heating icon appears on the screen (Fig.18).

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 are able to be selected individually.

Up to 7 start times are able to be set in parallel (PrE1-7).

 Press button during 3 seconds.

→ "PrE" appears on the screen (Fig.19).



Hinweis

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



Figure 17 - SC1000 Week Day



Figure 18 - SC1000 Heating Icon






Figure 19 - SC1000 PrE

2.5.3.1 Choose start time

 Press button to display the memory locations.

→ “PrE1” appears on the display (Fig.20).


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

 Press button to confirm selection.

→ “00:00” and “hour” appear on the screen (Fig. 21).

→ 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 number of hours.

→ 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. 22).

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.23).


2.5.3.2 Set operation time



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.



Figure 20 - SC1000 Memory Location



Figure 21 - SC1000 Hour Display




Figure 22 - SC1000 Display Week Day



Figure 23 - SC1000 Operation Time

2.5.3.4 Terminate

 Press button to exit the menu.

2.6 Reheat



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.

In addition, the difference between setpoint of room temperature and the setpoint of duct temperature must be $<2K$, and the difference between outside temperature and the setpoint of duct temperature must be $<-5K$.

After 10 minutes the reheat mode is terminated automatically.




Figure 24 - SC1000 Entfeuchten aktiv

2.6.1 Activate

 Press button (Fig. 3, No.9).

- The button's status lights up
- The reheating icon appears on the screen (Fig.24).

2.6.2 Terminate

 Press button.

- The button's status light turns off
- The heating icon disappears on the screen.

2.7 Errors



Note

If an error occurred, the error icon (Fig.25) appears on the display. (see chapter 2.7.2 Error message overview)



Figure 25 - SC1000 Fehler

2.7.1 Error read out

2.7.1.1 Activate



Press button (Fig.3, No.1) at driver's workplace for 2 seconds .

- The menu for system fault analysis opens.
- The error message (e.g. E2:00) appears on the display. (Fig 26)
- The count (e.g. H000) shows the current frequency of occurrence of the error. (Fig 26)



Figure 26 - SC1000 Error read out

2.7.1.2 Error messages



Press buttons to scroll through error messages.



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.27). If the error is corrected, the point disappears and the count increases.

To delete an error from the display, press and hold the button for six seconds.

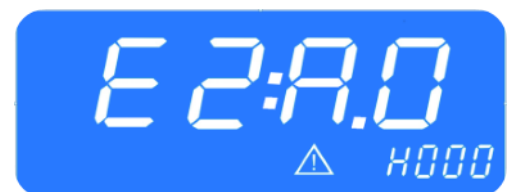


Figure 27 - SC1000 Current Error

2.7.1.3 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.27).

2.7.1.4 Terminate

🔘 Press button (Fig.3, No.1) at the driver's workplace until the standard screen appears.

2.7.2 Error message overview

Table 1 - SC1000 Error Messages

| Error message displayed | Description | Cause/remedy |
|-------------------------|---|--|
| 00 | Unused | - |
| 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 | |
| 03 | | |
| 10 | Note: Further errors can arise in conjunction with this error message. They shall be ignored until error 10 is corrected. Communication to the substation is interrupted. | 1. Verify if the substation is active ➔ Check plug connections ➔ Replace substations ➔ Replace control unit |
| 11 | Substation 1 timeout Servo 0 | |
| 12 | Hot water valve has failed (roof) (substation) | 1. Check plug connections ➔ 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 shall be ignored until error 20 is corrected. Communication to the substation is interrupted. | 1. Verify if the substation is active ➔ 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 ➔ 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) | |
| 30 | Communication to substation 3 is interrupted | |

| Error message displayed | Description | Cause/remedy |
|-------------------------|--|--|
| 31 | Substation 3 timeout Servo 0 | |
| 32 | Substation 3 timeout Servo 1 | |
| A0 | Outside temperature sensor – error (front) | 1. Check where the respective component is connected and replace the relevant control unit 2. Visual check of all plug connections ➔ Replace sensor |
| A1 | Passenger compartment temperature sensor – error | |
| A2 | Roof duct temperature sensor - error | |
| A3 | Ice sensor - error | |
| A4 | Convactor temperature sensor – error | |
| A5 | Water temperature sensor – error | |
| B0 | High-/Low pressure ➔ The clutch will be activated after three minutes if the pressure falls. | 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) | 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: <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 |

| Error message displayed | Description | Cause/remedy |
|-------------------------|---------------------------------|--|
| | | <ul style="list-style-type: none"> → 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 |

