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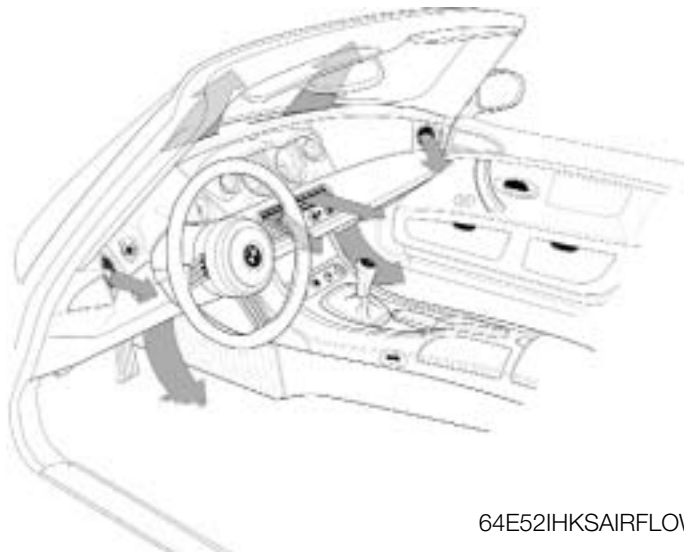
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## IHKS - Heating and Air Conditioning

### Purpose of the System

An integrated heating/air conditioning control system (IHKS) is used in the Z8 to provide the driver and passenger a comfortable atmosphere regardless of conditions outside the vehicle. The heater/air conditioner is designed as an air-based control. 6 actuators are used to distribute the air and control the temperature.



64E52IHKS AIRFLOW0100

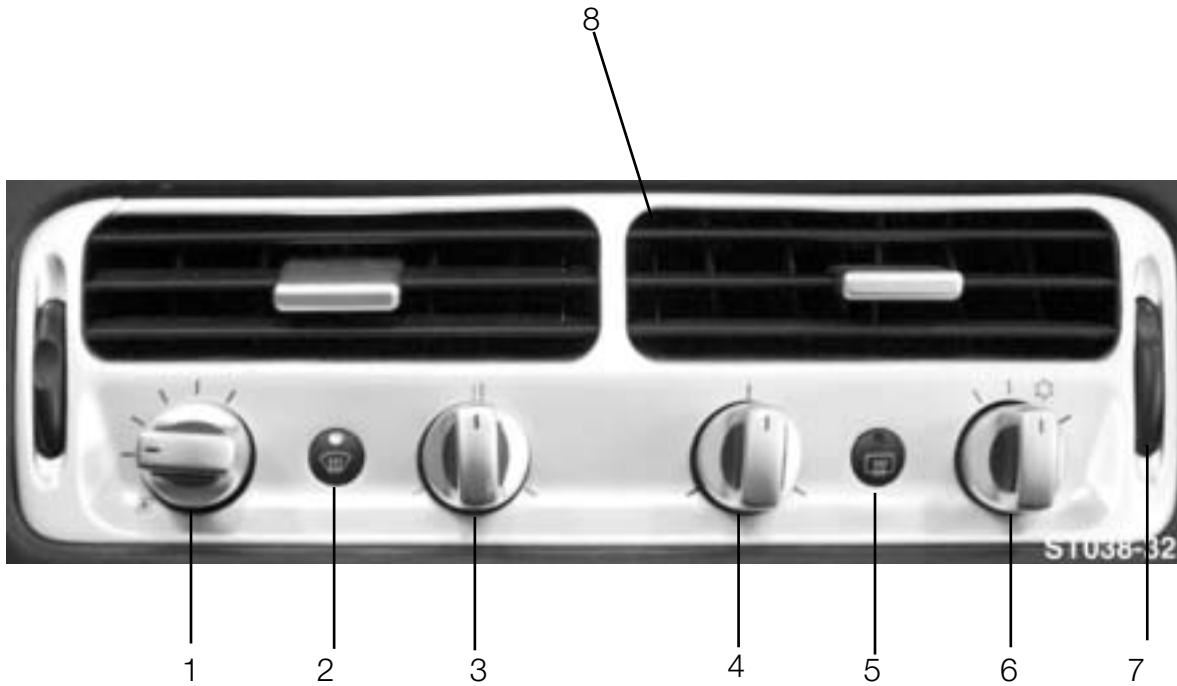
### System Components

The IHKS consists of the following main components:

- Electronic Control panel/module with integrated fresh air grille
- Heater/air conditioner unit
- Five actuators (bus stepper motors) for controlling the recirculated air, temperature mixing, defroster, face vent and foot-well flaps
- One actuator (high speed stepper motor) for controlling the fresh air flap
- Electric shut-off water valve
- Electric auxiliary water pump
- Refrigerant pressure sensor
- Evaporator temperature sensor
- Rear window defogger relay
- Series resistors for blower motor

## IHKS Control Panel

The interior temperature, fan speed, and air distribution are set with classic rotary knobs and push buttons. The setting request are processed by the integrated electronics.

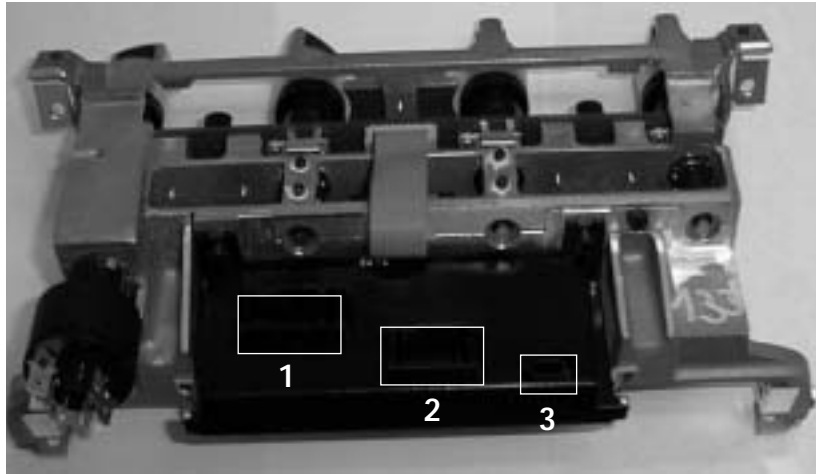


Number	Description
1.	Blower setting (5-stage rotary switch, including off)
2.	Defrost button
3.	Temperature setting (potentiometer)
4.	Air Distributor (potentiometer)
5.	Rear window defroger button (if hardtop fitted)
6.	A/C Program selector switch (potentiometer)
7.	Air flow control
8.	Fresh air grille

## Control Panel - Connections

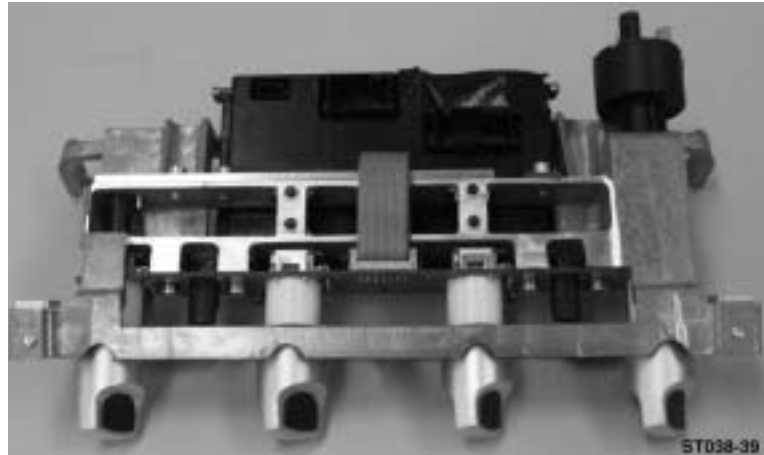
A total of 3 plug connections are integrated in the IHKS control module.

The forth is a separate connection to the blower switch.



The IHKS control module is located on the back of the control panel.

The Z8 IHKS can be coded and diagnosed via the DIS/MoDIC.



## Blower Setting

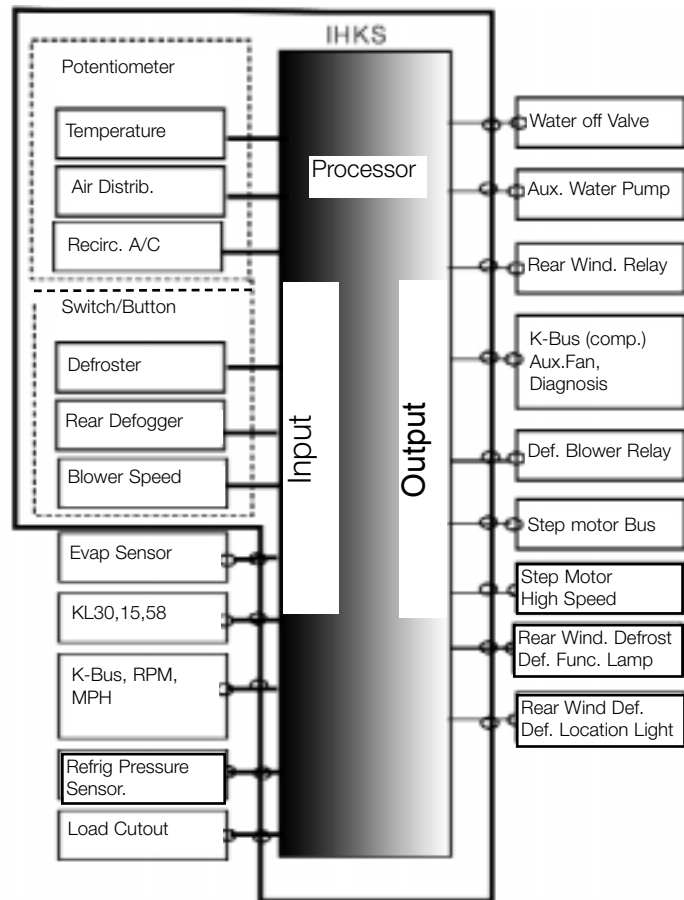
The blower control is designed as a 5-stage switch (including off). When the blower switch is set to the zero position all flaps are closed and the refrigerant circuit is switched off automatically.

The IHKS features “ram” air compensation in which the fresh air flap is increasingly closed as the vehicle speed increases thus making it dependent on the type of top used (hardtop or soft top). The fresh air flap is operated by a high speed stepper motor. The IHKS receives information (via the K-bus) as to whether the soft top is open or closed.

## System Operation

Functions:

- Blower control
- Temperature control
- Recirculated air/fresh air mode
- Air conditioner mode
- Defroster function
- Air distribution
- Rear window defogger

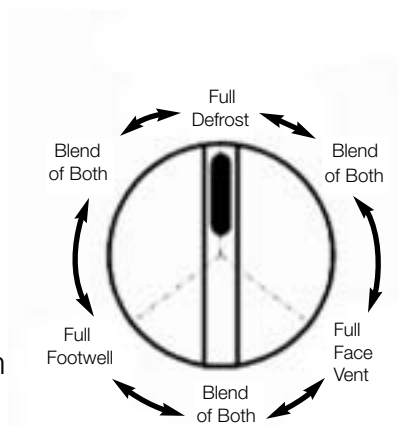


**Note:** If the IHKS control module is replaced, it must be recoded.

## Air Distribution

The air flow is adjusted by a 360° potentiometer. The flaps are controlled by 3 stepper motors (bus) that operate the defroster, face vent and footwell flaps. Flap control is dependent on the position of the air distribution knob as well as the position of the temperature knob.

Different characteristic curves are used for the maximum warm setting and the maximum cold setting. If the temperature control knob is anywhere between these two settings, the new flap position is set.



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## Flap setting

The stepper motors for flap operation execute a position run after ignition terminal 15 has been switched off. The fresh air and defroster flaps are completely opened, and all other flaps are closed.

The temperature setting flap is the only flap that remains unchanged. This procedure lasts approximately 15 seconds.

The IHKS performs a calibration run after every 20th time the ignition is switched off or after an interruption in memory power. The flap end positions serve as reference points.

A total of five (200 Hz) stepper motors with M-bus activation and one (500 Hz) high speed fresh air motor are used.

	IHKS Off (KL 15 on)	Defroster function	IHKS OFF (KL 15 off)
Fresh air	Closed	Open	Open
Recirculation	Closed	Closed	Closed
Defrosting	Closed	Open	Open
Ventilation	Closed	Closed	Closed
Footwell	Closed	Closed	Closed
Temperature	Unchanged	Maximum	Unchanged

## Auxiliary Water Pump

An auxiliary water pump is installed to ensure the necessary water flow rate at low engine rpm.

The auxiliary water pump is switched on when the following conditions are fulfilled:

- Water valve is opened (de-energized)
- Engine rpm < 2000 rpm
- Engine temperature > 32 °F
- Start procedure completed (terminal 50)

The auxiliary water pump is switched off when, apart from the engine speed that must exceed 2500 rpm, at least one of the above conditions is not fulfilled.

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## **Temperature Control**

The rotary knob locks in both end positions. The temperature is set by means of a mixing flap that is operated by a stepper motor (bus). The temperature control potentiometer can be turned through an angle of 240°.

The water valve is closed when the control knob is set in the minimum position. From the 10 o'clock position (potentiometer value) on, the water valve is opened and the auxiliary water pump switched on.

## **Air Conditioning**

The air conditioning is requested by a combination switch. The IHKS activates the A/C compressor magnetic clutch, and cool air flows from the evaporator. With the aid of a temperature mixing flap, this air is blended with warm air from the heater core.

To prevent the evaporator surface from icing up, the evaporator temperature sensor signals the IHKS to deactivate the compressor clutch. The switching threshold is set at approximately 1 °C (34 degrees F).

## **Idle Speed Compensation**

The Engine Control Module (ECM) compensates the idle speed to ensure smooth operation of the engine at idle.

The IHKS will signal the ECM for idle speed compensation when at least one of the following conditions occurs:

- Rear window defogger switched on (hardtop fitted)
- Blower set to max. position
- Air conditioning switched on

## **Filling Station Effect**

The filling station effect corresponds to the heater core "hot soak", because the water valve is sprung open with out power. In order to avoid this effect, after ignition terminal 15 is switched off, power is still applied to the water valve for 5 minutes.

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## **Characteristic Map Cooling**

Characteristic map cooling is not used in the Z8 with the S62 B50 engine.

## **Defroster Function**

The defroster function has priority over other functions. It has the task of defrosting the windshield as fast as possible.

The following functions are activated for this purpose:

- The temperature is set to maximum warm.
- The blower speed is set to the highest stage.
- Defroster flaps fully open.
- All other air distribution flaps are closed.
- The fresh air flap is fully opened (recirculated air closed).
- The water valve is opened.
- The auxiliary water pump is switched on.

## **Rear Window Defogger**

This function is active only in conjunction with the hardtop. During the defrost phase the heating is fully powered for 17 minutes.

If the defrost phase is not sufficient to completely defrost the rear window the heating can be activated for a further 5 minutes by pressing the rear window defogger button again.

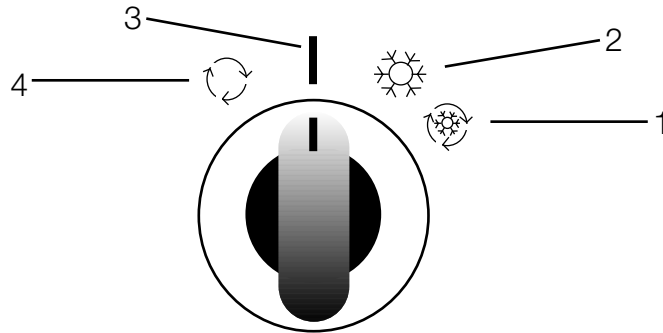
If the heating is switched off for any reason the timer is stopped so that defrosting can continue from exactly this point when switched on again.

The rear window defogger is completely deactivated when the unloader function is active (starting the vehicle).



## Program Selector Switch for Recirculated Air, Outside Air, A/C Functions

The functions are selected by a rotary knob with 4 settings. Each setting corresponds to a program.



Setting	Function
1	Recirculating air with air conditioning
2	Outside air with air conditioning
3	Outside air
4	Recirculating air

The recirculation air control flap is operated by a stepper motor (bus).

## Filters

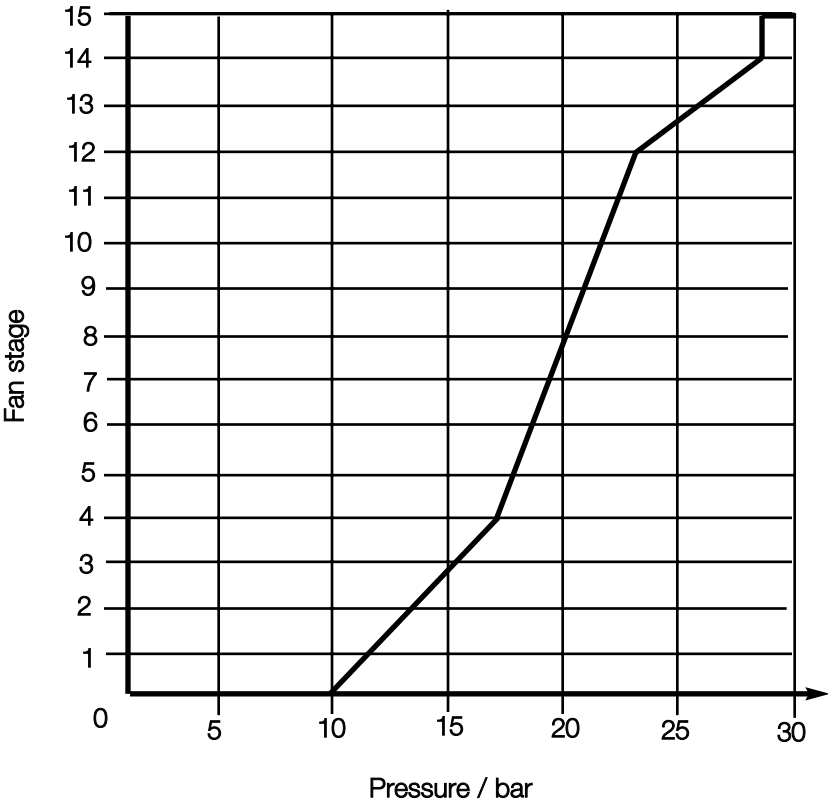
The micro-filters are located under the hood.

To service the micro-filters, simply remove the four torx screws and remove the cover panel.



### Auxiliary Fan

The auxiliary fan stage (speed) is determined from the refrigerant pressure sensor signal. The IHKS signals the ECM via the K-bus, and the ECM will activate the auxiliary fan. The fan stage (speed) is generally set to 0 at vehicle speeds above 50 mph (ram air)



### K-bus Interface

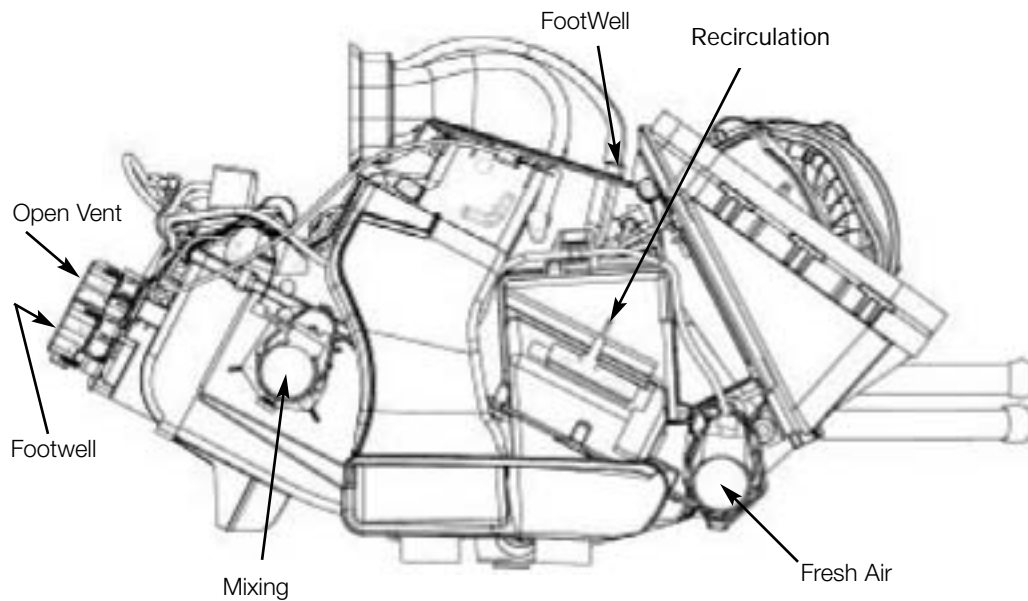
This interface transmits data such as the vehicle speed, engine speed and diagnosis between the IHKS control unit and the IKE.

The K-bus is also used to transmit compressor load values as well as auxiliary fan request from the IHKS through the IKE then over the can line to the ECM.

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## Heater/Air Conditioner Housing

The heater/air conditioner housing design is based on the E36/7. To compliment the lightweight and compact design, stepper motors are used to operate the flaps.



## Diagnosis

All inputs and outputs are monitored by the IHKS control module. Faults are stored in the EEPROM after terminal 15 has been switched off. Faults that occur sporadically can be deleted by the IHKS control module after successful self-repair. However, the entry "sporadic fault" is retained.

Unlike previous IHKS systems, the Z8 version is diagnoseable via DIS/MoDIC.