System overview, brief description

General

DICE is a comprehensive control system for the electronic functions in the car. The central unit in DICE is a control module which communicates with the system units and with other systems via the car's wiring and the instrument bus (I-bus). DICE has its own diagnostics function and diagnostic trouble codes are set when faults arise.

The following functions are controlled by DICE:

- Exterior lighting
- Interior lighting
- Rheostat control
- Acoustic warning
- Intermittent wiper, windscreen
- Wiper, headlamp
- Electrically heated rear window and door mirrors
- Radiator fan
- Air conditioning

Exterior lighting

The car's exterior lighting is operated with the main light switch and the left-hand toggle switch combined with the DICE control module.

The following light functions in the car's exterior lighting system are controlled by DICE:

- Main lighting
- Front fog lights
- Rear fog lights
- Direction indicators
- Hazard flashers

Interior lighting system

General interior lighting (dome lamps) in the car. Automatic or manual function depending on the position of the light switch.

The following light functions in the interior lighting system are controlled by DICE:

- Cabin lighting
- Map Light
- Vanity mirror lighting
- Glove box light
- Floor light
- Courtesy lights
- Luggage compartment lighting

Lighting for buttons and controls

DICE supplies power to the button and control lighting. The light intensity is controlled by DICE using pulse width modulation (PWM) of the supply voltage to the lamps.

If the Night Panel function has been selected on the SID module, the intensity of the lamps for the button and control lighting will be reduced.

Acoustic warning

Acoustic warning if the driver's door is opened while the key is still in the ignition.

Acoustic warning if the parking lights are on and the driver's door is opened while the key is not in the ignition.

The function is programmable.

Windscreen wiper, interval

When using the intermittent function on the windscreen wipers, the time between the strokes can be varied from 2 to 15 seconds and is adjusted using a potentiometer located on the control lever of the wiper switch.

DICE controls the windscreen wiper function even when the washer is used. When the washer is used very briefly, the wiper will do three strokes. As the requested washer time increases, the number of wiper strokes will increase up to a maximum of five strokes.

The “extra wiper stroke” function after washing” is programmable.

Headlamp wiper

DICE activates the headlamp wiper relay for 1 second when washing the windscreen.

Electrically heated rear window and door mirrors

Electric heating of the rear window and exterior rear-view mirrors. These functions are activated manually or automatically via the car's ACC function, alternatively manually when the car has MCC.

Radiator fan

DICE switches the radiator fan on and off. The car is equipped with 1 or 2 fans depending on the market.

On cars without A/C, one fan. DICE switches the radiator fan on/off.

On cars with A/C, 2 fans. DICE controls whether one or two fans will be used.

DICE uses the following information to control the function:

- Coolant temperature
- A/C pressure
- Outside temperature
- Vehicle speed

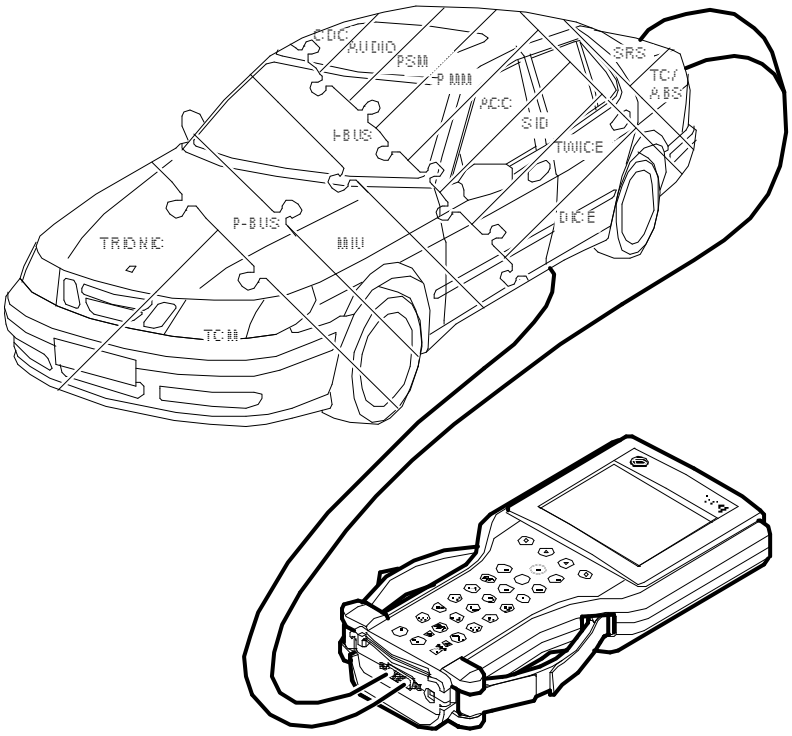
Air conditioning

Control of the A/C function. DICE uses the following values to determine whether the A/C compressor should be allowed to operate:

- Coolant temperature
- A/C system working pressure
- Evaporation temperature
- Outside temperature
- Vehicle speed
- Time that the engine has been running

If DICE gives approval for the A/C compressor to operate, DICE sends a bus message that is used by the engine control system to activate the compressor clutch relay.

P-bus and I-bus



PUZZLE

All the control modules in the Saab 9-5 are connected to the bus except those for the ABS and SRS.

The two powertrain systems, Trionic and TCM, are not connected to the I-bus, however. These systems need **much faster** communication facilities so that no delays will be noticeable, such as in connection with torque limitation when changing gear.

The Trionic and TCM are therefore connected by means of a separate bus called the P-bus (Powertrain Bus). The communication speed (data transfer rate) of the P-bus is ten times faster than that of the I-bus.

In addition, the P-bus is connected to the MIU. The MIU ensures that information which is available on one bus is also available on the other.

The diagnostic instrument is not connected directly to the bus but communicates via the DICE, one of the control modules connected to the I-bus, and so has access to all control modules connected to the bus.

Vehicle speed is an important item of information for many control modules. Since the ABS is not connected to a bus, the vehicle speed signal goes to the MIU via a cable of its own. The MIU then sends out the vehicle speed information on the buses.