eSID IPC 650 Gateway Instrument Panel Cluster User Guide

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eSID IPC 650 Gateway Instrument Panel Cluster User Guide

Change Log

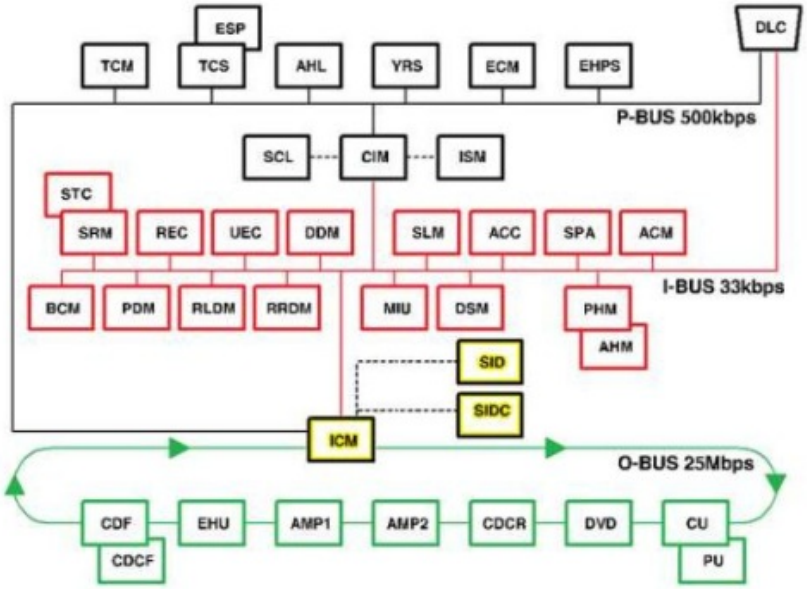
Version	Date	Description
1	04-06-23	Initial Version
2	15-11-23	Updated for production release

Introduction

This is not an eSID (extended Saab Information Display) product but a gateway unit to allow integration of IPC (Instrument Panel Cluster) from a Saab NG9-5 2010-2012 into a Saab 9-3 20032006 and replacing the MIU (Main Instrument Unit). IPC and MIU are two different names of the same thing (Instrument Cluster), just different platforms/architectures names. The internal name at Saab for the NG9-5 was `650′, hence the name of the gateway unit. In this document `MIU' is referred to the original Saab 9-3 cluster and `IPC' is the new cluster from Saab 9-5.
The Saab 9-3 is based on the GM/Opel Epsilon-1 platform and the new generation Saab 9-5 belongs to GM's Global Epsilon platform (also called Epsilon-2). These platforms are very different and the entire electrical architecture was redesigned for the global platform, which then result in two totally incompatible clusters. A gateway module has been developed to fit in the middle and merge these two platforms together.
This integration of NG9-5 cluster is fully compatible with the eSID 03-06 (which is designed for NG9-3 2003-2006).

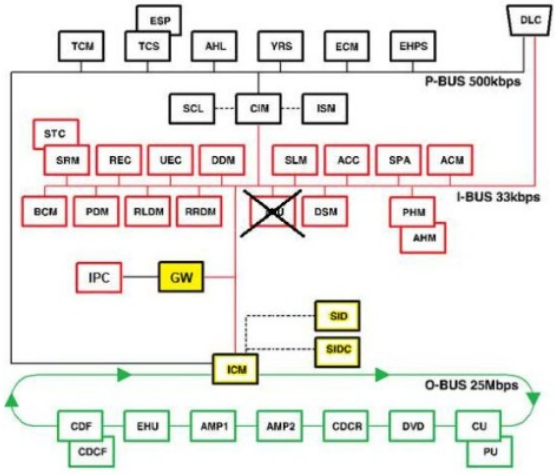
Saab 9-3 Bus Architecture

The early NG9-3 vehicle (2003-2006) is equipped with two CAN-communication buses (P-bus, and Ibus) and one fiber optic bus (O-bus) as illustrated in the figure below:



Saab 9-3 Electrical Architecture (2003-2006)

Saab 9-3 Electrical Architecture (2003-2006)
Updated with the IPC from NG9-5 it will look like the picture below. The MIU has been removed and the IPC and GW has been added, which then takes over the responsibilities of the MIU.
Saab 9-3 Electrical Architecture (2003-2006) with Saab NG9-5 IPC



Saab 9-3 Electrical Architecture (2003-2006) with Saab NG9-5 IPC

Compatibility Matrix

The gateway will only work on MY2003-2006 (pre-facelift) due to a more or less perfect match with NG9-5 IPC features. Two hardwired inputs to the IPC could unfortunately not be solved with the GW hardware (Coolant Level Low and Washer Fluid Low warnings) but this is not an issue since those warnings will still come up on the SID near the windscreen.
All features that are normally handled by MIU in the vehicle must now be handled by GW instead. Some of these features like: Odometer, Immobilizer and Fuel Level functionality requires configuration and these parameters needs to be programmed into the GW, i.e. It will be locked to one vehicle/VIN. This data will be pre-programmed before shipped to the customer. No tools or read-out from the car is needed, only VIN, Odometer and Fuel tank size.
This also means that the Odometer will work and update when the GW is in the car (the start value needs to be

programmed), but when the normal MIU is put back later on, the Odometer will be back to that value the car had when GW was installed (since MIU was never in the car, it couldn't have known that the Odometer has increased). This can be solved with updating the Odometer manually with TECH2.
The GW will not be implementing MIU diagnostic functions, i.e., TECH2 communication with the 650 IPC will not work. The original MIU needs to be connected at the same as the new instrument cluster when using TECH2 (see separate chapter for details)
The Gateway solution currently supports Gasoline engine variants only (4-cyl B207 and 6-cyl B284), not Diesel engine variants (D223L, Z19DT, Z19DTH)

Feature	9-3 2003-2006	9-3 2007-2014
Gauges - Engine Speed - Vehicle Speed - Coolant Temperature - Turbo Boost - Fuel Level	OK - Fuel tank configuration needs to be programmed into GW	OK - Fuel tank configuration needs to be programmed into GW
Telltales - Engine Lamp - Turn Indicators - Park Brake - Exterior Lights - Airbag, Battery, Driver Seatbelt - Cruise Control - ABS/ESP - Tire Pressure Warning	OK	OK
Automatic Display Illumination	OK (Illumination controlled by light sensor in SID)	NOK - Only manual display illumination (Rheostat +/-)
Trip Computer - Fuel Consumption - Trip Distance - Battery Voltage - Oil Life - DTE	OK (See separate chapter)	NOK (See separate chapter)
Odometer	OK - Odometer needs to be programmed into GW	OK - Odometer needs to be programmed into GW
Immobilizer	OK - VIN and Immobilizer data needs to be programmed into GW	OK - VIN and Immobilizer data needs to be programmed into GW
Saab Information Display: - Serious warnings (except the Coolant/Washer warnings)	OK (Handled by ICM, SID and GW, will come up on both SID and IPC)	OK (Handled by GW and shown on IPC)
Saab Information Display: - Coolant Level Low - Washer fluid Low - Outside Temperature	OK (Handled by ICM, SID)	NOK - Information/Warnings not available.
Saab Information Display: Vehicle Settings - ESP Off - Language - Units - Heater timers - Etc.	OK (Handled by ICM, SID)	NOK - Change vehicle settings not possible. - GW not sending out Vehicle Configuration. Unclear outcome. - Not possible to start Aux. Heater.
Connected to IP Switch - Night Panel Activation - Auxiliary Light Activation - Passenger Seatbelt Indication	OK (Handled by ICM, SID)	NOK - No Night Panel function - No Aux Light Sw - No Pass. Seatbelt Indication
Warning Sounds - Turn Indication (tick-tack) - Parking Assistance (beep-beep) - Seatbelt Reminder (ping-ping)	OK (Handled by ICM)	NOK - No sounds
TECH2 Support	OK (Works if MIU is connected during TECH2 operation)	OK (Works if MIU is connected during TECH2 operation)

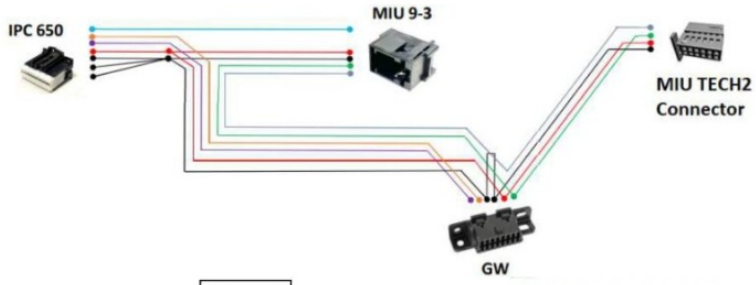
The GW solution is compatible with the Saab 9-3 2003-2006

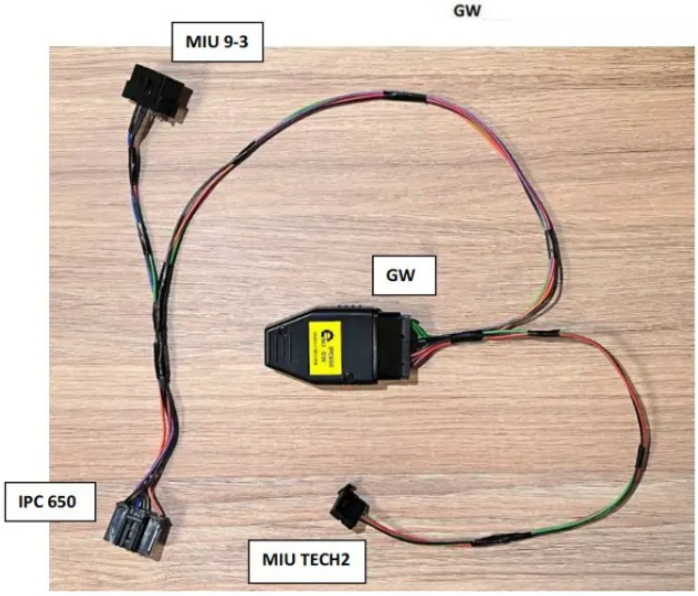
The GW solution is not compatible with the Saab 9-3 2007-2014

Adapter Harness

The adapter harness is needed to connect the IPC and the GW to the vehicle, and will be included with the GW as a plug-and-play solution (GW will be pre-configured to the specific vehicle).

- “MIU 9-3” connector will be connected where the original MIU is
- IPC650 connector will be connected to the new Saab 9-5 instrument cluster
- GW connector will be connected to the Gateway Unit (this is not the normal OBD!)
- “MIU TECH2 Connector” will be used to connect the original MIU at the same time as the new instrument cluster, when using Vehicle Maintenance / TECH2.





Cluster variants

The Saab 9-5 IPC is available in different variants:

- Kmh/Mph
- Gasoline/Diesel
- Gasoline clusters have an engine speed rpm that goes to 8000 rpm, while the diesel cluster only goes to 6000 rpm and has an extra glow plug indicator. The indicator will be no issue on a gasoline car, as it will not be lighted up by the GW unit (i.e., it is possible to use a Diesel cluster in a 9-3 gasoline.
- Color/Monochrome

All IPC variants will work on all gasoline cars (B207 + B284). The diesel glow plug indicator will not be lighted up by the GW unit.
Its possible to switch display units in the IPC in the display settings between Metric and Imperial.
However, it seems a color cluster programmed for US can only change between Metric and Imperial US, and for a color cluster programmed for EU, it has only the Metric and Imperial UK options.

Cluster programming and configuration

The gateway unit cannot alter the Saab 9-5 IPC, which means that 9-5 IPC must be programmed for an Automatic vehicle if the Saab 9-3 is Automatic otherwise the Actual gear (P, R, N, D) will not show.
The same applies for vehicle equipment dependent views like TPMS (Tire pressure monitoring) or BioPower gauge. If the original 9-5 vehicle had that view, it will work also on 9-3, but if it didn't have it, the gateway unit cannot make it appear.
Language is also programmed into the cluster and cannot be modified in the menus. Odometer of the donor 9-5 vehicle is not important, as it is programmed in the gateway unit!
If a brand-new cluster is used, it must be programmed to a 9-5 vehicle first, before being used in the 9-3, otherwise it will show warnings.

Note: “eSID Support” cannot provide support how to program the cluster on a 9-5. Only clusters from scrapped cars were used when developing the Gateway unit.

Cluster display features

The following display features have been verified:

Display View	Status	Image	Display View	Status	
Vehicle Speed	OK		Average Speed	OK	
Blank Page	OK		BioPower	OK [2]	
Tire Pressure	OK		Fuel Consumption	OK	
Navigation	NOK [1]		Trip Distance	OK	
Time to arrival	OK		DTE	NOK [3]	
Remaining Oil Life	OK		Battery Voltage	OK	
Speed Warning	NOK	No Sound	Units Settings	OK	-

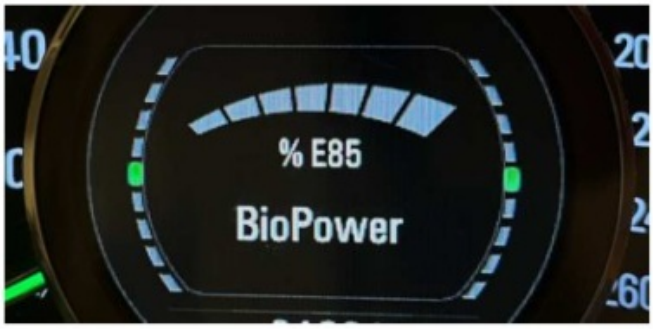
1. Navigation View has not been implemented.
2. BioPower only works if vehicle is equipped with eSID 03-06 Gen2 (SW 1.5.x or newer)
3. DTE algorithm is complex and in the test vehicles the value has been unrealistic high, at least initially. It might work over time, but use the DTE in the normal SID instead.

Cruise Set Speed

This feature is only available if vehicle is equipped with eSID 03-06 Gen2 (SW 1.5.x or newer). On the Monochrome display it is written with digits and on the color one it is marked with a green dot.

BioPower Gauge

This feature is only available if vehicle is equipped with eSID 03-06 Gen2 (SW 1.5.x or newer).



Quiescent Current

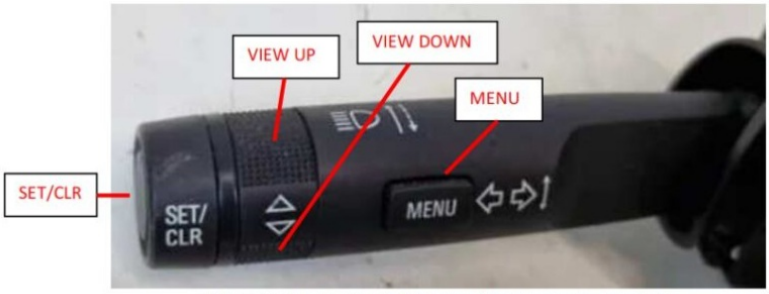
This is not an issue, GW and IPC consumes less than 2mA together when the vehicle is sleeping.

Three-Blink

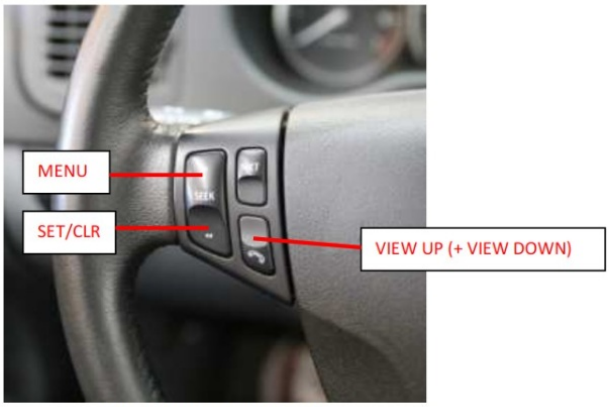
The gateway unit also provides the eSID “Three-Blink” feature if the vehicle is not equipped with an eSID 03-06. This function enables the vehicle to blink 3-5 times on a short press on the turn-indicator stalk, like modern vehicles.
This feature will be enabled/disabled in the gateway unit upon request and cannot be changed later.
It will however be automatically disabled if the gateway detects an “eSID 03-06” in the vehicle.

Cluster control

The IPC in Saab 9-5 is controlled using separate buttons on the turn indicator stalk, which does not exist on the Saab 9-3. Instead, the steering wheel control buttons will be used.



IPC control in the Saab 9-5 using the turn indicator stalk



IPC control in the Saab 9-3

As the MENU and SET/CLR buttons are not used as frequent they have been mapped to the SEEK buttons. When using AUX audio source, they could be used at any time, otherwise when the radio is turned off.
The “CALL” button is mapped to “VIEW UP”, and it is then only possible to go in one direction in the center display menu structure. However, on rare occasions it must be possible to have a “VIEW DOWN”, for instance when changing display settings, and in order to solve that the “CALL” button is also mapped to “VIEW DOWN” if the Accelerator Pedal is fully pressed down. This is only intended to be used when standing still and engine is off to have a way to go in both directions in the menu structure.

Installation

The IPC 9-5 cluster has a similar size compared to the original 9-3 but it’s not a direct fit. The mounting holes of the original MIU does not match and the original dashboard bezel needs to be modified.

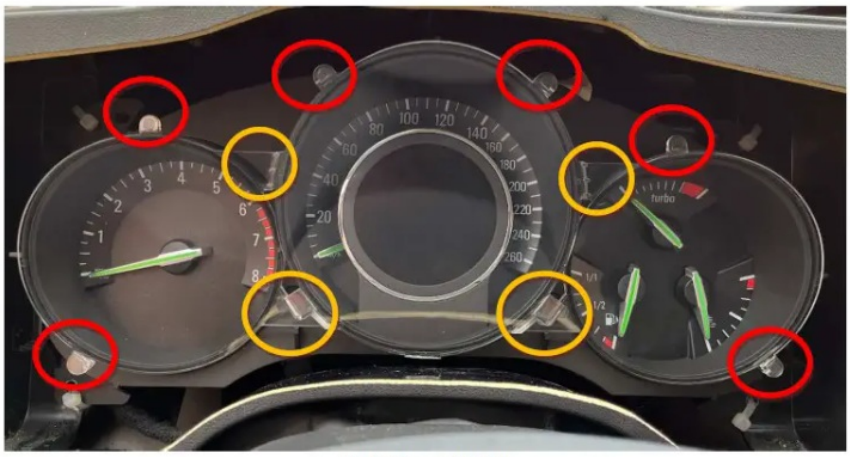
Removing the dashboard bezel
Step1: Remove the center and left ventilation
See Youtube: **https://www.youtube.com/watch?v=9jR4k2kOQ6Q**
(Tip: Use old credit cards to help holding down all the hooks)

Step2: Remove the ICM
Remove the two screws and disconnect the rear connector. Be careful of the fiber optic cables.

Step3: Remove the HPDC
Once the HPD is out, squeeze together to the two hooks on the back and push it out

Step4: Remove the dashboard bezel
Remove the screws and the dashboard bezel

Prepare the Instrument Cluster
For better look and fit against the dashboard bezel, the plastic “ears” on the displays should be cut off (red circles) and the middle parts could be either painted black or removed as well (orange circles). Finally, trim down the “side pieces” (see picture below).



Red circles = “Ears”
Orange circles = “Middle parts”

Middle parts painted black so it is more hidden from the rest for the driver.

“Side pieces” trimmed down.

Mount the Instrument Panel Cluster

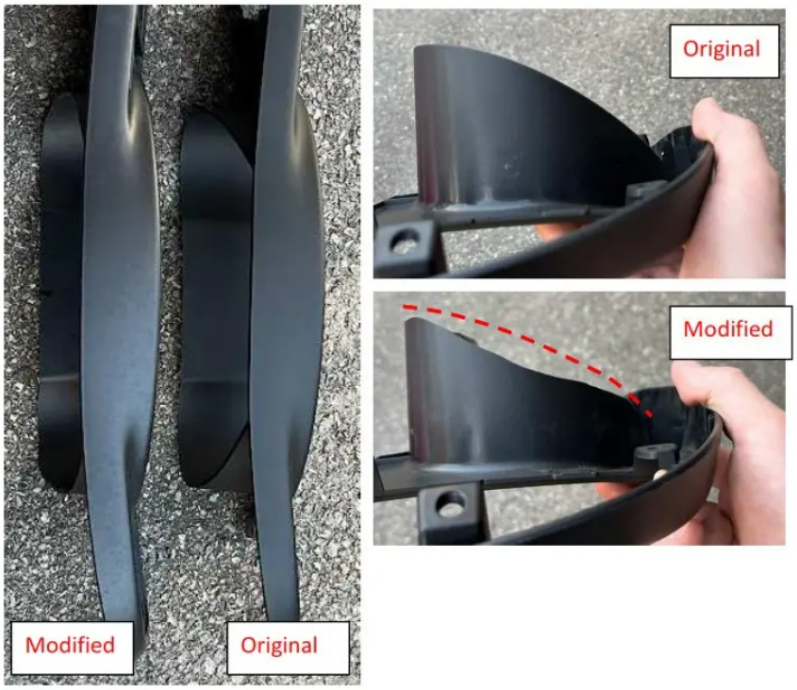
The original mounting holes does not match the new instrument cluster. Two simple way is to either drill four new holes and attach the cluster with cable ties or drill new holes and use the original cluster screws to hold it. Make sure there is some space in the bottom for the dashboard bezel

The instrument cluster attached with cable ties

The instrument cluster attached with screws

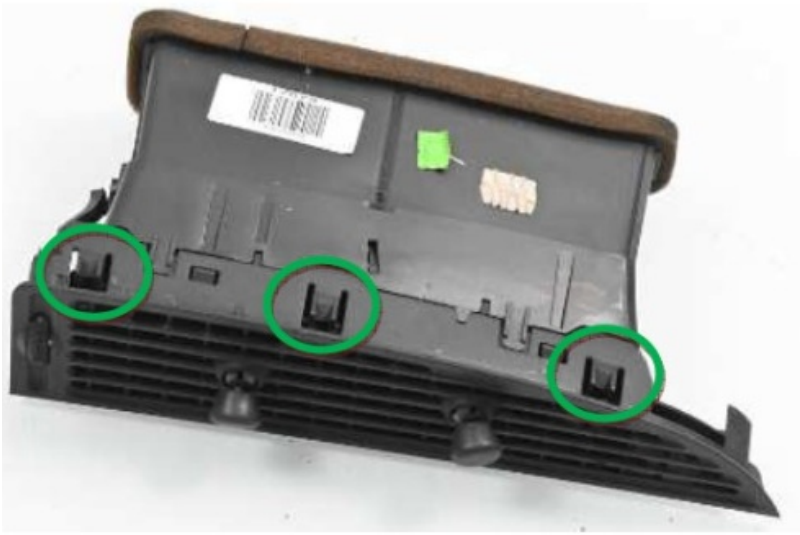
Modify Dashboard Bezel

The dashboard bezel needs to be modified in order for the cluster to fit. Below is a comparison between the one installed in the test vehicle and an original un-cut bezel. The best method is probably to take it little by little and make tryouts in the vehicle.



Modify center air ventilation

It is recommended to trim down the center ventilation “hooks” so it’s easier to remove it. By removing or modifying a couple of the hooks it will be much easier to remove it when needed for vehicle maintenance (see Vehicle Maintenance / TECH2).



Mount back everything
Mount back the Dashboard bezel, the ICM and HPDC and the ventilations. Ensure that its possible to reach the MIU TECH2 connector from the center air ventilation hole.

Installation completed
Picture below when installed in a vehicle with removed “ears” and painted middle plastic. The bezel is covering nicely the space around the cluster.

Vehicle Maintenance / TECH2

Some TECH2 functions will not work when MIU is missing on the bus and depending on what needs to be performed, it is recommended to connect the original MIU together with the new cluster, IPC, when TECH2 work is needed.
This is done by removing the center air ventilation and pull out the “MIU TECH2 Connector” (shown in Adapter Harness) which is used to connect the original cluster at the same time as the new cluster.
Once the TECH2 operation is finished the original cluster can be removed again. The IPC will temporarily show the original Odometer when MIU is connected but return to the GW value once the MIU is removed again.

Price and Availability

Price for the installation kit (gateway with the adapter harness):

- 2400 SEK (Inside EU with Swedish tax)
- 1920 SEK (Outside EU without tax, or inside EU with valid VAT number)

Shipping is estimated to be around 150 SEK. Payment through PayPal is preferred.
When ordering, the following information must be provided:

- Vehicle VIN (YS3FH45Y9410xxxxx)
- Odometer (12345 km, be sure to say if it's in Km or Miles)
- Fuel Tank size (58L or 61L)
- Cluster display type (Color or Monochrome)

The customers that have pre-booked will be able to get their kits in February 2024. Any new orders will be handled after that (order by sending a mail to **saab.esid@gmail.com**)

www.esid.se
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IPC 650 Gateway

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References

- **eSID.se**
- **User Manual**