



BRIEF INFORMATION

Intelligent battery sensor (IBS) 24 V

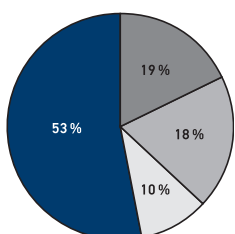
- › High-accuracy measurement of battery voltage, current and temperature parameters
- › Determination of the battery state of charge (SOC), state of health (SOH) and state of function (SOF) condition parameters
- › Simple electrical and mechanical integration

PRODUCT FEATURES

Benefit to the customer

The Intelligent Battery Sensor (IBS) informs you about the current energy status, allowing you to plan your energy supply.

In order to carefully conserve the energy of the vehicle battery, it is necessary to know the state of charge, ageing and any changes to the battery, as weak batteries are the main cause of vehicle breakdown in more than 50% of cases according to a study by the ADAC, the German automobile association.

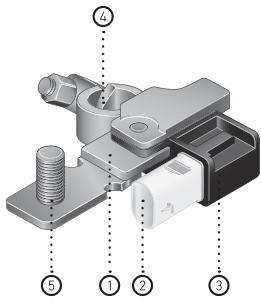


Application

The intelligent battery sensor (IBS) from FORVIA HELLA is the key element of vehicle energy management.

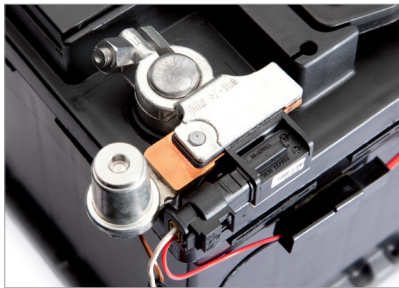
The IBS reliably and accurately measures the battery voltage, current and temperature parameters. Information on the state of charge (SOC), state of health (SOH) and state of function (SOF) of the battery is calculated algorithmically using the measurements. The IBS is designed to be used in starter (standard or EFB), gel and AGM batteries to monitor in-vehicle starter or consumer batteries. The IBS can be directly integrated into the vehicle's electrical system with the standardised LIN protocol.

DESIGN AND FUNCTION



- IBS battery sensor**
1. Shunt on the sensor
 2. Male connector
 3. Sensor module
 4. Negative pole terminal
 5. Screw-on bolt for battery pole adapter

The IBS is attached directly to the negative pole of the battery via the pole terminal. Alongside the terminal, the mechanical portion of the battery sensor consists of the shunt and grounding bolt. The shunt is attached to the vehicle's load path and is used as a measuring resistor to measure the current indirectly. The ground cable can be conveniently attached to the grounding bolt, e.g. with the optionally deliverable battery pole adapter.

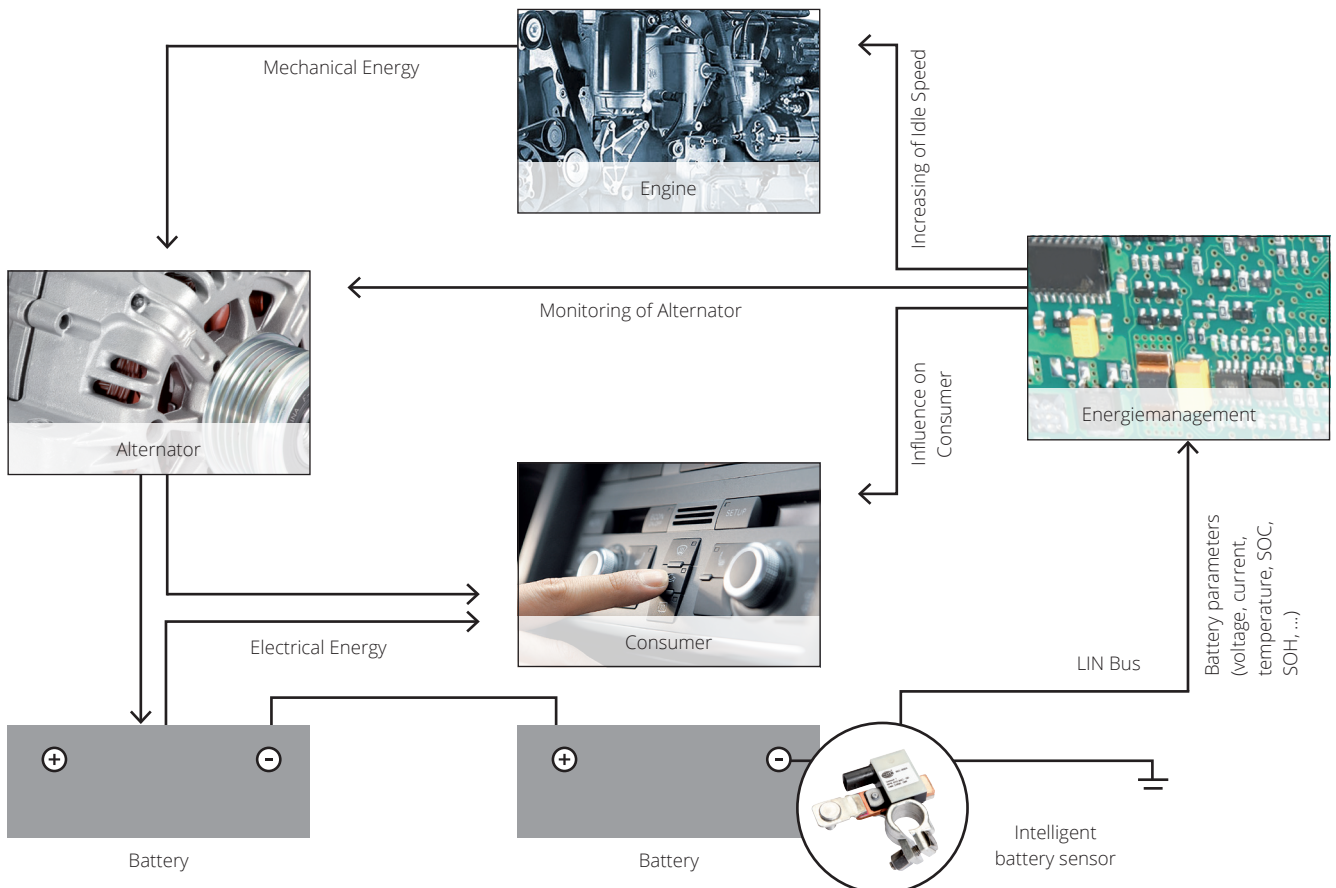


Fitted on standard battery terminal
(Battery pole adapter not included in scope of delivery).

The electronics are located in a cast housing with a plug connector which functions as the interface to the energy management system. The LIN protocol is the communication interface to the higher-level control unit. The supply voltage, used simultaneously as the reference voltage for voltage measurement, is provided by the connection to the positive poles of both batteries.

ENERGY MANAGEMENT

By using the intelligent battery sensor, the energy management system can react quickly in case of critical battery state and influence both consumer behaviour and the alternator.



BATTERY CONDITION ALGORITHMS

The intelligent battery sensor calculates and monitors the following battery conditions

State of Charge

The state of charge (SoC) describes the current state of charge of the battery. The SoC is defined as: $SoC [\%] = \text{dischargeable capacity} / \text{nominal capacity}$

State of Health

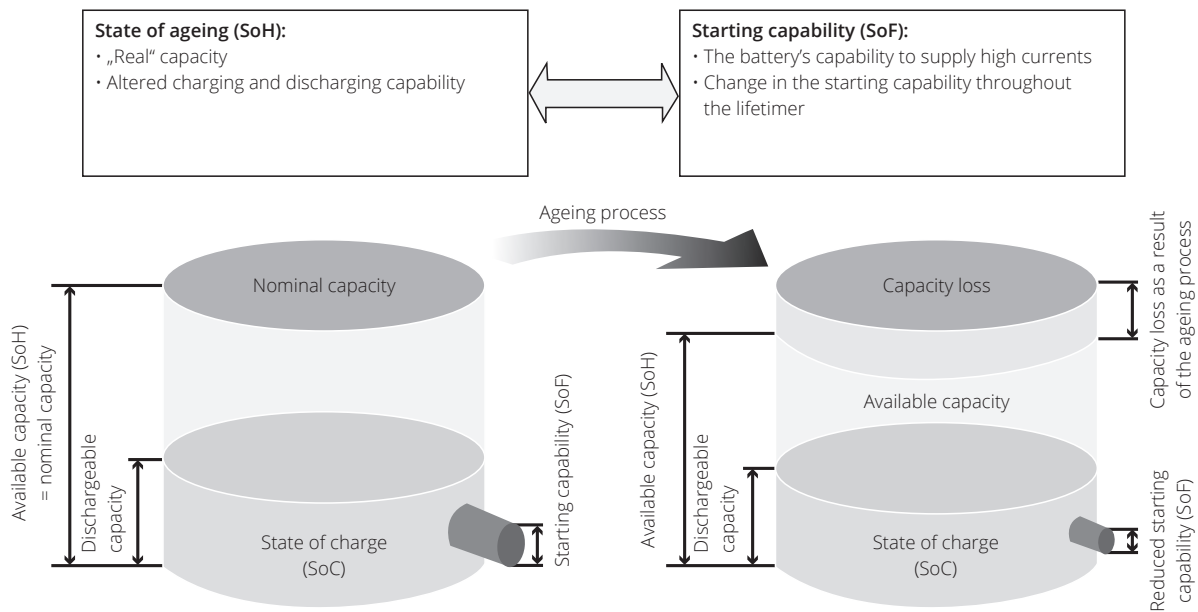
The state of health (SoH) indicates the battery's ageing condition. The State of health (SoH) is defined as: $SoH [\%] = \text{available capacity} / \text{nominal capacity}$

The available capacity of the battery typically decreases with increasing battery age and after a long and useful service life.

State of Function

The state of function (SoF) describes the future starting capability of the engine based on the power currently measured and on the voltage

Monitoring the various battery conditions



TECHNICAL DETAILS

Technical data

Operating voltage range	Multi-voltage (7.5 – 32 V)
Rated voltage	24 V
Polarity reversal voltage	- 28 V / 60 s
Test voltage	27.8 – 28.2 V
Nominal resistance (Shunt)	68 $\mu\Omega$
Permanent load current ¹⁾	± 200 A
Maximum current ¹⁾	± 2.000 A (20 ms) (variant -001 / -007) ± 2.000 A (500 ms) (variant -311 / -317)
Current consumption	≤ 16 mA (normal mode) ≤ 230 μ A (sleep mode)
Operating temperature	-40 °C to +80 °C
Re-heating temperature	+105 °C to +120 °C
Storage temperature	-20 °C to +50 °C
Defined charge controller	36 V / 120 min
Jump start	48 V / 2 min
Load Dump	58 V / 500 ms
Protocol	LIN 2.0 or higher
Protection class	IP 6K9K
Approved	ECE-R10 (variant -001 / -007)
Permissible pole terminal tightening torque	5 Nm \pm 1 Nm
Earthing bolt, ground connection	M8
Weight	119 g
Mating connector ²⁾	872-858-546
Max. battery capacity ³⁾	255 Ah
ASIL grade	QM

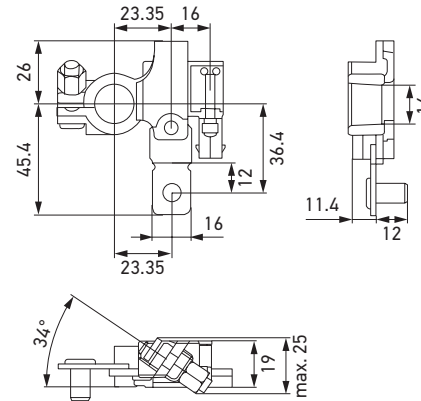
¹⁾ Typical condition: $T_a \leq 80$ °C; $U_b = 24$ V, Ground cable typical: ≥ 70 mm², approved for max. 500 ms. Other configurations on request.

²⁾ This accessory is not included in the scope of delivery. Available from Hirschmann Automotive.

³⁾ Expandable on request.

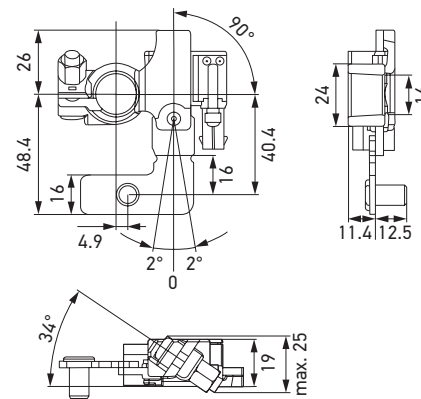
Dimensional sketch

Variant -001 and -007



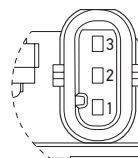
Tightening torque screw (terminal) 5 \pm 1 Nm

Variant -311 and -317



Tightening torque screw (terminal) 5 \pm 1 Nm

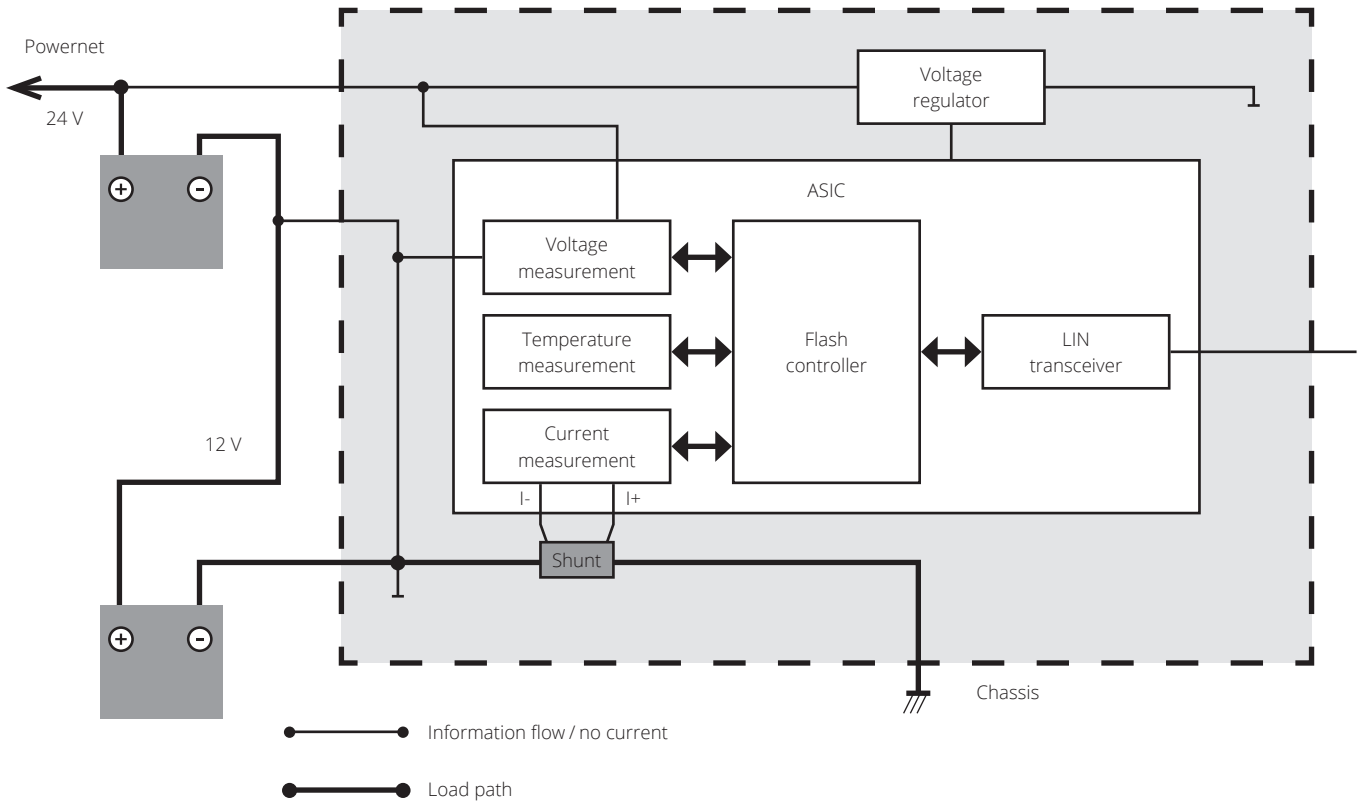
Pin assignment / electrical connection



Pin 1: Partial voltage 12 V
Pin 2: Connection for LIN bus
Pin 3: Supply voltage 24 V

CIRCUIT DIAGRAM

The ASIC is the main electronics component used to record and process measured values. Measured value acquisition in the ASIC, as a precision sensor, is the core function of the intelligent battery sensor and is used to record the physical parameters of current, voltage and temperature.



PROGRAM OVERVIEW

Description	Operating voltage range	Mating connector	Part number	VPE*
Cable lug straight	Multi-voltage (7.5 – 32 V)	Hirschmann 872-858-546	6PK 011 700-001	1
Cable lug straight			6PK 011 700-007	100
Cable lug right-angled			6PK 011 700-311	1
Cable lug right-angled			6PK 011 700-317	100
Optional accessories: Battery pole adapter for plug and play, installation			9MK 179 472-007	1

* Packaging unit.