

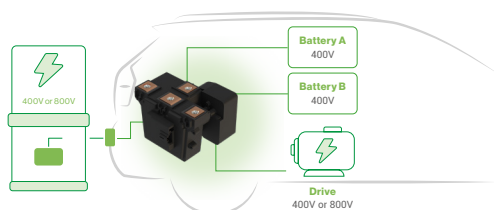
# HEC

## High Efficiency Contactor

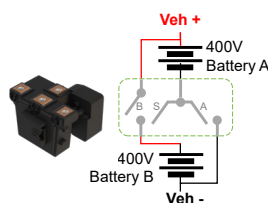
HEC (High Efficiency Contactor) is Sensata's high-voltage battery reconfiguration technology in 800V battery electric vehicles (BEVs). It enables seamless switching between 400V and 800V battery configurations, ensuring compatibility with both 400V and 800V DC fast chargers, and supporting drive operation at either voltage.

The HEC integrates mechanically synchronized contacts, providing an inherently safe and highly efficient switching mechanism.

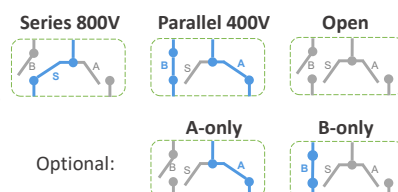
With up to five distinct battery configuration states—including independent access to each 400V battery for advanced functions such as battery balancing or limp-home mode—the HEC delivers unmatched safety, ruggedness, simplified integration, reduced cooling needs, and significant system-level savings compared to alternative solutions.



Typical application



Battery configuration states



## Key specifications






- Up to five battery configuration states:
  - » Standard states: Series Mode (800V Drive/Charge), Parallel Mode (400V Drive/Charge), Isolation Mode (All open)
  - » (Optional) Single-path states: A-only (Battery A only), B-only (Battery B only)
- Continuous current up to 1000 A
- Contact resistance: ~50  $\mu\Omega$  (low & stable)
- Shock robustness 90 g
- Short-circuit withstand 25 kA
- Operate time: <0.5 s
- Hold power: 0 W (bi-stable design)
- Position feedback: ASIL-D compliant sensor

Preliminary & Indicative Figures

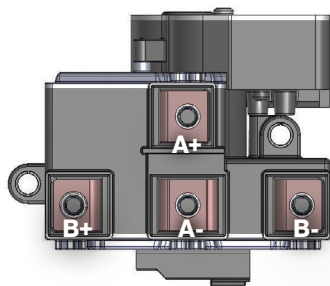
## Key benefits

- **Flexible Configuration** – Supports standard battery configurations (Series-800V, Parallel-400V, Open-Isolated) and single-pack selection (A-only / B-only) for battery balancing and limp-home modes.
- **Inherently Safe** – Unique mechanical design prevents incorrect switching, eliminating short-circuit risk.
- **Robust Performance** – Withstands short-circuit events up to 25 kA and mechanical shocks over 90 g.
- **Compact & Lightweight** – Reduces system component count by over 50%; no extra cooling or special equipment required.
- **High Efficiency** – No holding power (bi-stable design); ultra-low contact resistance minimizes energy loss.

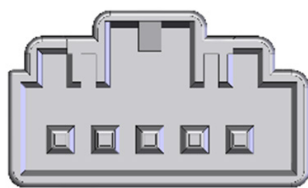
## Applications

-  Switchable Battery 400V/800V
-  Vehicle-to-Grid
-  Autonomous driving
-  Bi-stable
-  MW Charging

Connection Specifications



A+ (Battery Pack A+)  
A- (Battery Pack A-)  
B+ (Battery Pack B+)  
B- (Battery Pack B-)

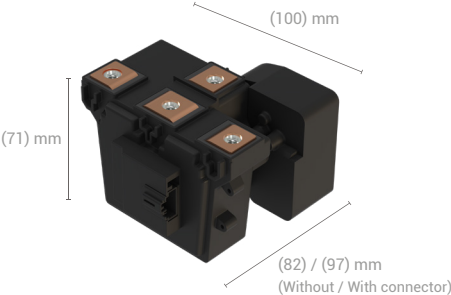


Pinout (from top to bottom)

- 1. Actuator power (+ or -)
- 2. Actuator power (+ or -)
- 3. Position sensor Output (SENT)
- 4. Position sensor GND
- 5. Position sensor supply 5V

Female housing with male pins, Tyco Electronics (TE 1-1418778-1)  
\*Custom connector on demand

Dimensions



- 1. M6 bolts to be used
- 2. All dimensions are in mm
- 3. Please contact Sensata technologies for tolerances and custom envelope dimensions

Preliminary & Indicative Figures

Parameters	Value
Specifications	
System Voltage	Up to 1000 V
Continuous Current	>500 A up to 1000 A *Depending on cooling (Active / Passive), busbar size and material, others.
Initial Device Resistance	~50 $\mu\Omega$
Shock Capability	90 g
Short Circuit Withstand	25 kA (no rupture - no fire - no explosion)
Weight	<500 g
Dimensions (LxWxH)	100x82x71mm (without connector) 100x97x71mm (with connector)
Mechanical Endurance (1x state change)	100K times
Operating Time (1x state change)	<0.5 s
Operating Voltage	9V to 16V
Temperature Range	-40°C to +85°C
Current Consumption	0 A in position (Bi-stable design) <2 A (5 A peak) when moving
Quiescent Current	< 20 mA on position sensor 5 V
Position Sensing Communication	SENT protocol

Safety

ASIL C	Achieved with the position sensor feedback
ASIL D	Can be achieved with ECU specific programming (contact Sensata for more details)

Insulation Performance

Dielectric Strength	2500 V <sub>DC</sub> for 1 min, between HV contacts
	2500 V <sub>DC</sub> for 1 min, between HV and LV contacts
Insulation Resistance (Initial)	1000 M $\Omega$ at 1000 V <sub>DC</sub> , between HV contacts
	1000 M $\Omega$ at 1000 V <sub>DC</sub> , between HV and LV contacts

Datasheets provided by Sensata Technologies, Inc., its subsidiaries and/or affiliates ("Sensata") are solely intended to assist third parties ("Buyers") who are developing systems that incorporate Sensata products (also referred to herein as "components"). Buyer understands and agrees that Buyer remains responsible for using its independent analysis, valuation, and judgment in designing Buyer's systems and products. Sensata datasheets have been created using standard laboratory conditions and engineering practices. Sensata has not conducted any testing other than that specifically described in the published documentation for a particular datasheet. Sensata may make corrections, enhancements, improvements, and other changes to its datasheets or components without notice.

Buyers are authorized to use Sensata datasheets with the Sensata component(s) identified in each particular datasheet. HOWEVER, NO OTHER LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE TO ANY OTHER SENSATA INTELLECTUAL PROPERTY RIGHT, AND NO LICENSE TO ANY THIRD PARTY TECHNOLOGY OR INTELLECTUAL PROPERTY RIGHT, IS GRANTED HEREIN. SENSATA DATASHEETS ARE PROVIDED "AS IS". SENSATA MAKES NO WARRANTIES OR REPRESENTATIONS WITH REGARD TO THE DATASHEETS OR USE OF THE DATASHEETS, EXPRESS, IMPLIED, OR STATUTORY, INCLUDING ACCURACY OR COMPLETENESS. SENSATA DISCLAIMS ANY WARRANTY OF TITLE AND ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, QUIET ENJOYMENT, QUIET POSSESSION, AND NON-INFRINGEMENT OF ANY THIRD PARTY INTELLECTUAL PROPERTY RIGHTS WITH REGARD TO SENSATA DATASHEETS OR USE THEREOF.

All products are sold subject to Sensata's terms and conditions of sale supplied at [www.sensata.com](http://www.sensata.com). SENSATA ASSUMES NO LIABILITY FOR APPLICATIONS ASSISTANCE OR THE DESIGN OF BUYERS' PRODUCTS. BUYER ACKNOWLEDGES AND AGREES THAT IT IS SOLELY RESPONSIBLE FOR COMPLIANCE WITH ALL LEGAL, REGULATORY, AND SAFETY-RELATED REQUIREMENTS CONCERNING ITS PRODUCTS, AND ANY USE OF SENSATA COMPONENTS IN ITS APPLICATIONS, NOTWITHSTANDING ANY APPLICATIONS-RELATED INFORMATION OR SUPPORT THAT MAY BE PROVIDED BY SENSATA.

Mailing Address: Sensata Technologies, Inc., 529 Pleasant Street, Attleboro, MA 02703, USA