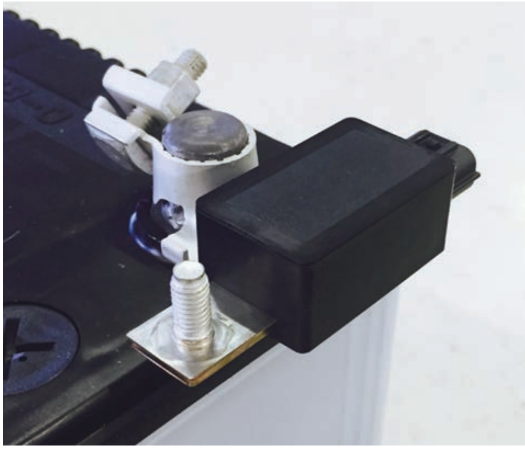
Battery State Sensor (BSS)



In late years for the realization of the sustainable society, the demand for environment friendly automobile is increased. It make the functions for fuel economy improvement and CO_2 reduction, including the generator control and automatic stop start system are became necessary.
For that, it is important to accurately monitor the battery condition.
BSS is mounted on a negative pole of battery and measurers current, voltage and temperature. According to these measured value, BSS precisely estimates battery states like SOC：State of Charge, SOF：State of Function.
More than 8 million units has shipped up to now.

Comparison with Hall Current sensor

Hall effect current sensor measures current, or current / temperature / voltage but is not able to estimate battery status.
BSS measures current / temperature / voltage and estimates battery status.
In addition, current is measured by shunt resistor and more accurate than Hall sensor.

	Current detector	I/F	Bat-State Monitor
Hall sensor	Hall effect	Analog	No
BSS	Shunt register	Digital (LIN)	Yes

Features

Feature 1 : Active measurement of internal resistance

Furukawa's BSS is the world first one that has built in pulse discharge circuit, and can measure Internal resistance (IR) most accurately (as of 2016).
IR has strong correlation with discharge capability (SOF), therefore a vehicle can understand engine restart is available or not.

IR and SOF accuracy

Competitor	Furukawa
± 1.0 m Ω ± 1.5 V	**± 0.5 m Ω** **± 0.5 V**

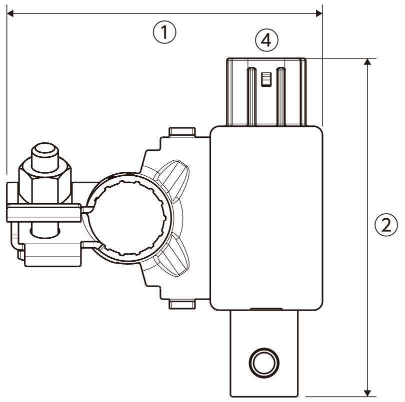
Feature 2 : Quick and accurate battery state estimation

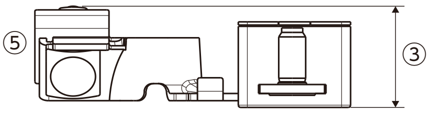
According to long experience of Lead acid battery, we have deep and wide knowledge and built quite unique estimation algorithms, they realize quick and accurate battery state estimation.
BSS make SOC control and stop start function more reliable and contribute fuel economy and CO_2 reduction. Quick estimation can provide status timely.

SOC estimate time and accuracy

Competitor	Furukawa
4hrs ± 10 %	**1.5hrs** **± 10 %**

Structure





① Width： approx. 71 mm
② Length： approx. 76 mm
③ Height： approx. 23 mm

④ 2 Poles or 3 Poles

⑤ Battery mount variation
Nut direction
- Horizontal (0˚)
- 30˚
- Vertical (90˚)

Specification

Grade (No. of Pin)	IR measurement timing	Estimation items and accuracy				
		OCV *1	SOC	SOF	Batt IR	Batt Temp.
3 Poles	Engine start / running / **parking**	± 0.1 V	± 10%	**± 0.5 V**	**± 0.5m Ω**	± 7℃
2 Poles	Engine start / running	± 0.1 V	± 10%	± 1.0 V	± 1.0m Ω	± 7℃

*1 Open Circuit Voltage: used for SOC calculation

◎ Specification

Environment	Storage Temperature	- 40 ～ 105℃
	Operation Temperature	- 40 ～ 105℃
Electrical	Operation Voltage	6 ～ 18 V
	Current Consumption	<Running> 10 mA typ.
		<Parking> 1 mA max.
I/F	LIN 2.0 *2	
Connector	3 Pole (+B, LIN, IR sense) or 2 Pole (+B, LIN) 025 water proof	
Battery terminal	JIS D 05301 / EN50342-2 / IEC60095-02 (NORTH AMERICA)	
Measurement value <accuracy>	Current	1 mA ～ 1500 A (± 1%)
	Voltage	6 V ～ 18 V (± 0.2%)
	Temperature	-40℃～ 105℃ (± 2℃)

*2 LIN2.1 developable

◎ Validated battery example

Type	Maker	Size
Flooded	Furukawa GS-YUASA Panasonic JCI	JIS 38 ～ 80 L0 ～ L5
EFB	Furukawa GS-YUASA Panasonic Hitachi JCI	JIS M42 ～ S95 L1 ～ L3
UB	Furukawa	N55, Q85 etc...

Other battery can be verified

FURUKAWA ELECTRIC CO., LTD. http://www.furukawa.co.jp/en/

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