

# Introduction of Open Loop Current Sensor

~L series~



**TAMURA**

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# Introduction of Open Loop Current Sensor

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~Case of Open loop F series~
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# Introduction of Open Loop Current Sensor

## 1. Why, When we started development Current Sensors



**Transformer Technology**



**Circuit design Technology**



**Potting Technology**



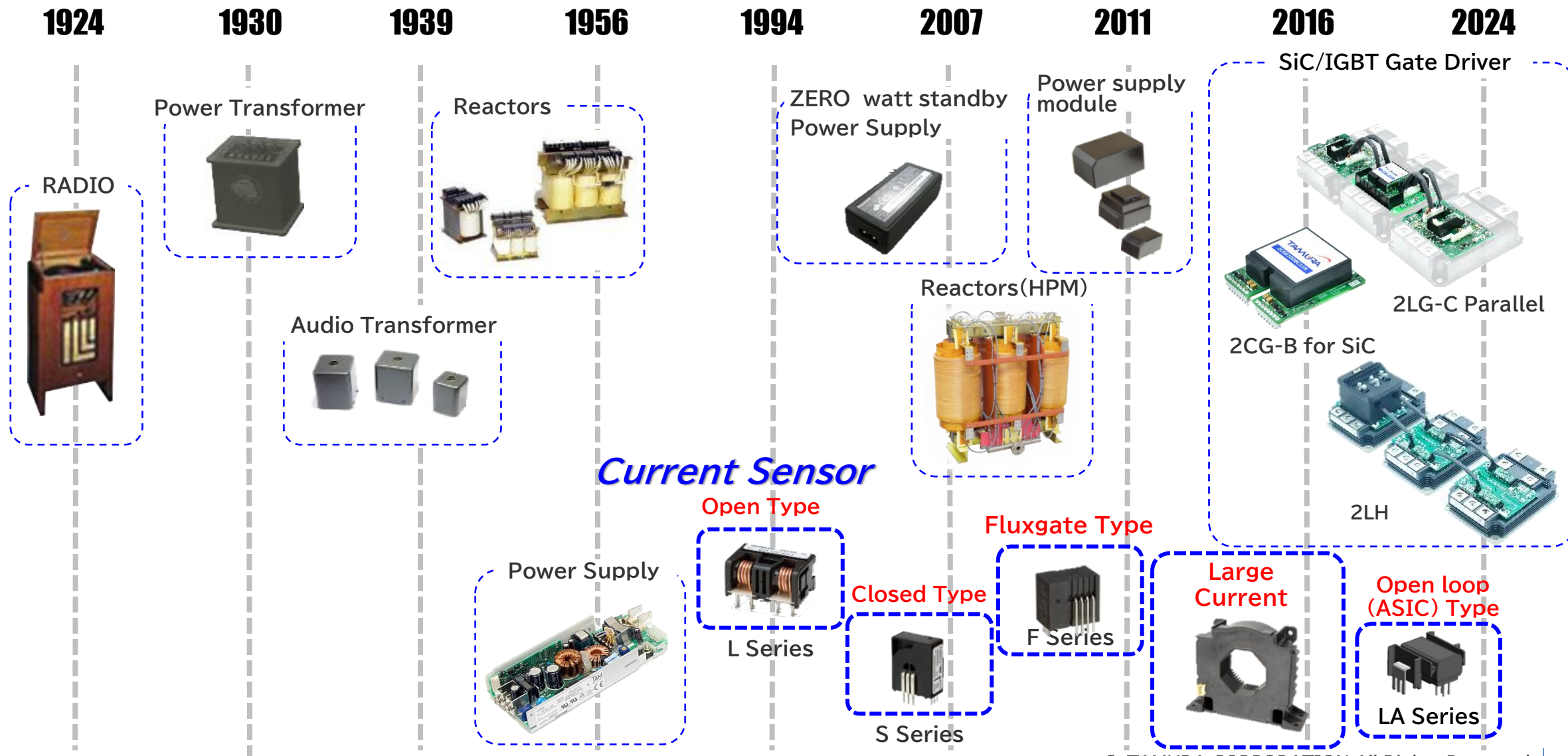

**EMI/EMC Solution**



**Market Awareness**

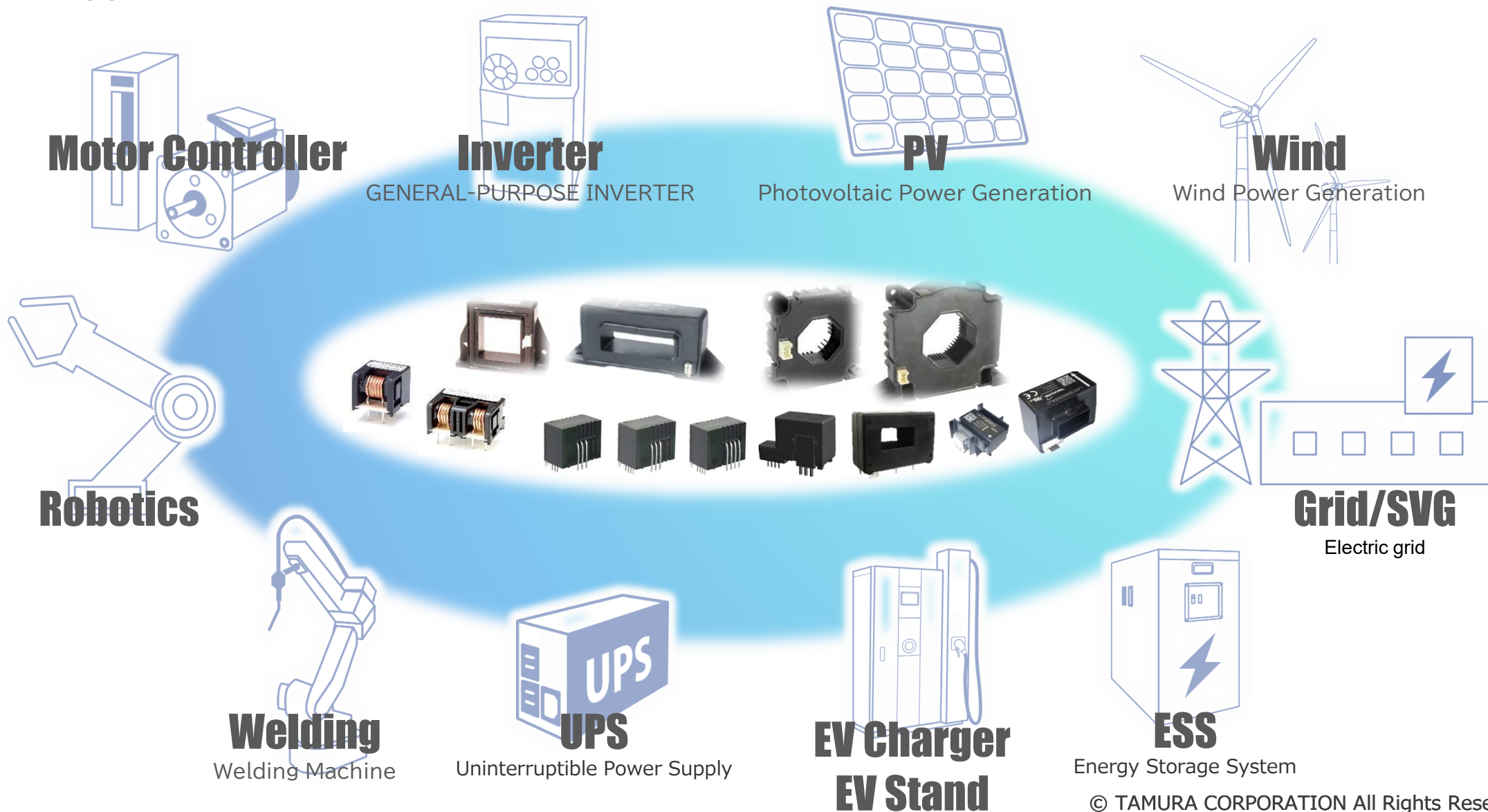
# Introduction of Open Loop Current Sensor

## 1. Why, When we started development Current Sensors



# Introduction of Open Loop Current Sensor

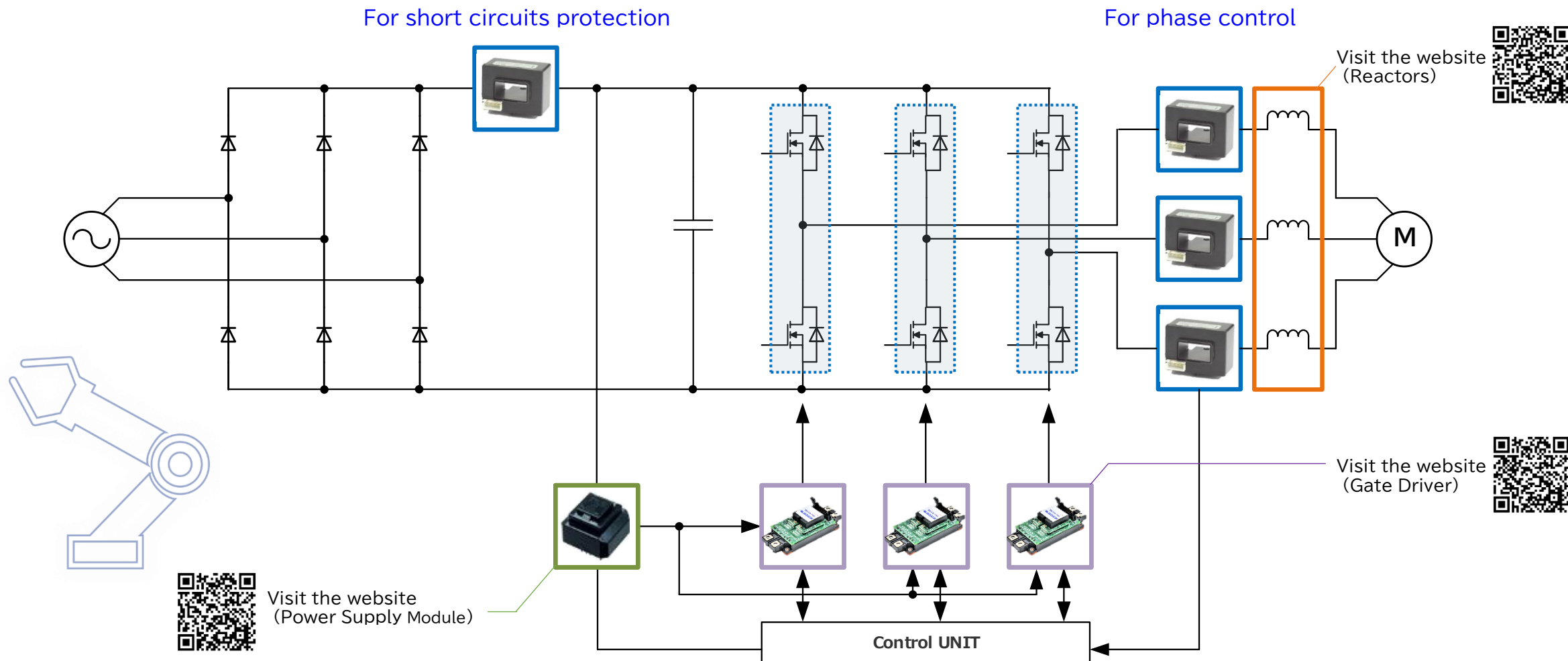
## 2. Application



# Introduction of Open Loop Current Sensor

## 2. Application







### Motor Controller



# Introduction of Open Loop Current Sensor

## 3. Features of Tamura Current Sensors

~Case of Open loop F series~

Features items	Applied technology		Benefits
<p><b>Lower offset drift</b></p>			<p><b>Achieved lower temp drift =&gt; High performance @ 85°C !</b></p>
<p><b>Lower dv/dt level</b></p>			<p><b>Error caused by high-speed switching =&gt; 45% reduction !</b></p>
<p><b>Lower offset gain</b></p>			<p><b>Achieved lower temp gain =&gt; High performance @ 85°C !</b></p>

# Introduction of Open Loop Current Sensor

## 3. Features of Tamura Current Sensors

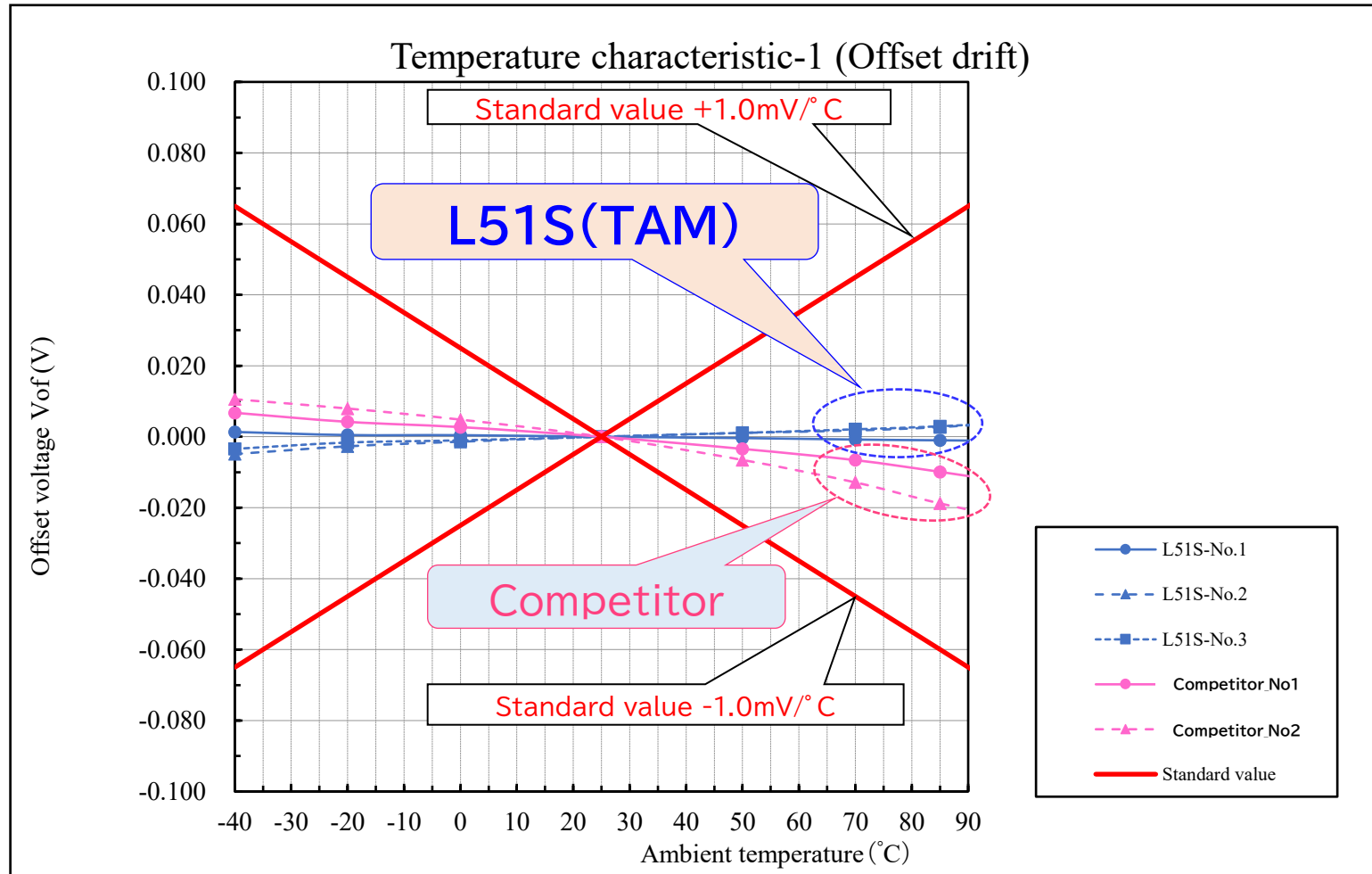
~Case of Open loop F series~

Lower offset drift

**Lower offset drift**



**L51S series**





# Introduction of Open Loop Current Sensor

## 3. Features of Tamura Current Sensors

~Case of Open loop F series~

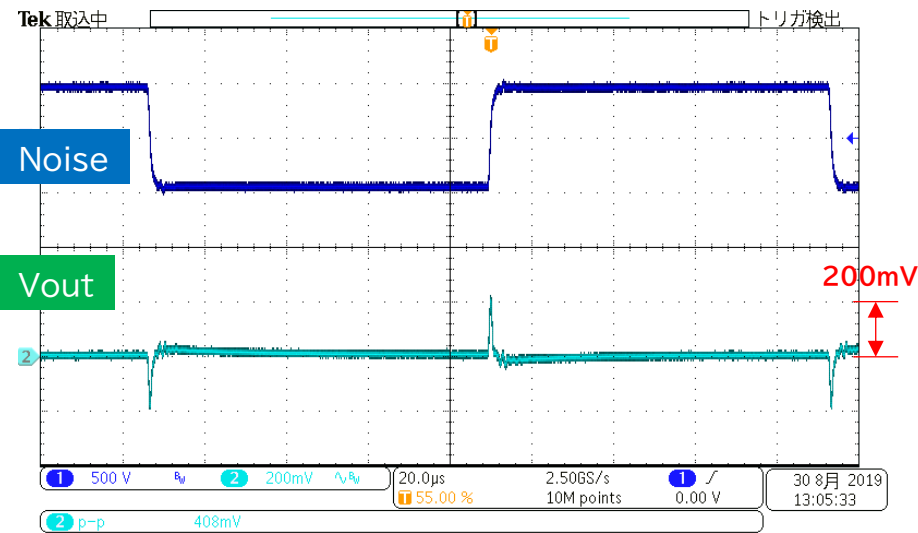
Low dv/dt Level

**Lower dv/dt level**



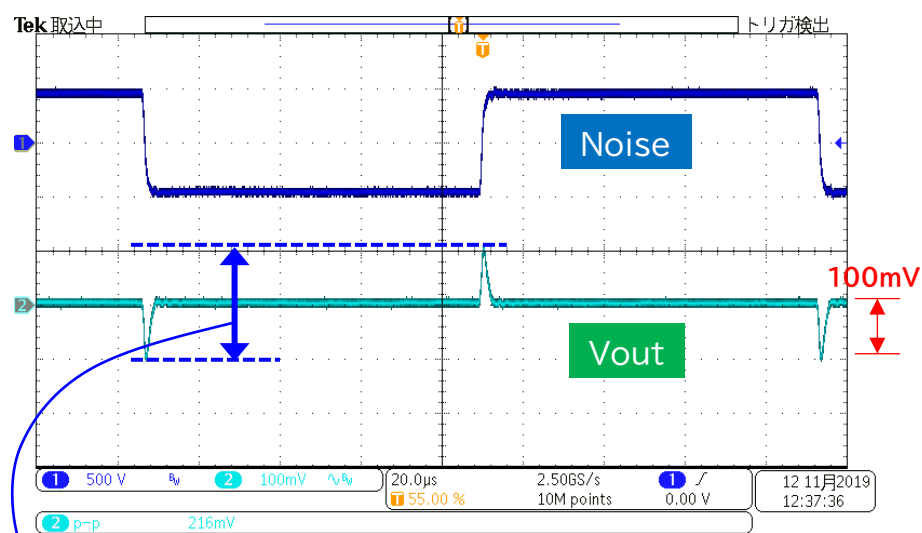
L51S series

Competitor's product



Error = 408mVpp

Tamura products: L51S



Error = 216mVpp

**45% reduction**

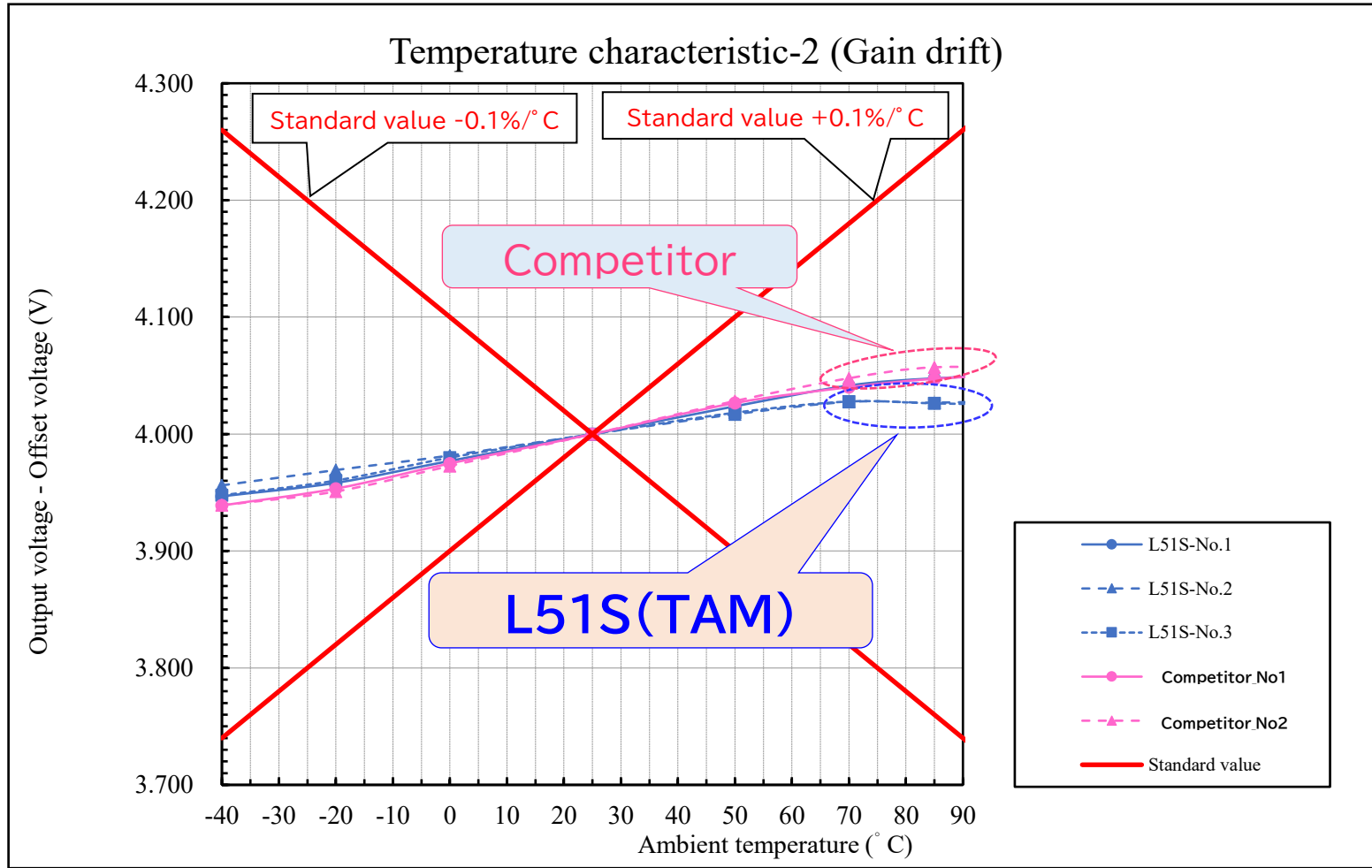
Test Noise :1kV  
 Noise : 500V/div  
 output voltage : 0.2V/div  
 Time :20μs/div

# Introduction of Open Loop Current Sensor

## 3. Features of Tamura Current Sensors ~Case of Open loop F series~

Lower output gain

**Lower offset gain**

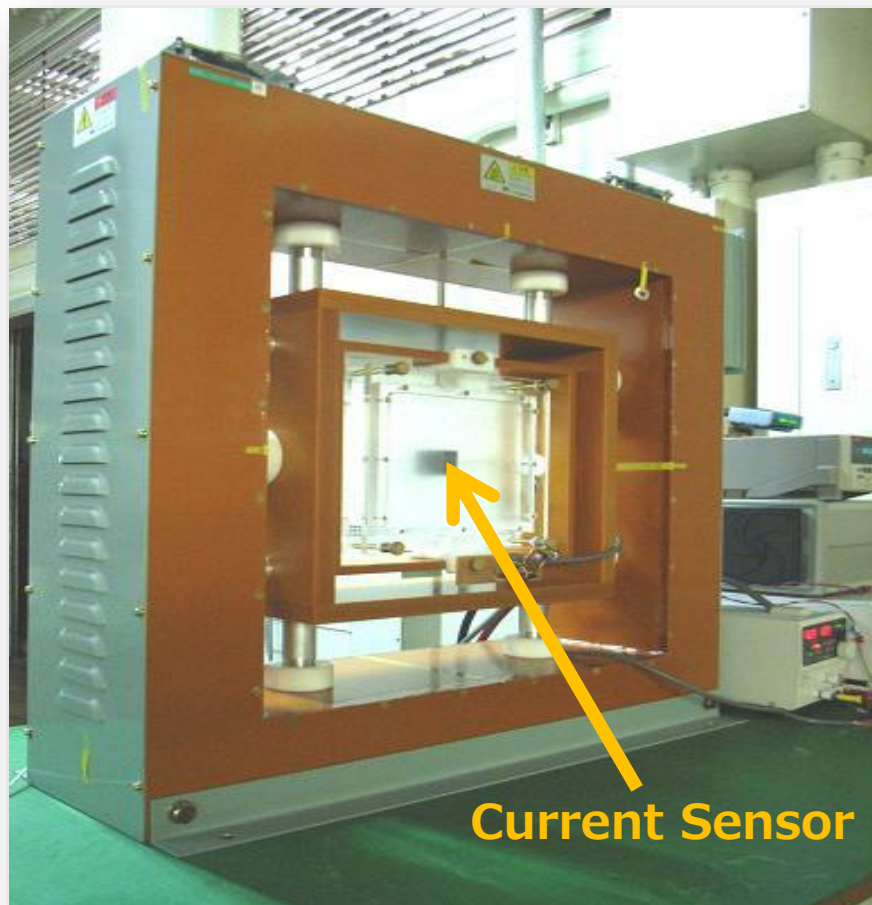


L51S series

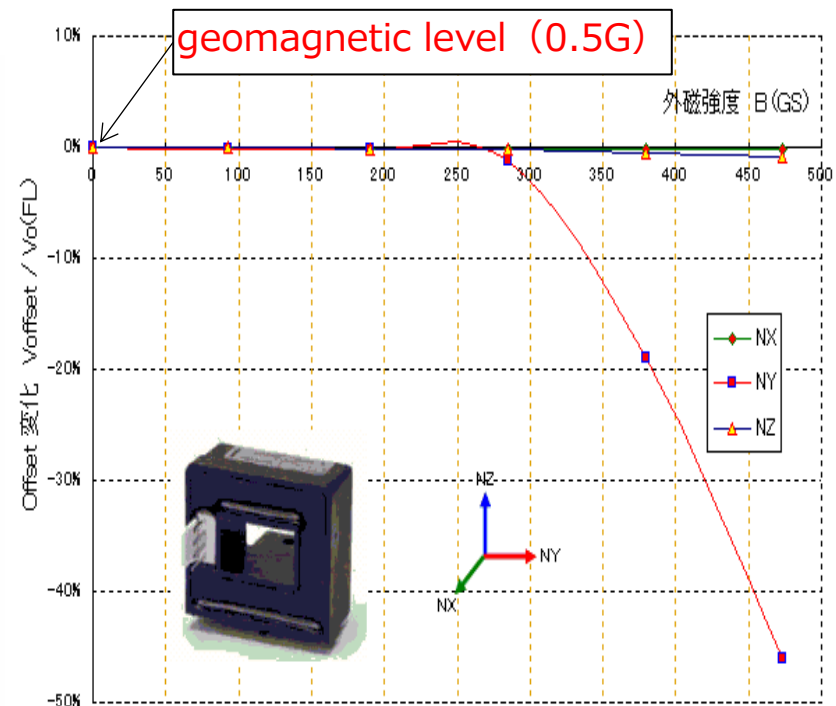
# Introduction of Open Loop Current Sensor

## 4. Technology to support of Current Sensors

### Magnetic noise immunity



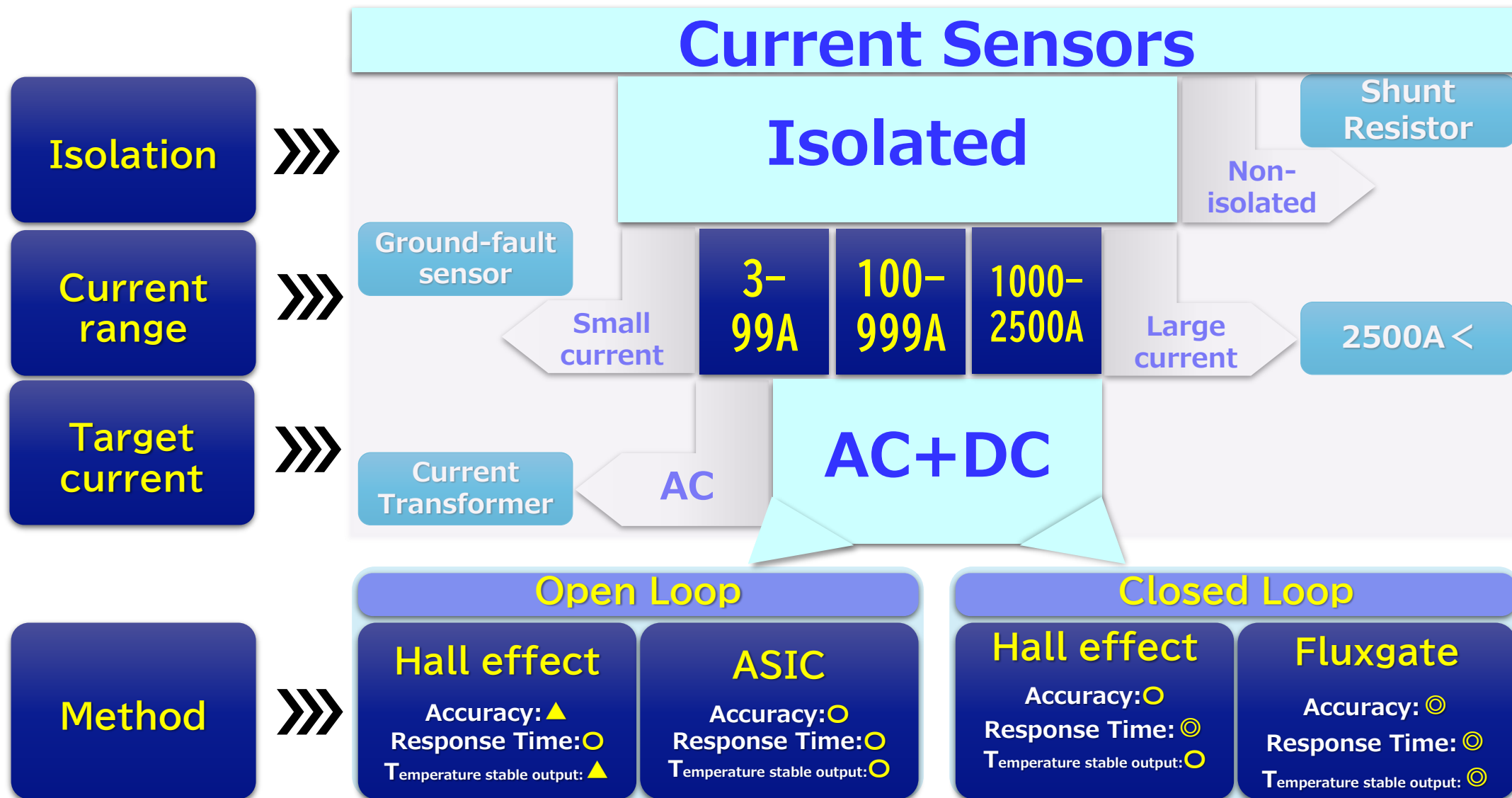
External magnetic noise evaluation equipment



**It is possible to evaluate magnetic noise immunity quantitatively from the geomagnetic level.**



















# Introduction of Open Loop Current Sensor

## 5. Product lineup / Tamura CS products range



# Introduction of Open Loop Current Sensor

## 5. Product lineup

Appearance	Current Range	Supply Voltage	Output Voltage	DC1500V system	Mounting	Model	Details
	3~30A	±15V	+4V	-	PCB	L07P(D15)	
		+5V	Vcc/2+1.25V	-	PCB	L07P(S05)	
	50~500A	±15V	+4V	-	PCB	L08P	
	3~60A	±15V	+4V	-	PCB	L18P	
	50~400A	+5V	+2.5V or Vref_in±0.625V	-	PCB	L32P	
	50~600A	±15V	+4V	-	Panel	L37S(D15)	
		+5V	+2.5V or Vref_in±0.625V	-	Panel	L37S(S05)	
	200~1500A	±15V	+4V	-	Panel	L34S	
	200~1500A	±15V	+4V	○	Panel	L40S	
	500~2500A	±15V	+4V	○	Panel	L51S	
	1500~2500A	±15V	+4V	-	Panel	L55S	

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Tamura's mascot "Quenu"