



- High Accuracy
- Broad Bandwidth
- Low Zero-drift

Shenzhen Hangzhi Precision Electronics Co., Ltd.

**Product Model:** AIT700-SG  
**Measurement Range:** DC  $\pm 700A$   
**Accuracy:** 10PPM

## AIT700-SG High-Precision Current Transducer

AIT700-SG has a high gain and measurement accuracy in the full bandwidth range, due to the application of the multi-point zero-flux technology system and high-frequency ripple sensing channel on top of currently existing DC sensor technology.

The multi-point zero-flux technology system secures the high accuracy by utilizing the technology combination of exciting magnetic flux closed-loop control, self-excited magnetic flux gate and multi-closed-loop control that realizes the closed-loop control between excitation magnetic flux and AC/DC magnetic flux generated by primary current, while the high-frequency ripple sensing channel allows the sensor to have the high performance over the full bandwidth range.

### Product photo





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## Key Technologies

- ◇ Excitation closed-loop control technology
- ◇ Self-excitation demagnetization technology
- ◇ Multi-point zero-flux technology
- ◇ Temperature control compensation technology
- ◇ Multi-range automatic switching technology

## Features

- ◇ Insulated measurement between primary and secondary side
- ◇ Excellent linearity and accuracy
- ◇ Extremely low temperature drift
- ◇ Extremely low zero drift
- ◇ Broad band and low response time
- ◇ Strong anti-electromagnetic interference

## Application Domain

- ◇ Medical Equipment: Scanner, MRI
- ◇ Power Industry: Converter, Inverter
- ◇ Renewable Energy: Photovoltaic, Wind energy
- ◇ Testing Instrument: Power analyzer, High-precision power supply
- ◇ Smart Power Grid: Power generation and battery monitoring, Medium low voltage substation
- ◇ Industry Control: Industrial motor drive, UPS, Welding, Robot, Hoist, Elevator, Ski lift
- ◇ Rail Transit: EMU, Metro, Trolley car
- ◇ Ship: Electric driven ship
- ◇ Car: Electric car

## Electrical Performance

| Parameter                      | Symbol       | Measuring Conditions  | Min        | Typ       | Max        | Unit     |
|--------------------------------|--------------|-----------------------|------------|-----------|------------|----------|
| Primary nominal direct current | $I_{PN\_DC}$ | —                     | —          | $\pm 700$ | —          | Adc      |
| Primary nominal RMS current*   | $I_{PN\_AC}$ | —                     | —          | 495       | —          | Aac      |
| Primary overload current       | $I_{PM}$     | 1 Minute              | —          | —         | $\pm 900$  | Adc      |
| Operating Voltage              | $U_C$        | —                     | $\pm 14.2$ | $\pm 15$  | $\pm 15.8$ | V        |
| Power consumption current      | $I_{PWR}$    | Rated primary current | $\pm 30$   | $\pm 430$ | $\pm 550$  | mA       |
| Conversion ratio               | $K_N$        | Primary/secondary     | 1750:1     | 1750:1    | 1750:1     | —        |
| Secondary nominal RMS current  | $I_{SN}$     | Rated Primary current | —          | $\pm 0.4$ | —          | A        |
| Secondary burden resistance    | $R_M$        | See Fig. 1            | 0          | 2.5       | 5          | $\Omega$ |

\* refers to AC effective value



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## Accuracy Measurement

| Parameter                                      | Symbol          | Measuring Conditions          | Min | Typ | Max                                  | Unit      |
|--|-----------------|-------------------------------|-----|-----|--------------------------------------|-----------|
| Accuracy                                       | X <sub>G</sub>  | Input direct current, 25±10°C | —   | —   | 10                                   | ppm       |
| Linearity error                                | ε <sub>L</sub>  | —                             | —   | —   | 2                                    | ppm       |
| Offset temperature coefficient                 | T <sub>C</sub>  | —                             | —   | —   | 0.1                                  | ppm/K     |
| Offset stability over time                     | T <sub>T</sub>  | —                             | —   | —   | 0.2                                  | ppm/month |
| Power supply interference                      | T <sub>V</sub>  | —                             | —   | —   | 1                                    | ppm/V     |
| Zero offset current                            | I <sub>O</sub>  | @25°C                         | —   | —   | 1 (can be adjusted to zero by users) | ppm       |
| Ripple current                                 | I <sub>N</sub>  | DC-10Hz                       | —   | —   | 0.5                                  | ppm       |
| Dynamic response time to 90%I <sub>PN_DC</sub> | t <sub>r</sub>  | di/dt of 100A/μs              | —   | —   | 5                                    | μs        |
| di/dt accurately followed                      | di/dt           | —                             | 100 | —   | —                                    | A/μs      |
| Frequency bandwidth (-3dB)                     | BW              | —                             | 0   | —   | 500                                  | kHz       |
| Zero offset current                            | I <sub>OT</sub> | Full temperature range        | —   | —   | ±5                                   | μA        |

## Safety Characteristics

| Parameter   | Symbol          | Measuring Conditions | Value | Unit |
|---|-----------------|----------------------|-------|------|
| Insulation voltage / Between primary and secondary        | U <sub>d</sub>  | 50Hz, 1min           | 2.5   | KV   |
| Impulse withstand voltage / Between primary and secondary | U <sub>w</sub>  | 50μs                 | 5     | KV   |
| Insulation voltage / Secondary side to outer shell        | V <sub>d</sub>  | 50Hz, 1min           | 2.5   | KV   |
| Creepage distance / Between primary and shield            | d <sub>CP</sub> | —                    | 11    | mm   |
| Clearance distance / Between primary and shield           | d <sub>CI</sub> | —                    | 11    | mm   |
| Comparative tracking index                                | CTI             | IEC-60112            | 600   | V    |

## General Characteristics

| Parameter                     | Symbol         | Measuring Condition | Min | Typ     | Max | Unit |
|-------------------------------|----------------|---------------------|-----|---------|-----|------|
| Ambient operating temperature | T <sub>A</sub> | —                   | -40 | —       | +85 | °C   |
| Ambient storage temperature   | T <sub>S</sub> | —                   | -40 | —       | +85 | °C   |
| Relative humidity             | RH             | —                   | 20  | —       | 80  | %    |
| Mass                          | M              | —                   |     | 1150±80 |     | g    |

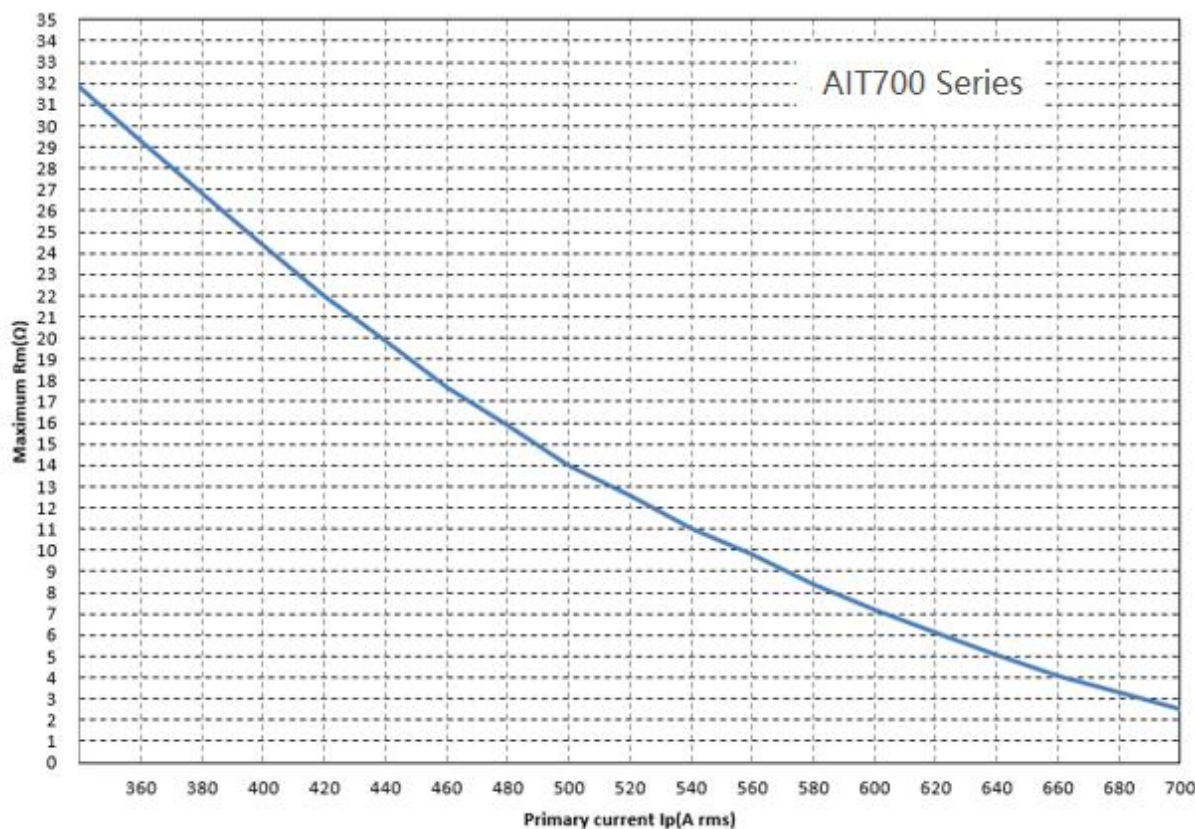


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## Burden Resistor Instructions



## Safety



### Cautions

This specifications documents provide users with relevant precautions for installation, commissioning, operation and maintenance. Please read carefully before installation and use. This manual is provided with the product, please keep it in a proper place for reference during maintenance.

The device must be used according to the manufacturer specifications, otherwise there are risks to damage the device, other equipment connected, and safety risks to operators.

Always inspect the device and its accessories, and confirm they are in good status before energize the device.



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If you find any damage to the device housing, fixing, power cord, connecting cables, or connected equipment, immediately disconnect the device from the power source.

If you have concerns about the safe operation of the equipment, you should immediately shut down the equipment and the corresponding accessories, and get in touch with the technical support department of our company as soon as possible to communicate and solve the problem.



## Danger

The current sensor is not allowed to be used when the secondary output is open-circuited, that is, when the primary has current or the sensor is powered on, the secondary output terminal is not allowed to be disconnected; only when the bus has no current and the sensor is not powered on, the current output terminal of the sensor can be disconnected. Otherwise, high voltage may be induced and there is a danger of electric shock or equipment damage.

When you need to move the product, please be sure to cut off the power first and unplug all the connecting cables connected to it.

## Operating Status Instructions

### ◇ Normal status:

The green indicator is on when the device is running normally:

After the device is powered on, the green indicator is on when the device is running normally, and the 3rd pin and 8th pin of D-Sub9 interface are connected together.

### ◇ Fault status:

The green light will be off when the transducer is in fault mode.

Trouble-shooting:

When the green light is off, the power supply should be checked as the first step;

If the power supply is normal, then the primary current is over the specified measurement range and the transducers will be in overload mode.

In this mode, the transducers will be working in non-zero flux mode, that the secondary current remains at specified maximum output, the secondary and primary currents are not in proportional and the connection between pin 3 & 8 of the DB9 interface will be off.



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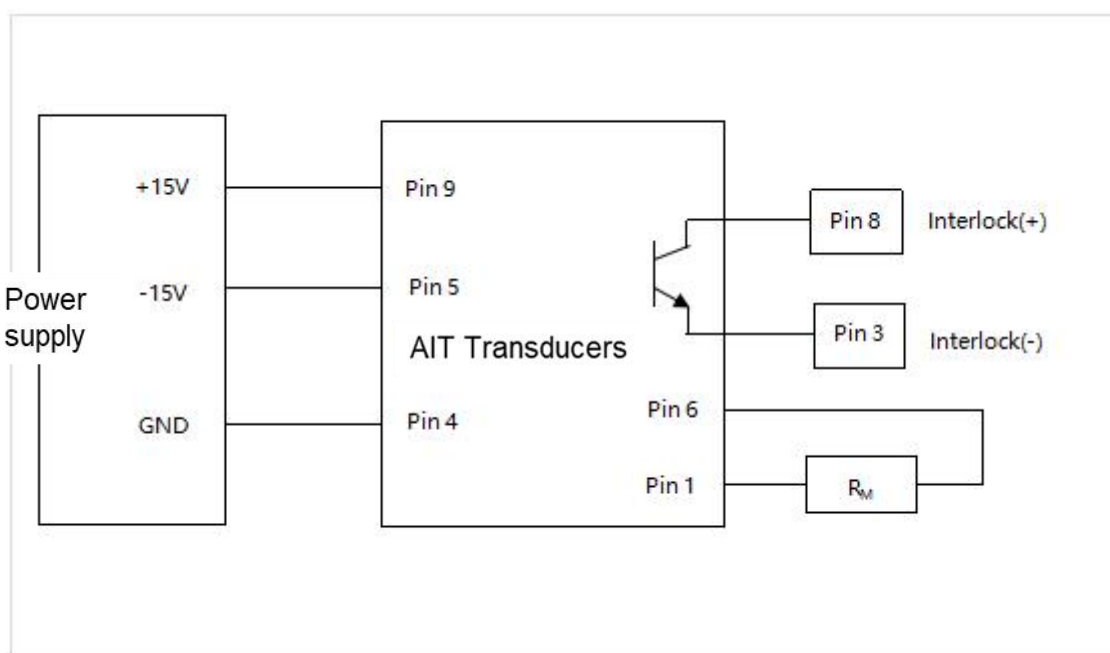
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## Connection system

### 1. D-Sub9 Connection terminal pin function definition

| Pin No.    | 1               | 2、7 | 3            | 4   | 5              | 6        | 8            | 9              |
|------------|-----------------|-----|--------------|-----|----------------|----------|--------------|----------------|
| Definition | I_Output<br>COM | N.C | Interlock(-) | GND | -15V<br>Supply | I_Output | Interlock(+) | +15V<br>Supply |



Test instruction:

The primary current  $I_P$  can be obtained by measuring the test current  $I_S$  flowing through  $R_M$  or the voltage  $U_R$  across  $R_M$ :

$$I_P = K_N * I_S = K_N * (U_R / R_M)$$

### 2. Interlock Port connection description:

There are two types of Interlock Port connection based on users' actual application shown as Fig A and Fig B:



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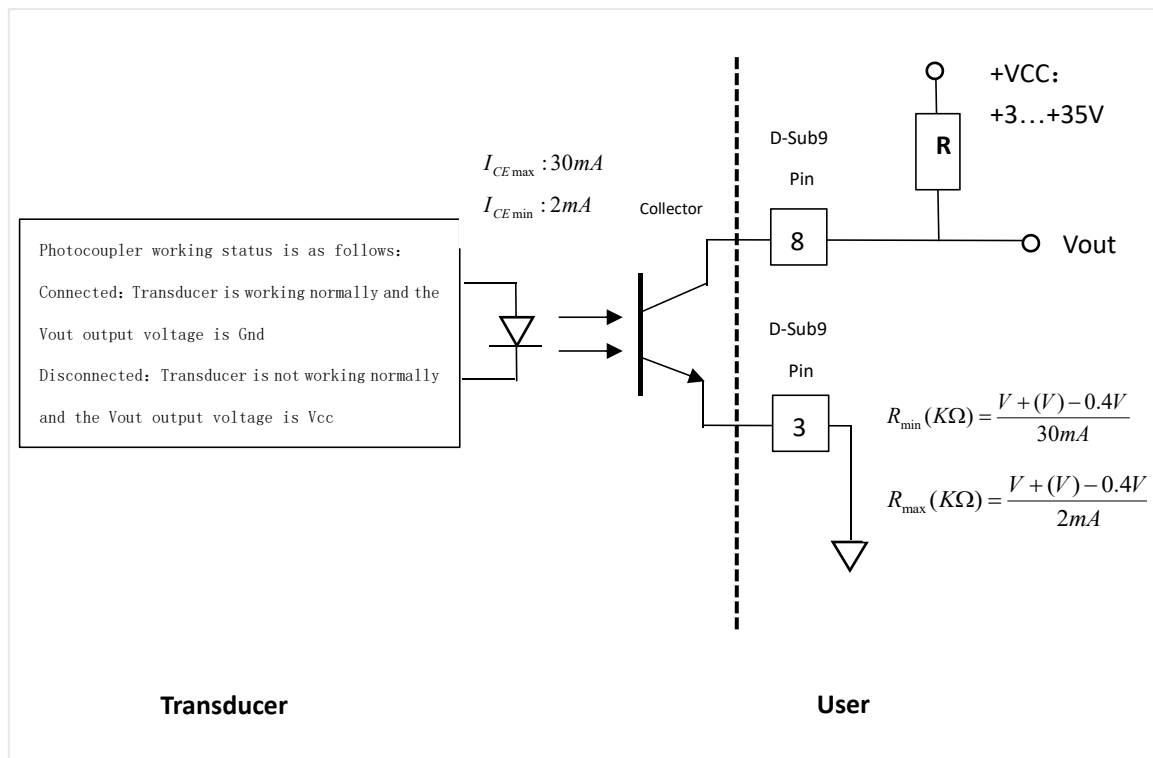


Fig A: Low level output when the transducer is operating normally

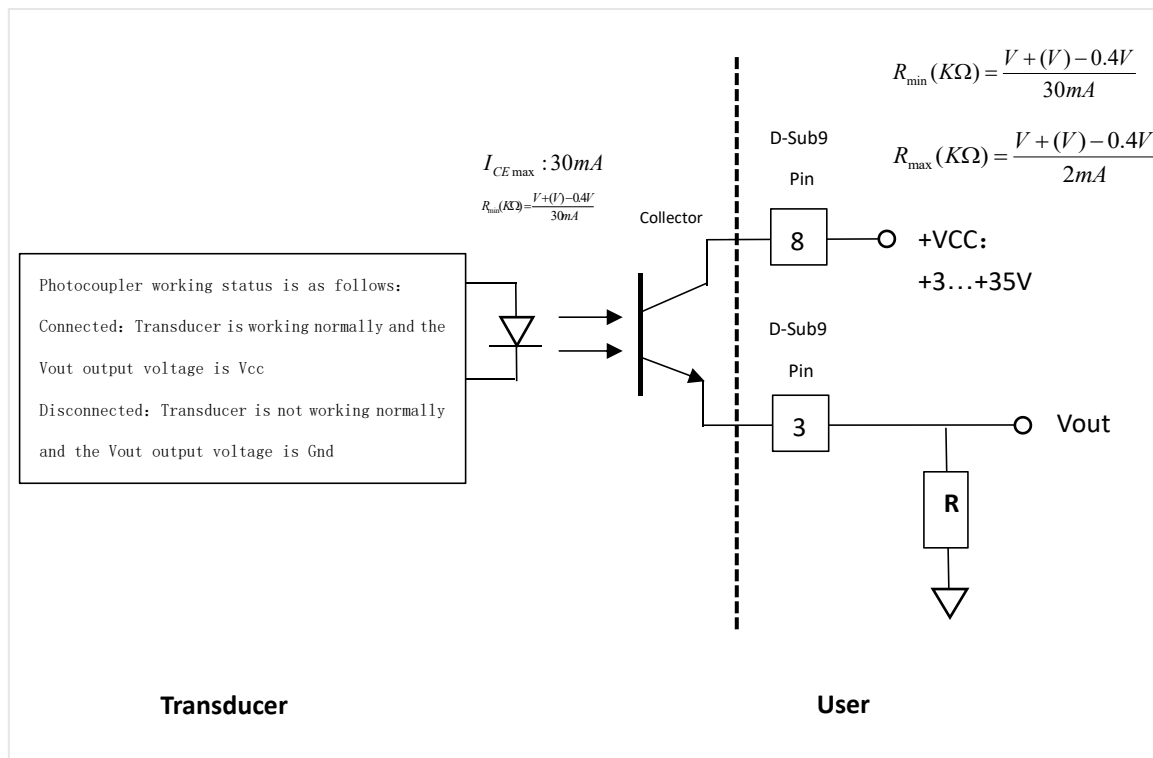


Fig B: High output when the transducer is operating normally





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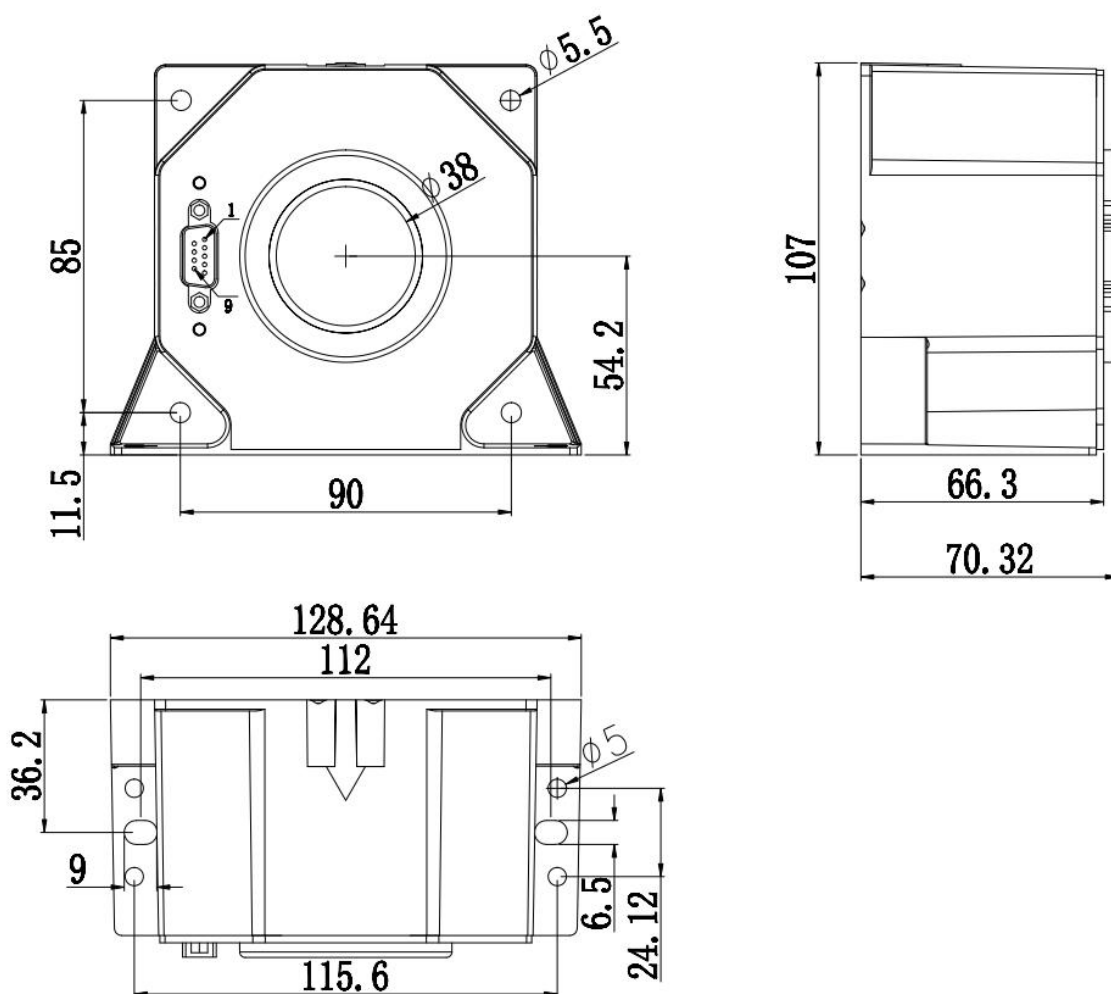
Accuracy: 10PPM

3.The output of the pin Vout in the optocoupler is related to the user-designed circuit, as shown in the following table.

| Parameter | Vout  | Description   |
|-----------|-------|---|
| Fig A     | <0.2V | The transducer is working normally.   |
|           | Vcc   | The transducer is working abnormally, i.e., in overload mode or abnormal power supply |
|           | <0.2V | The transducer is working abnormally, i.e., in overload mode or abnormal power supply |
| Fig B     | Vcc   | The transducer is working normally.   |

## Dimensions

Unit: mm







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## Packing List & Dimensions

Package dimensions (L x W x H): 157mm x 155mm x 110mm)

| Item      | Description        | Quantity | Comments |
|-----------|--------------------|----------|----------|
| AIT700-SG | Current Transducer | 1        | /        |