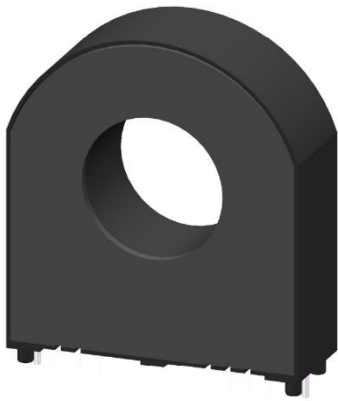


## ARCS01V

*Residual Current Sensor for Charging Equipment of Electric Vehicles*

- DC 6mA (IEC 62955)
- Type A 30mA and DC 6mA (IEC 62752; IEC61008-1/IEC60947-2-(M) + IEC 62955)



- Cost-effective PCB-mount solution of built-in residual current device for AC EV charger
- Trip Pin output based on solely DC 6mA or Type-A 30mA +DC 6mA detection
- Fast response time facilitating a broad selection of switching devices
- Compact design with 18mm through-hole for charging cable up to 3P+N 32A

**Technical Specification**

#	Technical Specification	ARCS01V-ADC-S	ARCS01V-DC6-S
101	Rated operating voltage in monitoring circuit	230/400VAC	230/400VAC
102	Rated current in monitoring circuit	≤ 32A	≤ 32A
103	Poles in monitoring circuit	1P+N / 3P+N	1P+N / 3P+N
104	Frequency in monitoring circuit	50Hz	50Hz
105	Rated impulse withstand voltage in monitoring circuit	6kV	6kV
106	Over-voltage category in monitoring circuit	III	III
201	Rated operating voltage in control circuit, Vcc	5VDC±3%	5VDC±3%
202	Power consumption	<500mW	<500mW
203	Pin 1 – Vcc	5VDC	GND
204	Pin 2 – TRIP	AC&DC Detection	DC Detection
205	Pin 3 – GND	GND	GND
206	Pin 4 – CAL	CAL	CAL
207	Pin 5 - TEST	Test	Test
301	Rated DC residual operating current $I_{\Delta dc}$	6mA	6mA
302	Rated DC residual non-operating current $I_{\Delta ndc}$	3mA	3mA
303	Rated AC residual operating current $I_{\Delta n}$	30mA	-
304	Rated AC residual non-operating current $I_{\Delta nc}$	15mA	-
305	Electrical endurance	20,000	20,000
306	Rated operating temperature	-40~85 °C	-40~85 °C
307	Pollution degree	2	2

## Residual Current Detection Characteristics

### Operating Current

#	Description	ARCS01V-ADC-S	ARCS01V-DC6-S
401	Operating current for smooth DC	4.0~6.0 mA	4.0~6.0 mA
402	Operating current for DC rectified from 2 phases	4.0~7.0 mA	4.0~7.0 mA
403	Operating current for DC rectified from 3 phases	4.0~6.2 mA	4.0~6.2 mA
404	Operating current for sinewave AC	22.0~28.0 mA	-
405	Operating current for A0 pulsating DC	10.5~42.0 mA	-
406	Operating current for A90 pulsating DC	7.5~42.0 mA	-
407	Operating current for A135 pulsating DC	3.3~42.0 mA	-

### Operating Time

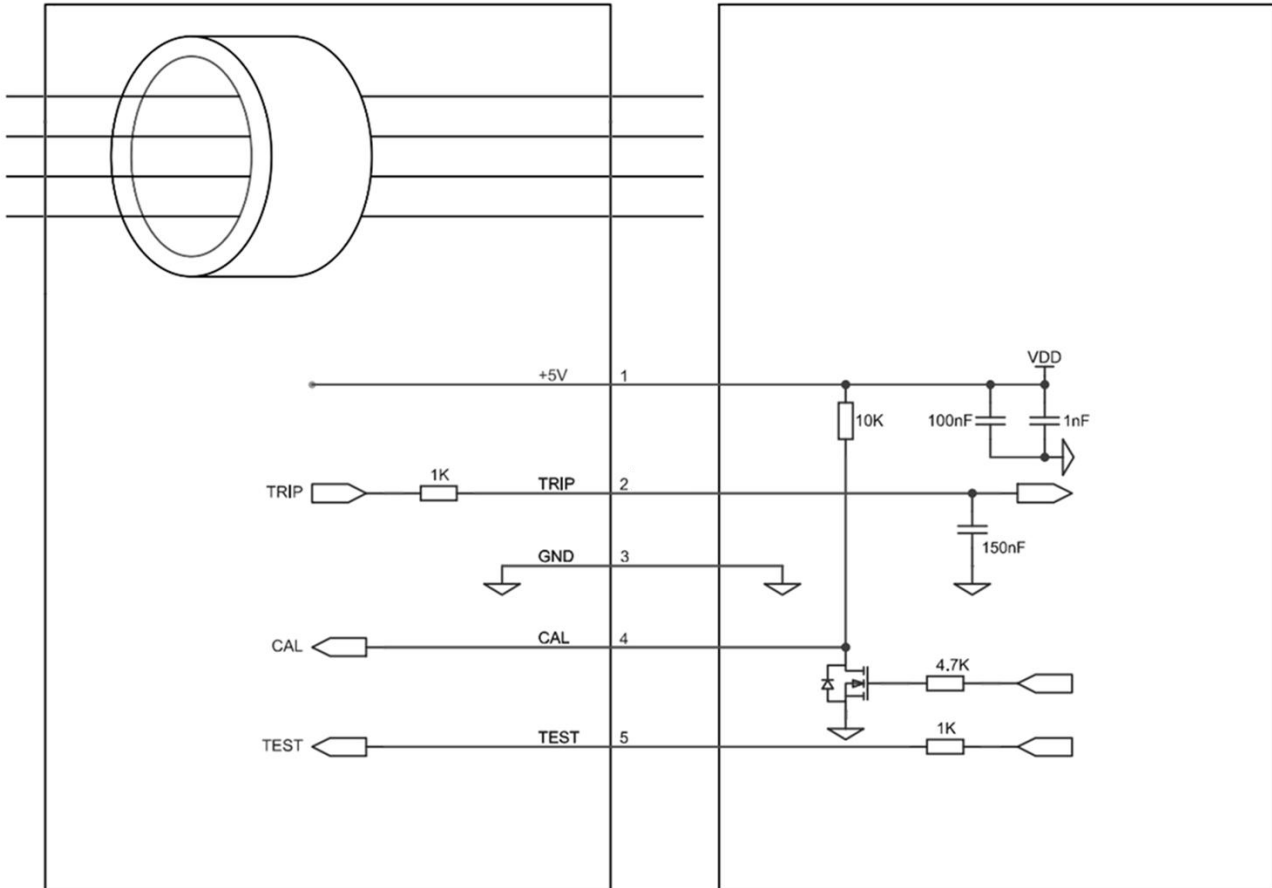
#	Description	ARCS01V-ADC-S	ARCS01V-DC6-S
501	Response time for 6mA smooth DC residual current	≤ 500 ms	≤ 500 ms
502	Response time for 60mA smooth DC residual current	≤ 200 ms	≤ 200 ms
503	Response time for 200mA smooth DC residual current	≤ 70 ms	≤ 70 ms
504	Response time for 300mA smooth DC residual current	≤ 20 ms	-
505	Response time for 60mA DC rectified from 2 phases	≤ 200 ms	≤ 200 ms
506	Response time for 200mA DC rectified from 2 phases	≤ 70 ms	≤ 70 ms
507	Response time for 300mA DC rectified from 2 phases	≤ 20 ms	-
508	Response time for 60mA DC rectified from 3 phases	≤ 200 ms	≤ 200 ms
509	Response time for 200mA DC rectified from 3 phases	≤ 70 ms	≤ 70 ms
510	Response time for 300mA DC rectified from 3 phases	≤ 20 ms	-
511	Response time for 30mA AC residual current	≤ 80 ms	> 10000 ms
512	Response time for 60mA AC residual current	≤ 60 ms	> 300 ms
513	Response time for 150mA AC residual current	≤ 20 ms	> 80 ms
514	Response time for 5A AC residual current	≤ 20 ms	> 80 ms

**Application Notes of 5V DC Interface Version**

**Typical application diagram**

**ARCS01V 5V version**

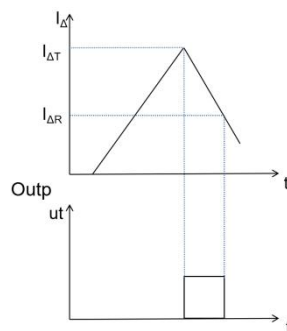
**EV charging controller**



**Additional information**

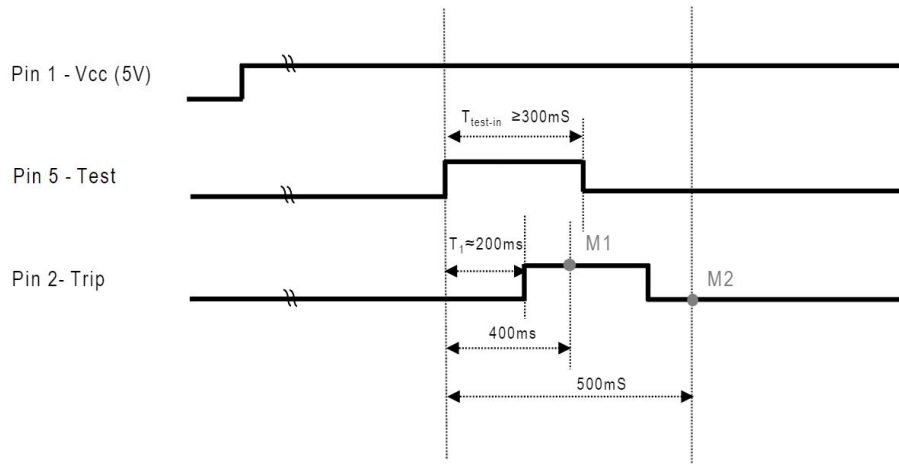
- A direct connection of Pin 2/6 to switching devices such as relays or contactors- is NOT allowed. The trip signal of Pin2/6 is suggested to be monitored by the charging controller MCU.

**Figures:**



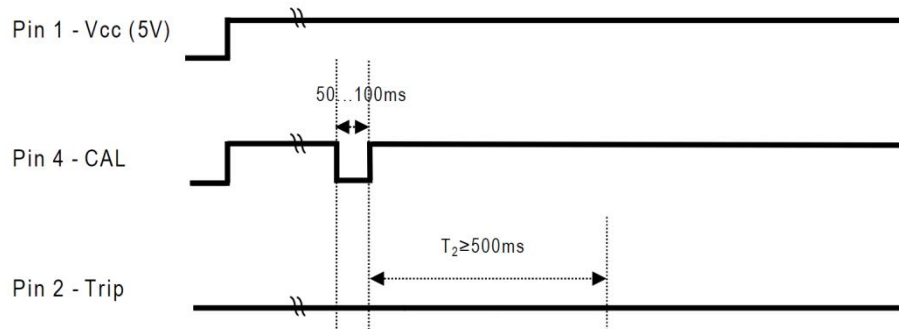
If the trip-level  $I_{\Delta T}$  is accomplished the output will change their state from low-level (GND) to high level. Depending on the existence of the residual current  $I_{\Delta}$ , the output will remain in this state until  $I_{\Delta}$  falls below the threshold  $I_{\Delta R}$ .

**Self-test time chart**



A self-test excluding offset calibration is activated if Pin 5 - Test is connected to a high level for a period above 300ms.  $t_1$  is the response time for internally generated test current.

**Offset calibration time chart**



An offset calibration is activated if Pin 4 - CAL is connected to GND for a period of 50ms to 100ms. An offset calibration can be activated at regular intervals (such as start-up) or after the occur of certain critical events (such as short circuit).

$T_2 (\geq 500 \text{ ms})$  indicates the waiting period for the calibration to complete.

**Attention:** During the offset calibration, NO leakage current or any other current may flow through the device and the relays/contactors must be open. Also, the power supply voltage at Pin 1 Vcc must stay at 5VDC  $\pm$  3%.

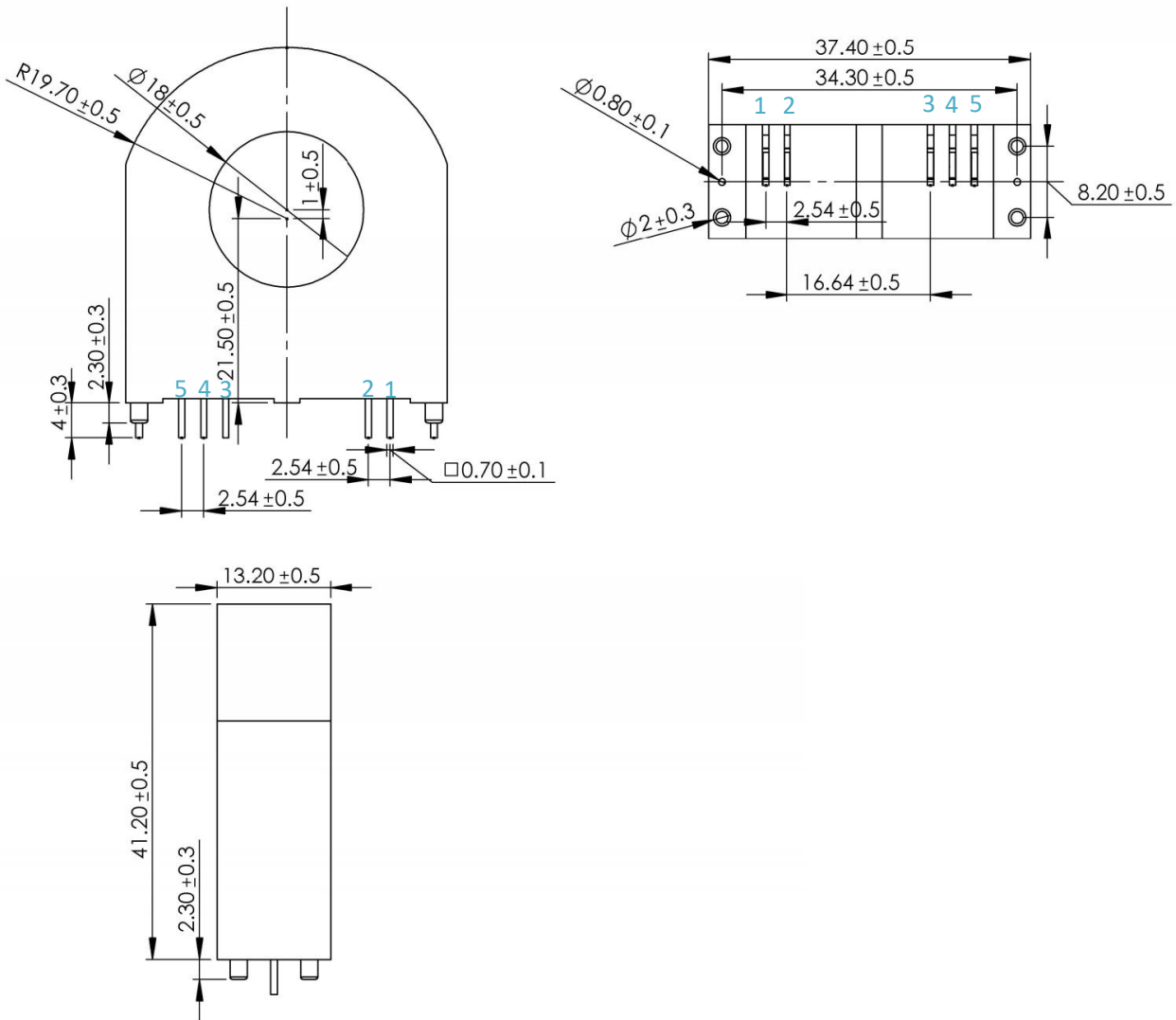
**Possible Output States**

Status	Pin-2 Trip Output (ARCS01V-ADC-S)	Pin-2 Trip Output (ARCS01V-DC6-S)
Normal condition	GND	GND
$I_{\Delta} \geq 6 \text{ mA DC}$	High level	High level
$I_{\Delta} \geq 30 \text{ mA AC}$	High level	GND <sup>1)</sup>
$I_{\Delta} \geq 30 \text{ mA AC} \ \& \ I_{\Delta} \geq 6 \text{ mA DC}$	High level	High level

A change from GND to High level is allowed, as long as such a change is compliant with IEC 62955.

**Mechanical outline**

**ARCS01V-ADC/DC6-S:**



	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5
ARCS01V-ADC-S	5V DC	AC & DC Trip	GND	CAL	Test
ARCS01V-DC6-S	5V DC	DC Trip	GND	CAL	Test

### Ordering information

#	Order Number	Description
1	ARCS01V-ADC-S	ARCS01V Residual Current Sensor, 5V DC Type A 30 mA+DC6mA, 32A, 1P+N / 3P+N
2	ARCS01V-DC6-S	ARCS01V Residual Current Sensor, 5V DC DC6mA, 32A, 1P+N / 3P+N

### Additional Notes

- Do NOT allow strong static electricity near the sensor, because static electricity can cause damage to the ICs inside the sensor.

Take static electricity precautions when handling.

- Do NOT drop the sensor or apply any other mechanical stress to the sensor, as such stresses may change performance characteristics.
- Please place the sensor with an appropriate distance from components that can generate high magnetic fields, such as relays or contactors, to ensure accurate residual current detection.
- Please refer to the product standards of RCD/RDC-DD (Residual Current Device / Residual Direct Current Detection Device) , when designing built-in RCD/RDC-DD for mode-2/3 Electric Vehicle Supply Equipment with the sensor.



The sensor is susceptible to be damaged from an ESD event and the personnel should be grounded when handling it.

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变更说明（正式发布后应移除）

版本	日期	变更项	编写	审核 (R&D)	审核 (QM)
V0.0.1	20240424	V1.0 完成, 初步使用	HX	LHL	ZG
V0.0.2	20240702 (Preliminary)	1) 添加电平反转图 2) 修改自检和校准时序图和文字描述 3) 修改产品型号 -》尺寸图信息还有缺失信息等韦工反馈	XHJ	LHL	ZG