Hall-Effect Vane Sensor CYHME56

INTRODUCTION

ChenYang Automotive Shaft Position Monitoring Sensor CYHME56 is designed to work in the conditions of automobile environment. The device is produced in compliance with the international standard and features: modern design, accurateness, endurance, narrow temperature drifting, smooth and clean output curve as well as non instantaneous dithering.

It is applicable to engines with electronic ejection. The main applications are in automobile industry, i.e. as a breakerless trigger in electronic systems, in control engineering, especially in those areas where switches/ sensors must operate maintenance-free under harsh environmental conditions, e.g. rpm sensors, limit switches, position sensors, speed measurements, shaft encoders, scanning of coding disks etc.

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The CYHME56 is replacement for the similar products 2AV54, 2AV16A, 2AV51A, 2AV56 and 2AV63. They are compatible in electrical and mechanical properties but with different circuitry principle.

FEATURES

- Contactless switch/sensor with open collector output (40mA)
- Static switching/sensing
- High switching/sensing frequency
- Hermetically sealed with plastic
- Unaffected by dirt, light and vibration
- Large temperature and voltage ranges
- Integrated protection of overvoltage etc.

The Hall Effect vane sensor CYHME56 is a non-contact sensor/switch, which consists of a monolithic integrated Hall Effect circuit and a special magnetic circuit hermetically sealed in a plastic package. The sensor is actuated by a soft-iron vane passing through the air gap between magnet and Hall sensor.

MEASURING PRINCIPLE

The Hall Effect vane sensor consist of a Hall IC and a permanent magnet (SmCo, NdFeB disc or block), which are hermetically sealed in plastic (see the following figures). The sensor is actuated by a soft iron vane that passes through the air gap between the magnet and Hall IC. The open collector output is conductive (low) when the vane is outside the air gap (see Fig. a)), and blocks (high) when the vane moves into the air gap (see Fig. b)). The output remains high as long as the vane positions in the air gap. This is the so called static function. The output signal shape is in this case independent on the operating frequency.

a)

![diagram a]

Hall IC

Fe Flux
Conductors

Case Magnet
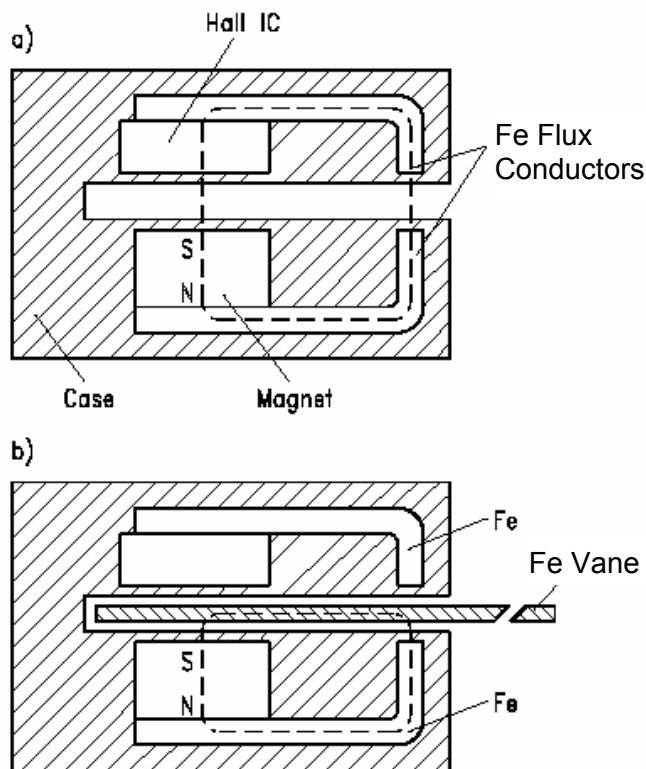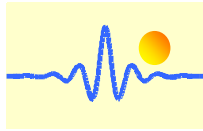
a) Magnetic flux through the
Hall-effect switch
with no vane
in the gap

b)

Fe

Fe Vane

Fe

b) Magnetic flux
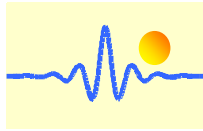short-circuited by
the soft-iron
vane

Overvoltage is integrated in the circuit in order to protect against most of the voltage peaks occurring in automotive and industrial applications. The output stage has a Schmitt trigger characteristic. Most of electronic circuits can be driven directly thanks to the open collector output current of maximum 40mA.

MECHANICAL CHARACTERISTICS

The Hall Effect vane sensor is hermetically sealed in a special plastic package, so that it can also be used under harsh environmental conditions. The package is waterproof, resistant to vibration, gasoline, oil and salt. Two tubular rivets are incorporated in the package to mount the sensor on the carrier plate. The sensor has three leads for power supply, output and ground.

ABSOLUTE MAXIMUM RATINGS

Supply Voltage	30V
Reverse Battery Voltage	- 40V
Output OFF Voltage	40V
Reverse Output Voltage	- 0.5V
Output Current (at T_A=25°C)	40mA for 5 minutes max
Operating Temperature Range	- 40°C~ +150°C

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ELECTRICAL CHARACTERISTICS at Vcc＝12V

Supply Voltage	4.5V~24V
Supply Current	≤9mA
Output Saturation Voltage(Sinking 20mA)	≤0.4V
Output Leakage Current	≤10uA
Output Rise Time	≤2uS
Output Fall Time	≤2uS
Output type	NPN (OC)

MECHANICAL PARAMETERS

Part number	De(mm) operation distance			Da(mm) release distance		
	Min	Typ	Max	Min	Typ	Max
CYHME56	0.85	1.45	2.05	1.54	2.29	3.04

CROSS REFERENCE

Part Number	Replacement
CYHME56	2AV54, 2AV16A, 2AV51A, 2AV56, 2AV63

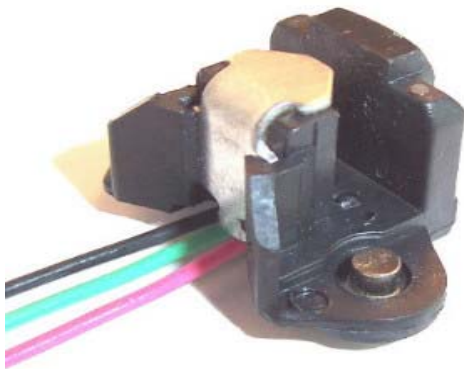## Application Notes

The output of these sensors is sinking current (OC, open collector). A pull-up resistor (1kΩ ~ 10kΩ) should be connected to the sensor output circuit (between power supply + and output).
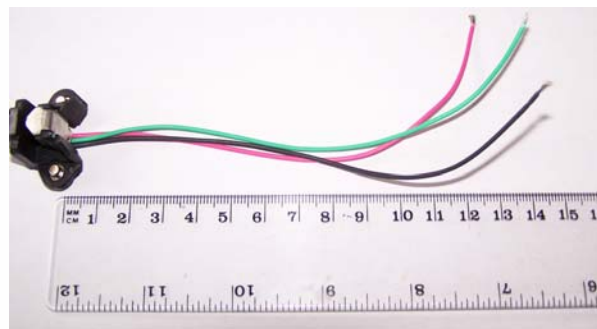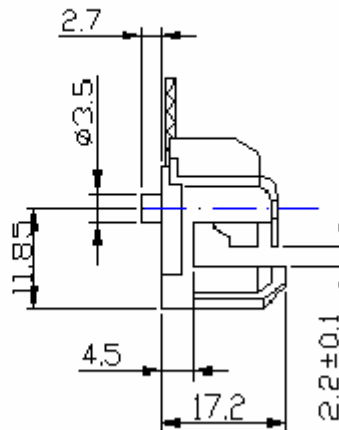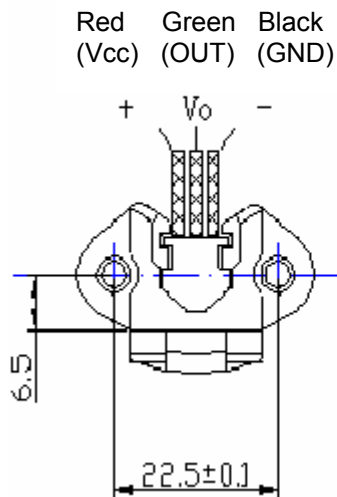
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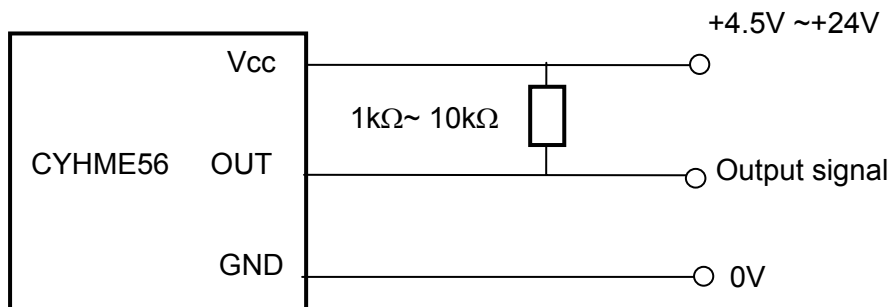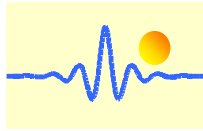
MOUNTING DIMENSIONS (for reference only)

The standard length of the leads is 150mm
Diameter: Ø1.4mm

Red   Green   Black
(Vcc)   (OUT)   (GND)

+   Vo   −

2.7

Ø3.5

11.85

6.5

22.5±0.1

4.5

17.2

2.2±0.1

The type and length of the leads can be made according to customer's requirements