

# Hall Effect Voltage Sensor CYHVS10-50LVA

CYHVS10-50LVA is a Hall Effect Voltage sensor, which is based on closed loop and magnetic compensation principle. This sensor can be used for measuring DC and AC voltage with different wave forms. It has high electric isolation.

#### **Features**

- High electrical isolation
- High reliability
- Good overload capability
- Small sizes
- Insulated plastic case recognized according to UL94-V0
- Very good property-price ratio

# **Applications**

- Railway Applications
- Battery supplied applications
- Uninterruptible power supplies (UPS)
- Variable speed drives
- Welding machine
- Electric power network monitoring
- AC frequency conversion servomotors.

#### **Technical Data**

Parameters	Values			Unit
Rated input current (I <sub>N</sub> )	±10			mA
Measuring range(I <sub>P</sub> )	0~ ±20			mA
Measuring voltage range	100 – 2500 (possible maximum voltage 10000)			V
Measuring resistance (R <sub>M</sub> )		R <sub>Mmin</sub>	R <sub>Mmax</sub>	Ω
	@ ±15V, I <sub>N</sub>	50	200	
	@ ±15V, 2 x I <sub>N</sub>	50	100	
	@ ±24V, I <sub>N</sub>	100	330	
	@ ±24V, 2 x I <sub>N</sub>	100	200	
Rated secondary current (Is)	± 50 ± 0.5%			mA
Power supply (V <sub>c</sub> )	±15 ~ ±24			V
Turns ratio (N)	5000 : 1000			
Current consumption (I <sub>c</sub> )	20+ls			mA
Galvanic isolation voltage	@ 50Hz,AC,1min, between primary and secondary +			kV
	shield: 12.0			
	@ 50Hz,AC,1min Between secondary and shield : 2.0			
Measuring accuracy (X <sub>G</sub> )	±0.5% FS (Full Scale)			
Linearity (ε <sub>L</sub> )	<0.1			% FS
Offset current (I <sub>o</sub> )	@ Ip =0,	≤±0.2		mA
Thermal drift of offset current lo	@-40°C~+85°C	≤ ±0.5		mA
Response time (t <sub>r</sub> )	≤200			μs
Ambient operating temperature (T <sub>A</sub> )	-40 ~ +85 (custom-made sensors: -55 ~ +85)			°C
Ambient storage temperature (T <sub>S</sub> )	- 40 ~ +125 (custom-made sensors: -55 ~ +125)			°C
Primary Impedance (Z <sub>p</sub> )	1.5kΩ, 6H			
Secondary coil resistance (R <sub>s</sub> )	@Ta=85°C, 55			Ω
Unit weight	450			g

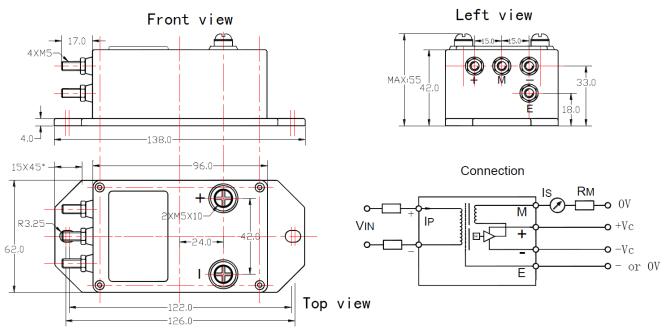
http://www.cy-sensors.com

#### Standards used for this sensor:

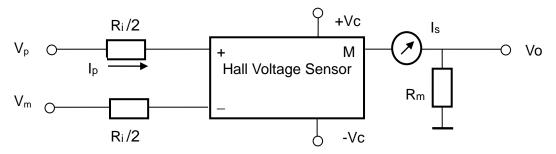
- UL94-V0.
- EN60947-1:2004
- IEC60950-1:2001
- EN50178:1998
- SJ 20790-2000



# **Case Style and Connection**

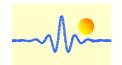


### **Measuring Principle**



Polarity: output current I<sub>s</sub> is positive when input current I<sub>p</sub> is applied on the "+" terminal

A magnetic field is generated by current  $I_p$  when a voltage  $(V_p-V_m)$  is applied on the input terminals of the sensor through the primary resistor  $R_i$ . This magnetic field is compensated with the reverse magnetic field caused by the current  $I_s$  in the secondary coil. The field compensation effect can be detected with a Hall Effect element. One obtains the following equation when the magnetic flux is zero:



$$N_p I_p = N_s I_s$$

where  $I_p$ : primary current;  $I_s$ : secondary current,

 $N_p$ : primary turns,  $N_s$ : secondary turns.

The secondary current  $I_s$  is considered as output current of the sensor. Therefore the voltage  $(V_p-V_m)$  can be measured in this way under using the measuring resistor  $R_m$ .

## **Application Note**

### 1) Determination of Primary Resistor R<sub>i</sub>

The primary resistor R<sub>i</sub> should be selected to enable the rated input current to be equal 10mA in order to obtain an optimal measuring accuracy.

For instance, the resistor Ri is  $25k\Omega$  for a rated input voltage of 250V. Here is recommended resistor in dependence of the measuring voltage:

Rated Input voltage (V)	Primary resistor Ri (kΩ) at input current of 10mA	
100	10	
200	20	
300	30	
400	40	
500	50	
600	60	
700	70	
800	80	
900	90	
1000	100	
1500	150	
2000	200	
2500	250	

With the selection of high-power input resistors, the maximum possible measurement voltage is 10,000 V.

## 2) Measuring Range

The sensors are suitable for measuring a voltage  $\pm 100 \sim \pm 2500$ V. The primary resistor should be considered when selecting the measuring range in order to keep the temperature heating to a possible low level and to guarantee the high electric isolation property.