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

- Battery supplied applications
- Uninterruptible power supplies (UPS)
- Variable speed drives
- Welding machine
- Electric power network monitoring
- AC frequency conversion servo-motors
- Electrochemical applications

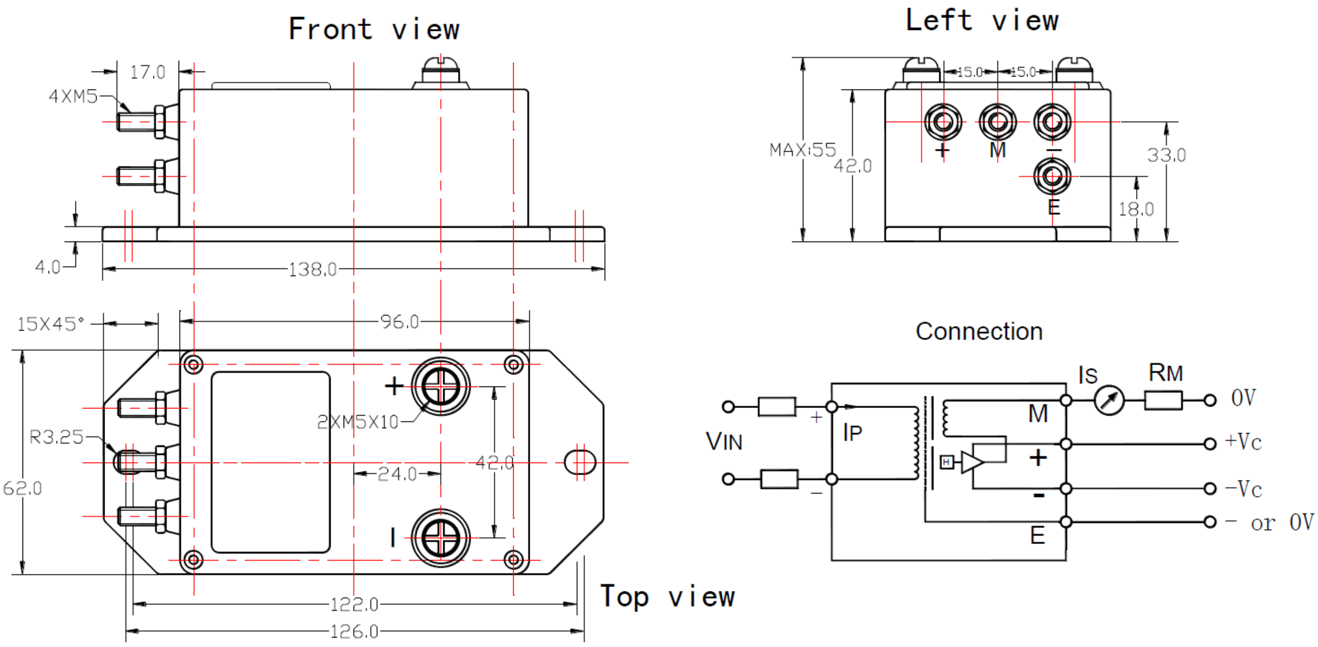
Technical Data

Parameters	**Values**			Unit
Rated input current (I_N)	±10			mA
Measuring range(I_P)	0~ ±20			mA
Measuring voltage range	100 – 2500 (possible maximum voltage 10000)			V
Measuring resistance (R_M)		R_{Mmin}	R_{Mmax}	Ω
	@ ±15V, I_N	50	200	
	@ ±15V, 2 x I_N	50	100	
	@ ±24V, I_N	100	330	
	@ ±24V, 2 x I_N	100	200	
Rated secondary current (I_S)	± 50 ± 0.5%			mA
Power supply (V_c)	±15 ~ ±24			V
Turns ratio (N)	5000 : 1000			
Current consumption (I_c)	20+Is			mA
Galvanic isolation Isolation voltage	@ 50Hz,AC,1min, between primary and secondary + shield: 12.0			kV
	@ 50Hz,AC,1min Between secondary and shield : 2.0			
Measuring accuracy (X_G)	±0.5% FS (Full Scale)			
Linearity (ε_L)	<0.1			% FS
Offset current (I_o)	@ Ip =0, ≤±0.2			mA
Thermal drift of offset current Io	@-40°C~+85°C ≤ ±0.5			mA
Response time (t_r)	≤200			µs
Ambient operating temperature (T_A)	-40 ~ +85			°C
Ambient storage temperature (T_S)	- 40 ~ +125			°C
Primary Impedance (Z_p)	1.5kΩ, 6H			
Secondary coil resistance (R_s)	@Ta=85°C, 55			Ω
Unit weight	450			g

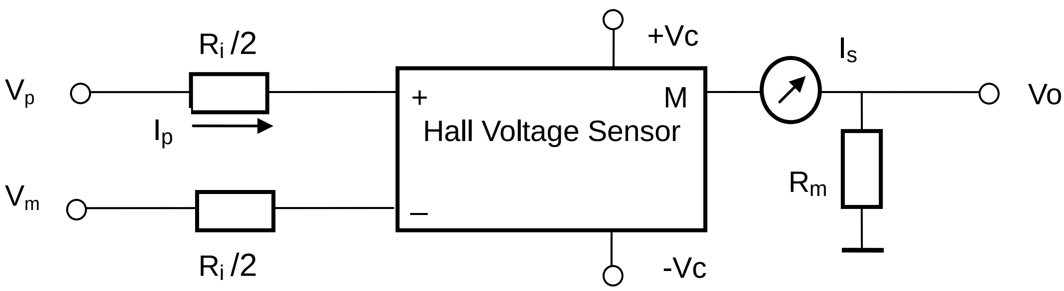
Standards used for this sensor:

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

Case Style and Connection



Measuring Principle



Polarity: output current I_s is positive when input current I_p 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:

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$$N_p I_p = N_s I_s$$

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_i

The primary resistor R_i 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 25kΩ 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 ±100 ~ ±2500V. 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.