VN4A M15

Voltage sensor

Model Number：

VN4A 500 M15
VN4A 750 M15
VN4A 1500 M15
VN4A 2000 M15

For the electronic measurement of current: DC, AC, pulsed…, with galvanic insulation between the primary and the secondary circuits.

Features

- Closed loop (compensated) voltage sensor using the Hall Effect.
- Galvanic insulation between the primary and secondary
- Insulating plastic case recognized according to UL 94-V0
- Good linearity
- Very low offset drift over temperature
- Resistant to strong external interference
- Standards:
  - IEC 60664-1:2020
  - IEC 61800-5-1:2022
  - IEC 62109-1:2010
  - EN 50155:2017

Applications

Single-phase or three-phase inverter
Brake chopper
Propulsion converter
Auxiliary converter
Battery charge management
AC variable speed debugging and servo motor driver
DC Motor Driven Static Converter
Uninterruptible power supply UPS
Switching power supply SMPS
Renewable energy sources (solar and wind)

Safety

This sensor must be used according to IEC 61800-5-1.
This sensor must be used in electric/electronic equipment with respect to applicable standards and safety requirements in accordance with the following manufacture's operating instructions.

Caution, risk of electrical shock!

When operating the sensor, certain parts of the module can carry hazardous voltage (e.g., Primary busbar, power supply).
Ignore this warning can lead to injury and/or cause serious damage.
This sensor is a built-in device, whose conducting parts must be inaccessible after installation. A protective housing or additional shield could be used.
Main supply must be able to be disconnected.

Absolute maximum ratings(not operating)

Parameter	Symbol	Unit	Value
Supply voltage	V_C	V	26.4
Primary conductor temperature	T_B	℃	105
ESD rating,Human Body Model (HBM)	V_{ESD}	V	6

※ Stresses above these ratings may cause permanent damage.

※ Exposure to absolute maximum ratings for extended periods may degrade reliability.

Environmental and mechanical characteristics

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Ambient operating temperature	T_A	℃	-40		85	
Ambient storage temperature	T_S	℃	-50		90	
Mass	m	g		670		

Insulation coordination

Parameter	Symbol	Unit	Value	Comment
Rms voltage for AC insulation test @ 50Hz,1min	V_d	kV	8.5	@primary and secondary
Clearance(Pri.-sec.)	d_{Cl}	mm	51.3	
Creepage distance(Pri.-sec.)	d_{Cp}	mm	76.7	
Insulation resistance	R_{INS}	MΩ	200	
Plastic case	-	-	UL94-V0	
Comparative traking index	CTI	PLC	Level I	
Application example	-	-	2000V	Reinforced insulation,according to IEC 61800-5-1, IEC 62109-1CATⅢ，PD2
Application example	-	-	4000V	Basic insulation,according to IEC 61800-5-1, IEC 62109-1CATⅢ，PD2

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Electrical data

VN4A 500 M15

※ With T_A = 25℃, V_C = ±15V, R_M = 100Ω,unless otherwise noted.

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal rms voltage	V_{PN}	V		500		
Maximum measuring voltage	V_{PM}	V	-750		750	
Measuring resistance	R_M	Ω	50 50 100 100		230 140 400 250	@±500V，±15V，85℃ @±750V，±15V，85℃ @±500V，±24V，85℃ @±750V，±24V，85℃
Output rated current RMS	I_{SN}	mA		50		
Output rated current maximum	I_{SM}	mA	-75		+75	
Secondary coil resistance	R_S	Ω		14		@ 25°C
Supply voltage	V_C	V	±15		±24	@±5%
Current consumption	I_C	mA		22+I_s		
Offset current	I_O	mA	-0.2		0.2	@V_P=0
Offset current temperature drift	I_{OT}	mA	-0.3		0.3	-40°C…+85°C
Theoretical sensitivity	G_{th}	μA/V		100		
Sensitivity error	ε_G	%	-0.1		0.1	
Thermal drift of offset current	$TC\varepsilon_G$	% of V_{PN}	-0.5		0.5	@-40°C…+85°C
Accuracy@v_{PN}	X	% of V_{PN}	-0.5 -1		0.5 1	@ 25°C @-40°C…+85°C
Linearity error	ε_L	% of V_{PN}	-0.2		0.2	
Primary power consumption@ v_{PN}	P_P	W		5		
Response time@ 90% of V_{PN}	t_r	μs			90	@From the step signal input to the output signal remains basically stable
Frequency bandwidth(-3dB)	BW	khz			14	

VN4A M15

Electrical data

VN4A 750 M15

※ With T_A = 25℃, V_C = ±15V, R_M = 100Ω,unless otherwise noted.

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal rms voltage	V_{PN}	V		750		
Maximum measuring voltage	V_{PM}	V	-1125		1125	
Measuring resistance	R_M	Ω	50 50 100 100		230 140 400 250	@±750V, ±15V, 85℃ @±1125V, ±15V, 85℃ @±750V, ±24V, 85℃ @±1125V, ±24V, 85℃
Output rated current RMS	I_{SN}	mA		50		
Output rated current maximum	I_{SM}	mA	-75		+75	
Secondary coil resistance	R_S	Ω		14		@ 25°C
Supply voltage	V_C	V	±15		±24	@±5%
Current consumption	I_C	mA		22+I_s		
Offset current	I_O	mA	-0.05		0.05	@V_P=0
Offset current temperature drift	I_{OT}	mA	-0.15		0.15	-40°C…+85°C
Theoretical sensitivity	G_{th}	μA/V		66.66		
Sensitivity error	ε_G	%	-0.2		0.2	
Thermal drift of offset current	$TC\varepsilon_G$	% of V_{PN}	-0.5		0.5	@-40°C…+85°C
Accuracy@V_{PN}	X	% of V_{PN}	-0.5 -1		0.5 1	@ 25°C @-40°C…+85°C
Linearity error	ε_L	% of V_{PN}	-0.2		0.2	
Primary power consumption@ V_{PN}	P_P	W		5		
Response time@ 90% of V_{PN}	t_r	μs			90	@From the step signal input to the output signal remains basically stable
Frequency bandwidth(-3dB)	BW	khz			14	

VN4A M15

Electrical data

VN4A 1500 M15

※ With T_A = 25℃, V_C = ±15V, R_M = 100Ω,unless otherwise noted.

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal rms voltage	V_{PN}	V		1500		
Maximum measuring voltage	V_{PM}	V	-2250		2250	
Measuring resistance	R_M	Ω	50 50 100 100		230 140 400 250	@±1500V, ±15V, 85℃ @±2250V, ±15V, 85℃ @±1500V, ±24V, 85℃ @±2250V, ±24V, 85℃
Output rated current RMS	I_{SN}	mA		50		
Output rated current maximum	I_{SM}	mA	-75		+75	
Secondary coil resistance	R_S	Ω		14		@ 25°C
Supply voltage	V_C	V	±15		±24	@±5%
Current consumption	I_C	mA		22+I_s		
Offset current	I_O	mA	-0.2		0.2	@V_P=0
Offset current temperature drift	I_{OT}	mA	-0.3		0.3	-40°C…+85°C
Theoretical sensitivity	G_{th}	μA/V		33.3		
Sensitivity error	ε_G	%	-0.1		0.1	
Thermal drift of offset current	$TC\varepsilon_G$	% of V_{PN}	-0.5		0.5	@-40°C…+85°C
Accuracy@V_{PN}	X	% of V_{PN}	-0.5 -1		0.5 1	@ 25°C @-40°C…+85°C
Linearity error	ε_L	% of V_{PN}	-0.2		0.2	
Primary power consumption@ V_{PN}	P_P	W		5		
Response time@ 90% of V_{PN}	t_r	μs			90	@From the step signal input to the output signal remains basically stable
Frequency bandwidth(-3dB)	BW	khz			14	

VN4A M15

Electrical data

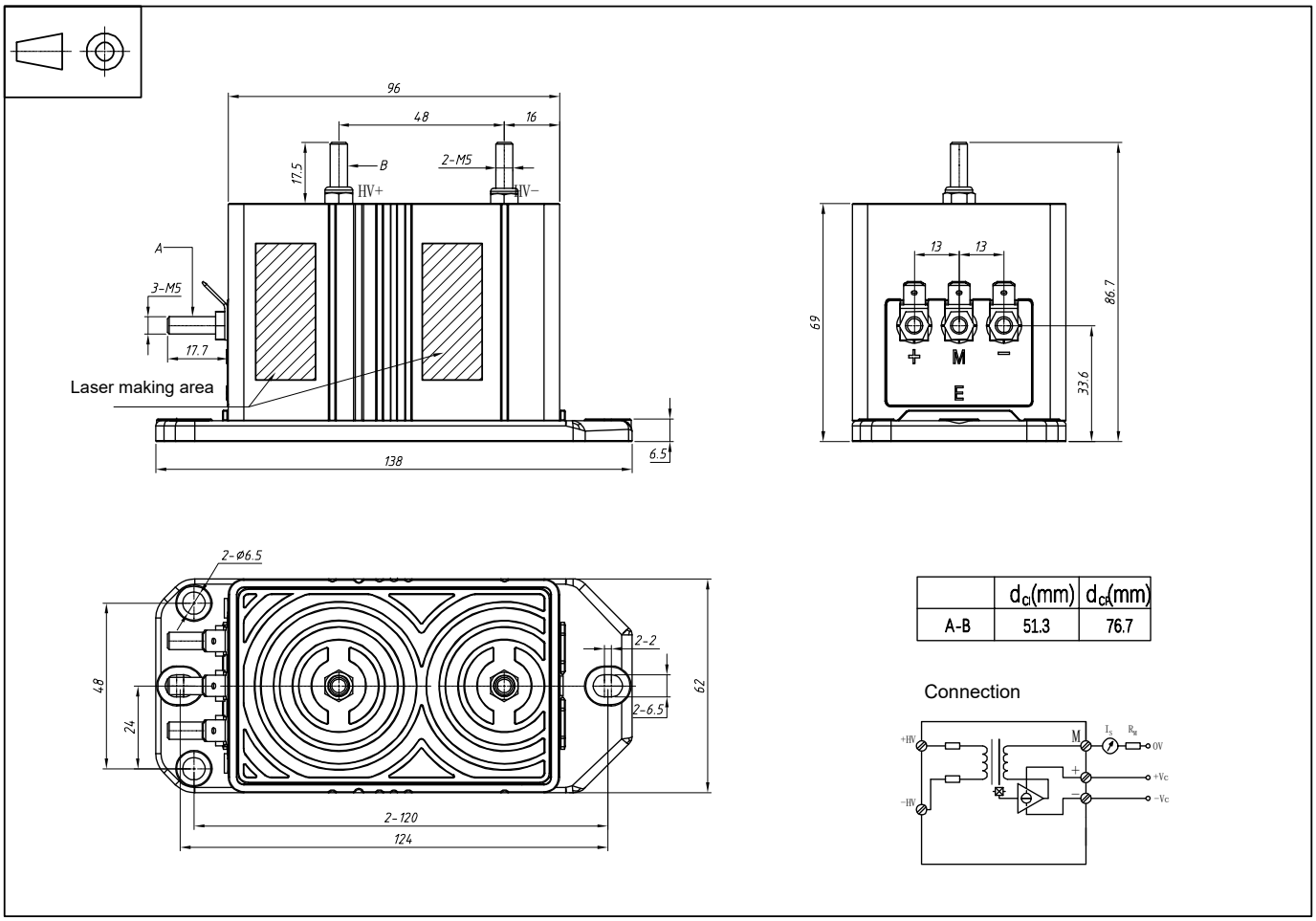
VN4A 2000 M15

※ With T_A = 25℃, V_C = ±15V, R_M = 100Ω,unless otherwise noted.

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal rms voltage	V_{PN}	V		2000		
Maximum measuring voltage	V_{PM}	V	-3000		3000	
Measuring resistance	R_M	Ω	50 50 100 100		230 140 400 250	@±2000V, ±15V, 85℃ @±3000V, ±15V, 85℃ @±2000V, ±24V, 85℃ @±3000V, ±24V, 85℃
Output rated current RMS	I_{SN}	mA		50		
Output rated current maximum	I_{SM}	mA	-75		+75	
Secondary coil resistance	R_S	Ω		14		@ 25°C
Supply voltage	V_C	V	±15		±24	@±5%
Current consumption	I_C	mA		22+I_s		
Offset current	I_O	mA	-0.4		0.4	@V_P=0
Offset current temperature drift	I_{OT}	mA	-0.15		0.15	-40°C…+85°C
Theoretical sensitivity	G_{th}	μA/V		25		
Sensitivity error	ε_G	%	-0.2		0.2	
Thermal drift of offset current	$TC\varepsilon_G$	% of V_{PN}	-0.5		0.5	@-40°C…+85°C
Accuracy@V_{PN}	X	% of V_{PN}	-0.2 -1		0.2 1	@ 25°C @-40°C…+85°C
Linearity error	ε_L	% of V_{PN}	-0.2		0.2	
Primary power consumption@ V_{PN}	P_P	W		5		
Response time@ 90% of V_{PN}	t_r	μs			60	@From the step signal input to the output signal remains basically stable
Frequency bandwidth(-3dB)	BW	khz			14	

VN4A M15

Dimensions(Unit mm)



	d_{Cl}(mm)	d_{CR}(mm)
A-B	51.3	76.7

Mechanical characteristics

- ✧ General tolerance ±0.5 mm
- ✧ Sensor 4pc Φ6.5 mm through hole
  Recommended installation torque 2-3 pc M6 metal bolt
- ✧ Primary connection 5 N.m
- ✧ Recommended installation torque M5 thread screw
- ✧ Connection of secondary 2.2 N•m
  M5 thread screw
- ✧ Recommended installation torque 2.2 N•m

Remarks

- ✧ When the measured voltage V_P is connected to the + HV of the sensor, the output current I_s is positive.
- ✧ The maximum temperature of the primary busbar is 105 ℃.
- ✧ The primary side and the measured voltage must be firmly connected.
- ✧ This is a standard model. For different applications (measurement, econdary connections…), please contact CHIPSENSE.