

CURRENT SENSOR

PRODUCT SERIES: STB-LF6D

STB-1000LF6D

STB-1000LF6D-A

STB-1200LF6D-A/SP10

PRODUCT PART NUMBER: STB-1188LF6D-A/SP25

STB-1000LF6D-B/SPA1

STB-1188LF6D/SPA6

STB-1000LF6D/ZJ

VERSION: Ver 1.7

Sinomags Technology Co., Ltd.

Web site: www.sinomags.com

CONTENT

1. Description	2
2. STB-1000LF6D Electrical parameters	5
3. STB-1000LF6D-A Electrical parameters	6
4. STB-1200LF6D-A/SP10 Electrical parameters	7
5. STB-1188LF6D-A/SP25 Electrical parameters	8
6. STB-1000LF6D-B/SPA1 Electrical parameters	9
7. STB-1188LF6D/SPA6 Electrical parameters	10
8. STB-1000LF6D/ZJ Electrical parameters	10
9. STB-1000LF6D Dimensions:	12
10. STB-1000LF6D-A Dimensions:	13
11. STB-1200LF6D-A/SP10 Dimensions:	14
12. STB-1188LF6D-A/SP25 Dimensions:	15
13. STB-1000LF6D-B/SPA1 Dimensions:	16
14. STB-1188LF6D/SPA6 Dimensions:	17
15. STB-1000LF6D/ZJ Dimensions:	16
16. Mechanical characteristics	19
17. STB-1000LF6D Typical performance characteristics	20
18. STB-1188LF6D/SPA6 Typical performance characteristics	20

1. Description

STB-LF6D series current sensors are based on close loop principle. The sensor can detect the current with DC, AC, pulse and irregular wave shape with current output.

Typical application

- Industrial
- Windmill inverters
- Test measurement
- UPS
- Power supplies for welding applications
- AC variable speed and servo motor drives
- Static converters for DC motor drives
- Battery supplied applications
- Switched Mode Power Supplies (SMPS)

General parameters

Parameter	Symbol	Unit	Value
Sensor operating temperature	T_A	°C	STB-LF6D:-40~85 STB-LF6D-A:-40~85 STB-LF6D-A/SP25:-10~70 STB-LF6D-A/SP25:-10~75 STB-LF6D-B/SPA1:-40~85 STB-LF6D/SPA6:-40~70
Storage temperature	T_s	°C	STB-LF6D:-45~100 STB-LF6D-A:-45~100 STB-LF6D-A/SP10:-25~85 STB-LF6D-A/SP25:-25~85 STB-LF6D-B/SPA1:-50~90 STB-LF6D/SPA6:-50~90
Mass	m	g	

Absolute parameters

Parameters	Symbol	Unit	Value
Supply voltage (-40°C...85°C)	$V_{CC_{max}}$	V	±25.2
Primary conductor temperature	$T_{B_{max}}$	°C	100
Maximum steady state primary current (-40°C...85°C)	$I_{PN_{max}}$	A	STB-LF6D:1000 STB-LF6D-A:1000 STB-LF6D-A/SP25:1200 STB-LF6D-A/SP25:1188 STB-LF6D-B/SPA1:1000 STB-LF6D/SPA6:1188

STB-1000LF6D Isolation parameters

Parameter	Symbol	Unit	Value	Remark
RMS voltage for AC test 50Hz/1 min	U_d	kV	3.8	
Impulse withstand voltage 1.2/50μs	U_w	kV	15.6	

Clearance (pri.-sec.)	d_{cl}	mm	19.0	Shortest distance through air
Creepage distance(pri.-sec.)	d_{cp}	mm	20.1	Shortest path along device body
Case material	-	-	V0	According to UL 94
Comparative tracking index	CTI		600	
Application example			2600	Basic insulation according to IEC 61800-5-1 CAT III, PD2
			1000	Reinforced insulation according to IEC 61800-5-1 CAT III, PD2

STB-1000LF6D-A STB-1000LF6D-A/SP10 Isolation parameters

Parameter	Symbol	Unit	Value	Remark
RMS voltage for AC test 50Hz/1 min	U_d	kV	3	
Impulse withstand voltage 1.2/50μs	U_W	kV	14.1	
Clearance (pri.-sec.)	d_{cl}	mm	16.6	Shortest distance through air
Creepage distance(pri.-sec.)	d_{cp}	mm	17.4	Shortest path along device body
Case material	-	-	V0	According to UL 94
Comparative tracking index	CTI		175	

STB-1188LF6D-A/SP25 Isolation parameters

Parameter	Symbol	Unit	Value	Remark
RMS voltage for AC test 50Hz/1 min	U_d	kV	3	
Impulse withstand voltage 1.2/50μs	U_W	kV	14.1	
Clearance (pri.-sec.)	d_{cl}	mm	16.6	Shortest distance through air
Creepage distance(pri.-sec.)	d_{cp}	mm	17.4	Shortest path along device body
Case material	-	-	V0	According to UL 94
Comparative tracking index	CTI		175	

STB-1000LF6D-B/SPA1 Isolation parameters

Parameter	Symbol	Unit	Value	Remark
RMS voltage for AC test 50Hz/1 min	U_d	kV	3.8	
Impulse withstand voltage 1.2/50μs	U_W	kV	10	
Clearance (pri.-sec.)	d_{cl}	mm	11.3	Shortest distance through

				air
Creepage distance(pri.-sec.)	d_{cp}	mm	24.6	Shortest path along device body
Case material	-	-	V0	According to UL 94
Comparative tracking index	CTI		600	
Insulation resistance	R_{IS}	M Ω	200	Measured at 500 V DC

STB-1188LF6D/SPA6 Isolation parameters

Parameter	Symbol	Unit	Value	Remark
RMS voltage for AC test 50Hz/1 min	U_d	kV	6.8	
Impulse withstand voltage 1.2/50 μ s	U_W	kV	14.5	
Clearance (pri.-sec.)	d_{cl}	mm	17.6	Shortest distance through air
Creepage distance(pri.-sec.)	d_{cp}	mm	27.6	Shortest path along device body
Case material	-	-	V0	According to UL 94
Comparative tracking index	CTI		600	

STB-1000LF6D/ZJ Isolation parameters

Parameter	Symbol	Unit	Value	Remark
RMS voltage for AC test 50Hz/1 min	U_d	kV	4	
Impulse withstand voltage 1.2/50 μ s	U_W	kV	14.1	
Clearance (pri.-sec.)	d_{cl}	mm	14.2	Shortest distance through air
Creepage distance(pri.-sec.)	d_{cp}	mm	32.4	Shortest path along device body
Case material	-	-	V0	According to UL 94
Comparative tracking index	CTI		175	

2. STB-1000LF6D Electrical parameters

Condition: $T_A = 25\text{ }^{\circ}\text{C}$, $V_{CC} = \pm 24\text{ V}$, $R_M = 1\text{ }\Omega$, unless otherwise noted.

Parameters	Symbol	Unit	Min	Type	Max	Remark
Primary nominal rms current	I_{PN}	A			1000	
Primary current measuring range	I_{PM}	A	-1500		1500	With $V_{CC} = \pm 22.8\text{V}$; $T_A = 85^{\circ}\text{C}$;
Measuring resistance			0		37	
Secondary nominal RMS current	I_{SN}	mA			200	I_{PN}
Turns ratio	N_S	NT		5000		
Resistance of secondary winding	R_S	Ω			37	$T_A = 25^{\circ}\text{C}$
Output range	I_S	A	-0.54		0.54	
Supply voltage	V_{CC}	V	± 14.25		± 25.2	
Current consumption	I_{CC}	mA		$23 + I_S$ $37 + I_S$		$V_{CC} = \pm 14.25\text{V}$ $V_{CC} = \pm 25.2\text{V}$
Nominal sensitivity	S_N	mA/A		0.2		
Offset current	I_O	mA	-0.4		0.4	$I_P = 0\text{A}$, $T_A = 25^{\circ}\text{C}$
Magnetic offset current referred to primary	I_{OM}	mA	-0.2		0.2	After 3* I_{PN}
Offset current temperature drift	I_{OT}	mA	-0.8		0.8	$-40^{\circ}\text{C} \dots 85^{\circ}\text{C}$
Overall accuracy at I_{PN}	X_G	% of I_{PN}	-0.4		0.4	$-40^{\circ}\text{C} \dots 85^{\circ}\text{C}$
Linearity error	ε_L	% of I_{PN}	-0.1		0.1	$-40^{\circ}\text{C} \dots 85^{\circ}\text{C}$
Sensitivity error	ε_S	% of I_{PN}	-0.15		0.15	
Delay time @ 10 % of I_{PN}	t_{d10}	μs		<0.5		0 to 1 kA, 200A/ μs
Delay time @ 90 % of I_{PN}	t_{d90}	μs		<0.5		0 to 1 kA, 200A/ μs
Frequency bandwidth	BW	kHz	150			-3dB

3. STB-1000LF6D-A Electrical parameters

Condition: $T_A = 25\text{ }^{\circ}\text{C}$, $V_{CC} = \pm 24\text{ V}$, $R_M = 1\text{ }\Omega$, unless otherwise noted.

Parameters	Symbol	Unit	Min	Type	Max	Remark
Primary nominal current rms	I_{PN}	A_{RMS}	0		1000	
Primary current, measuring range	I_{PM}	A_{peak}	-2100		2100	$V_{CC} = \pm 24\text{ V}$
Measuring resistance	R_M	Ω	0			Max value of R_M is given in figure 1
Secondary nominal RMS current	I_{SN}	A	0		0.2	I_{PN}
Secondary current	I_S	A	-0.42		0.42	I_{PM}
Turns ratio	N_S	NT		5000		
Resistance of secondary winding	R_S	Ω				$T_A = 25\text{ }^{\circ}\text{C}$
Supply voltage	V_{CC}	V	± 15		± 24	$\pm 5\%$
Current consumption	I_{CC}	mA				$V_{CC} = \pm 24\text{ V}$
Offset current	I_O	mA	-0.4		0.4	$I_P = 0\text{ A}$, $T_A = 25\text{ }^{\circ}\text{C}$
Magnetic offset current	I_{OM}	mA	-0.2		0.2	After 3* I_{PN}
Offset current temperature drift	I_{OT}	mA	-0.4		0.4	-10 $^{\circ}\text{C}$...70 $^{\circ}\text{C}$
			-0.8		0.8	-40 $^{\circ}\text{C}$...85 $^{\circ}\text{C}$
Overall accuracy at I_{PN}	X_G	% of I_{PN}	-0.4		0.4	25 $^{\circ}\text{C}$
Linearity error	ε_L	% of I_{PN}	-0.15		0.15	
Delay time @ 90 % of I_{PN}	$t_{d\ 90}$	μs			1	$d_i/d_t > 100\text{ A}/\mu\text{s}$
Frequency bandwidth	BW	kHz			100	-1dB

4. STB-1200LF6D-A/SP10 Electrical parameters

Condition: $T_A = 25\text{ }^{\circ}\text{C}$, $V_{CC} = \pm 24\text{ V}$, $R_M = 1\text{ }\Omega$, unless otherwise noted.

Parameters	Symbol	Unit	Min	Type	Max	Remark
Primary nominal current rms	I_{PN}	A_{RMS}	0		1200	
Primary current, continuous, cycle 10 s/1 min	I_{P10s}	A_{RMS}			1450/950	
Primary current, Non-repetitive overload, 100 us	I_{Ppeak}	A_{peak}			2700	
Measuring resistance	R_M	Ω	2		2.2	$I_{Ppeak} V_{CC} = \pm 22.8$
Secondary nominal RMS current	I_{SN}	mA	0		400	I_{PN}
Turns ratio	N_S	NT		3000		
Resistance of secondary winding	R_S	Ω			38	$T_A = 25^{\circ}\text{C}$
Supply voltage	V_{CC}	V	± 15		± 24	$\pm 5\%$
Current consumption	I_{CC}	mA		25		$V_{CC} = \pm 24\text{ V}$
Offset current	I_O	mA	-0.4		0.4	$I_P = 0\text{ A}$, $T_A = 25\text{ }^{\circ}\text{C}$
Magnetic offset current	I_{OM}	mA	-0.2		0.2	After 3* I_{PN}
Offset current temperature drift	I_{OT}	mA		± 0.4	± 0.7	$-10^{\circ}\text{C} \dots 70^{\circ}\text{C}$
Overall accuracy at I_{PN}	X_G	% of I_{PN}	-0.4		0.4	25°C
Linearity error	ε_L	% of I_{PN}	-0.15		0.15	
Delay time @ 90 % of I_{PN}	t_{d90}	μs			1	$d_i/d_t > 100\text{ A}/\mu\text{s}$
Frequency bandwidth	BW	kHz	100			-3B

5. STB-1188LF6D-A/SP25 Electrical parameters

Condition: $T_A = 25\text{ }^{\circ}\text{C}$, $V_{CC} = \pm 24\text{ V}$, $R_M = 1\text{ }\Omega$, unless otherwise noted.

Parameters	Symbol	Unit	Min	Type	Max	Remark
Primary nominal current rms	I_{PN}	A_{RMS}	0		1188	
Primary current, measuring range	I_{PM}	A_{peak}	-3400		3400	$V_{CC} = \pm 24\text{ V}$
Measuring resistance	R_M	Ω	0		37	$V_{CC} = \pm 24\text{ V}; I = 1188\text{ A}$
			0		30	$V_{CC} = \pm 24\text{ V}; I = 1412\text{ A}$
			1		1	$V_{CC} = \pm 24\text{ V}; I = 3400\text{ A}$
Secondary nominal RMS current	I_{SN}	mA	0		396	I_{PN}
Secondary current	I_S	mA			1133	I_{PM}
Turns ratio	N_S	NT		3000		
Resistance of secondary winding	R_S	Ω			20	$T_A = 25\text{ }^{\circ}\text{C}$
Supply voltage	V_{CC}	V	± 15		± 24	$\pm 5\%$
Current consumption	I_{CC}	mA		25		$V_{CC} = \pm 24\text{ V}$
Offset current	I_O	mA	-0.4		0.4	$I_P = 0\text{ A}$, $T_A = 25\text{ }^{\circ}\text{C}$
Magnetic offset current	I_{OM}	mA	-0.2		0.2	After $3 \times I_{PN}$
Offset current temperature drift	I_{OT}	mA		± 0.4	± 0.7	$-10\text{ }^{\circ}\text{C} \dots 70\text{ }^{\circ}\text{C}$
Overall accuracy at I_{PN}	X_G	% of I_{PN}	-0.4		0.4	$25\text{ }^{\circ}\text{C}$
Linearity error	ε_L	% of I_{PN}	-0.1		0.1	
Delay time @ 90 % of I_{PN}	t_{d90}	μs			1	$d_i/d_t > 100\text{ A}/\mu\text{s}$
Frequency bandwidth	BW	kHz			150	-1dB

6. STB-1000LF6D-B/SPA1 Electrical parameters

Condition: $T_A = 25\text{ }^{\circ}\text{C}$, $V_{CC} = \pm 24\text{ V}$, $R_M = 1\text{ }\Omega$, unless otherwise noted.

Parameters	Symbol	Unit	Min	Type	Max	Remark
Primary nominal current rms	I_{PN}	A_{RMS}	0		1000	
Primary current, measuring range	I_{PM}	A_{peak}	-2300		2300	$V_{CC} = \pm 18\text{ V}$
Measuring resistance	R_M	Ω	0			
Secondary nominal RMS current	I_{SN}	A	-0.25		0.25	
Secondary current	I_S	A	-0.575		0.575	
Turns ratio	N_S			4000		
Resistance of secondary winding	R_S	Ω			20.3	$T_A = 25\text{ }^{\circ}\text{C}$
Supply voltage	V_{CC}	V	± 14.25		± 25.2	
Current consumption	I_{CC}	mA		17 21		$V_{CC} = \pm 15\text{ V}$ $V_{CC} = \pm 24\text{ V}$
Offset current, referred to primary	I_O	A	-1		1	$I_P = 0\text{ A}$, $T_A = 25\text{ }^{\circ}\text{C}$
Magnetic offset current	I_{OM}	A		± 1		After 3* I_{PN}
Offset current temperature drift, referred to primary	I_{OT}	A	-0.6		0.6	
Overall accuracy at I_{PN}	X_G	% of I_{PN}	-0.2 -0.4		0.2 0.4	25...70...85 $^{\circ}\text{C}$ -40...85 $^{\circ}\text{C}$
Sensitivity error	ε_G	%	-0.15		0.15	
Linearity error	ε_L	% of I_{PN}	-0.15		0.15	
Output rms current noise referred primary	I_{no}	mA		50		1 Hz to 20kHz
Delay time @ 10 % of I_{PN}	t_{ra}	μs		<0.5		0 to 1kA, 200A/ μs
Delay time @ 90 % of I_{PN}	$t_{d\ 90}$	μs		<0.5		0 to 1kA, 200A/ μs
Frequency bandwidth	BW	kHz		200		-3dB, small signal bandwidth

7. STB-1188LF6D/SPA6 Electrical parameters

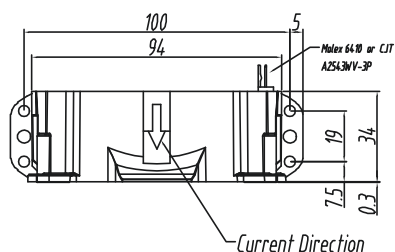
Condition: $T_A = 25\text{ }^{\circ}\text{C}$, $V_{CC} = \pm 24\text{ V}$, $R_M = 1\text{ }\Omega$, unless otherwise noted.

Parameters	Symbol	Unit	Min	Type	Max	Remark
Primary nominal current rms	I_{PN}	A_{RMS}	0		1188	
Primary current, measuring range	I_{PM}	A_{peak}	-3400		3400	
Measuring resistance	R_M	Ω	0			The value of $R_{M\min}$ is 0 Ω in AC or 15 Ω in DC
Secondary nominal RMS current	I_{SN}	A	-0.396		0.396	
Secondary current	I_S	A	-1.13		1.13	
Turns ratio	N_S			3000		
Nominal sensitivity	S_N	mA/A		0.333		
Resistance of secondary winding	R_S	Ω	12.9		14.1	$T_A = 25\text{ }^{\circ}\text{C}$
Supply voltage	V_{CC}	V	± 22.8		± 25.2	
Current consumption	I_{CC}	mA		$28 + I_S$		
Offset current referred to primary	I_O	A	-1		1	$I_P = 0\text{ A}$, $T_A = 25\text{ }^{\circ}\text{C}$
Magnetic offset current referred to primary	I_{OM}	A		± 1		After 3* I_{PN}
Offset current temperature drift referred to primary	I_{OT}	A	-0.6		0.6	
Overall accuracy at I_{PN}	X_G	% of I_{PN}	-0.2 -0.4		0.2 0.4	25...70 $^{\circ}\text{C}$ -40...70 $^{\circ}\text{C}$
Sensitivity error	ε_G	%	-0.15		0.15	
Linearity error	ε_L	% of I_{PN}	-0.15		0.15	
Output rms current noise referred primary	I_{no}	mA		50		1 Hz to 20kHz
Delay time @ 10 % of I_{PN}	t_{d10}	μs		<0.5		0 to 1kA, 200A/ μs
Delay time @ 90 % of I_{PN}	t_{d90}	μs		<0.5		0 to 1kA, 200A/ μs
Frequency bandwidth	BW	kHz		200		-3dB, small signal bandwidth

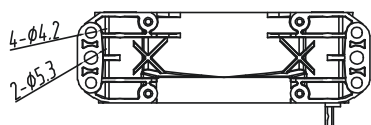
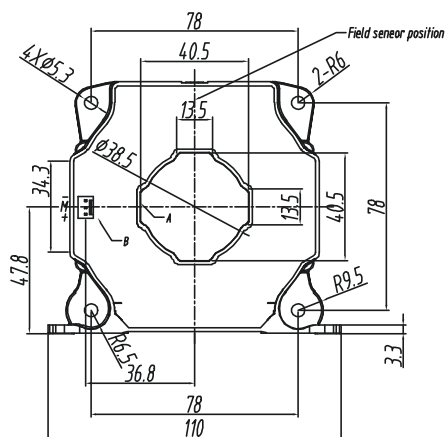
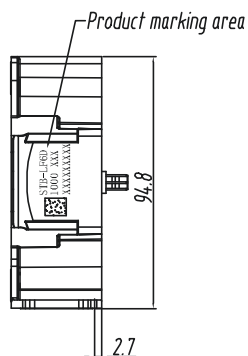
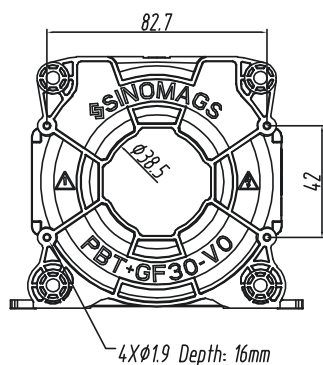
8. STB-1000LF6D/ZJ Electrical parameters

Parameters	Symbol	Unit	Min	Type	Max	Remark
Primary nominal current rms	I_{PN}	A_{RMS}	0		1000	
Primary current, measuring range	I_{PM}	A_{peak}	-2100		2100	$V_{CC} = \pm 24V$
Measuring resistance	R_M	Ω	0			Max value of R_M is given in figure 1
Secondary nominal RMS current	I_{SN}	A	0		0.2	I_{PN}
Secondary current	I_S	A	-0.42		0.42	I_{PM}
Turns ratio	N_S	NT		5000		
Resistance of secondary winding	R_S	Ω				$T_A = 25^\circ C$
Supply voltage	V_{CC}	V	± 15		± 24	$\pm 5\%$
Current consumption	I_{CC}	mA				$V_{CC} = \pm 24V$
Offset current	I_O	mA	-0.4		0.4	$I_P = 0A, T_A = 25^\circ C$
Magnetic offset current	I_{OM}	mA	-0.2		0.2	After $3 \times I_{PN}$
Offset current temperature drift	I_{OT}	mA	-0.4		0.4	$-10^\circ C \dots 70^\circ C$
			-0.8		0.8	$-40^\circ C \dots 85^\circ C$
Overall accuracy at I_{PN}	X_G	% of I_{PN}	-0.4		0.4	$25^\circ C$
Linearity error	ε_L	% of I_{PN}	-0.15		0.15	
Delay time @ 90 % of I_{PN}	t_{d90}	μs			1	$d_i/d_t > 100A/\mu s$
Frequency bandwidth	BW	kHz			100	-1dB

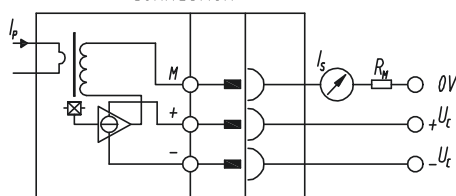
9. STB-1000LF6D Dimensions:



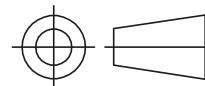
	d_a	d_p
A-B	19.0mm	20.1mm



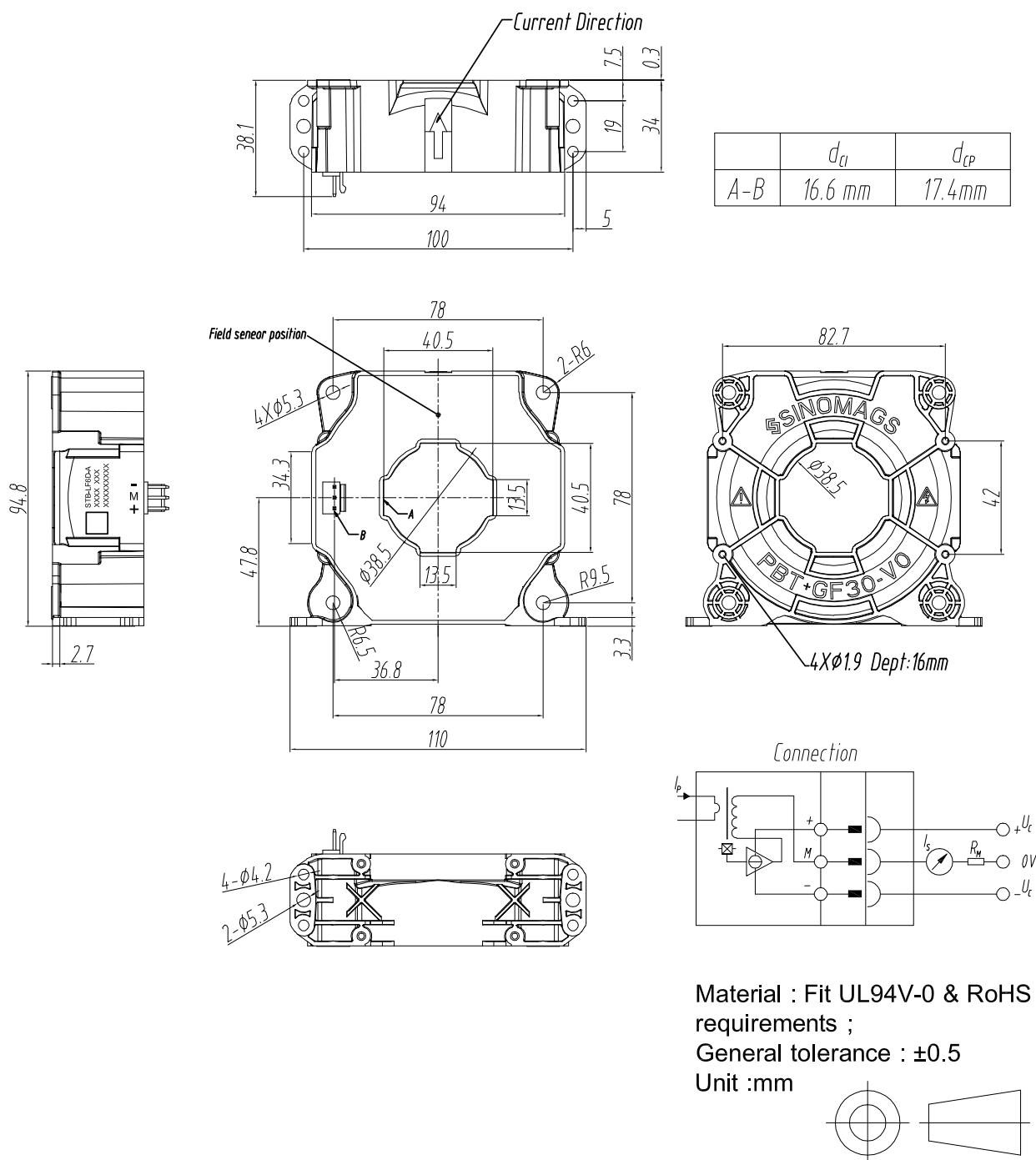
Connection



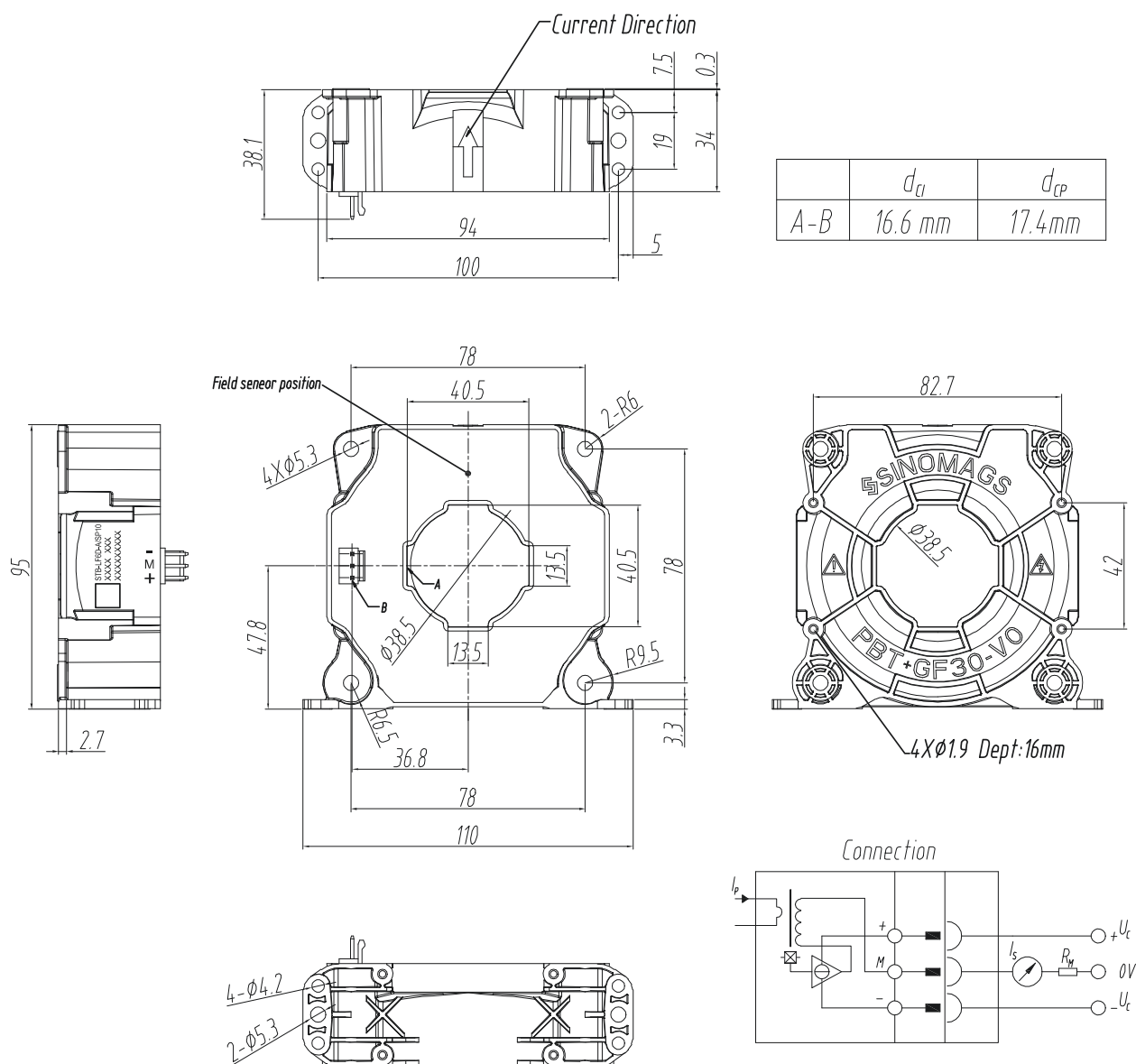
Material : Fit UL94V-0 & RoHS requirements ;
General tolerance : ± 0.5
Unit : mm



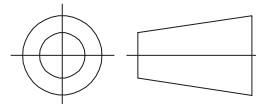
10. STB-1000LF6D-A Dimensions:



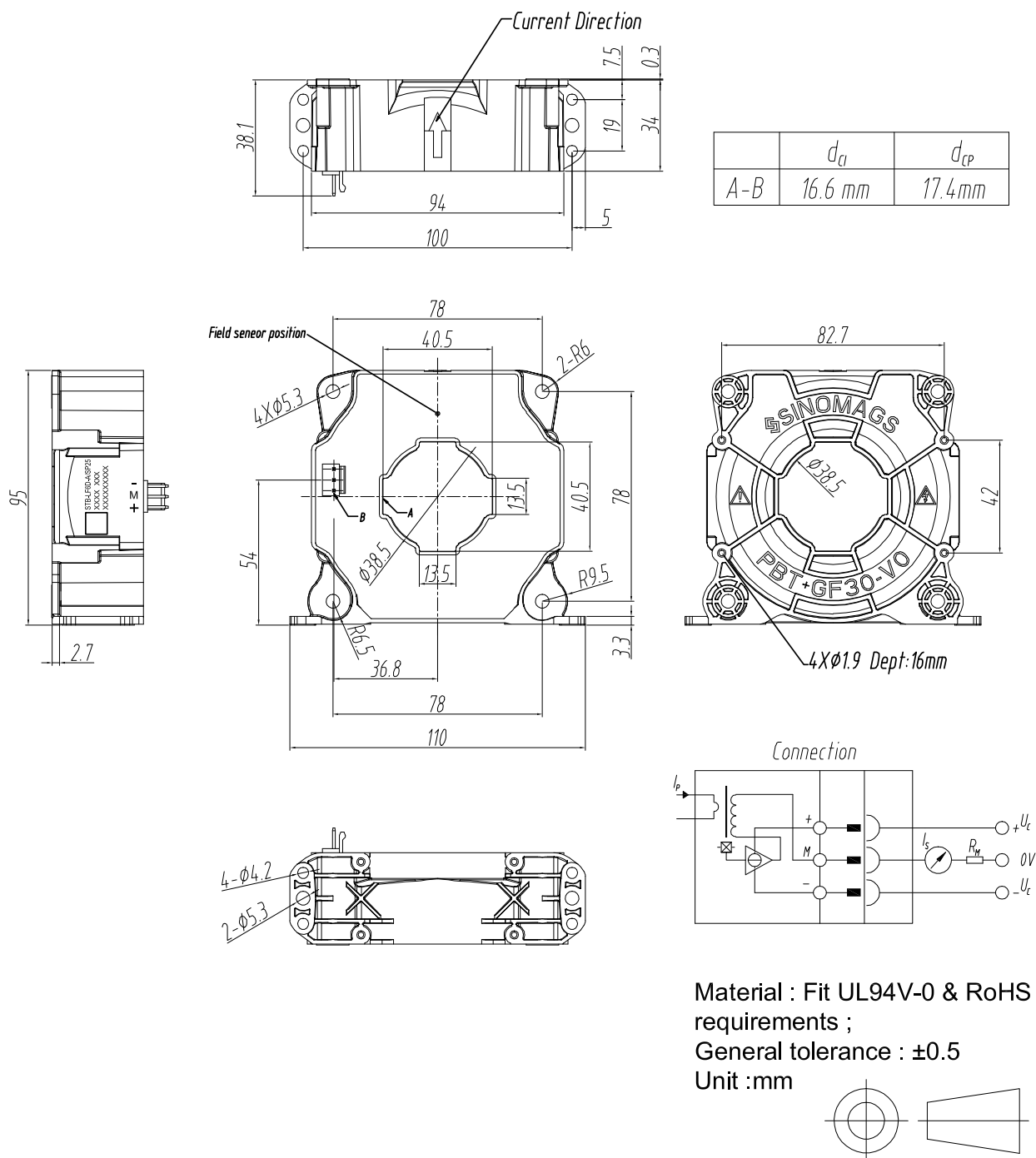
11. STB-1200LF6D-A/SP10 Dimensions:



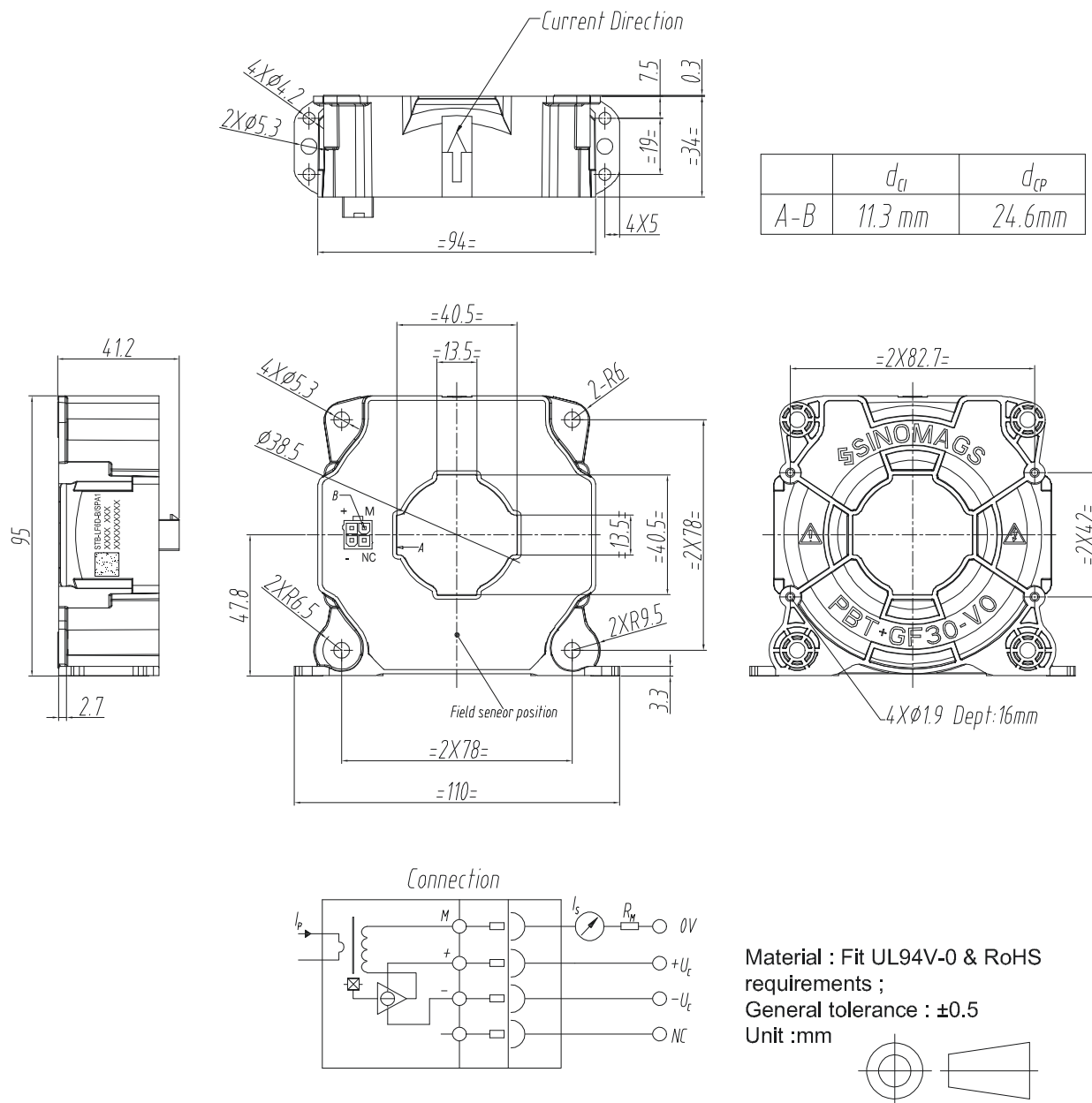
Material : Fit UL94V-0 & RoHS requirements ;
 General tolerance : ± 0.5
 Unit : mm



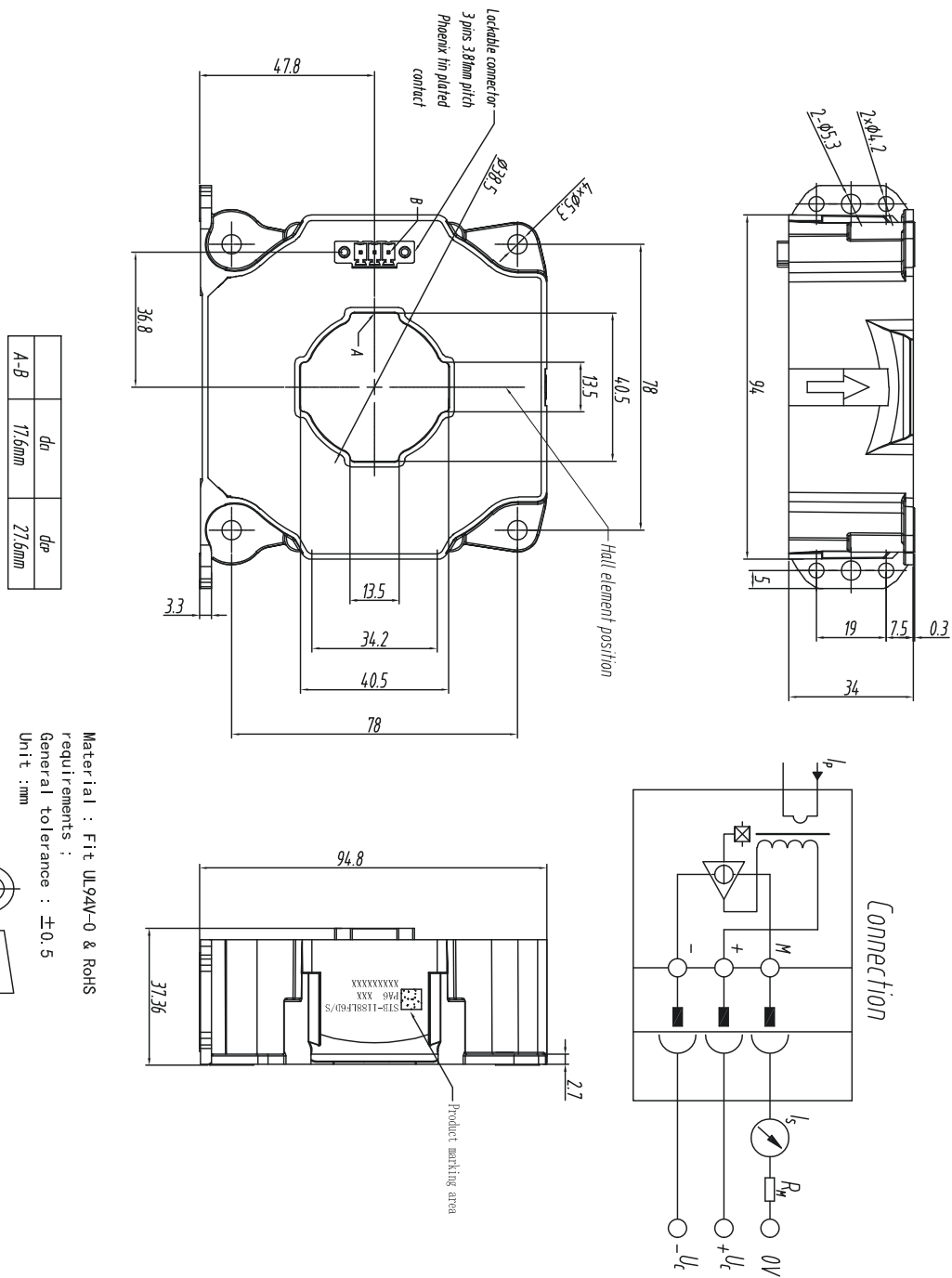
12. STB-1188LF6D-A/SP25 Dimensions:



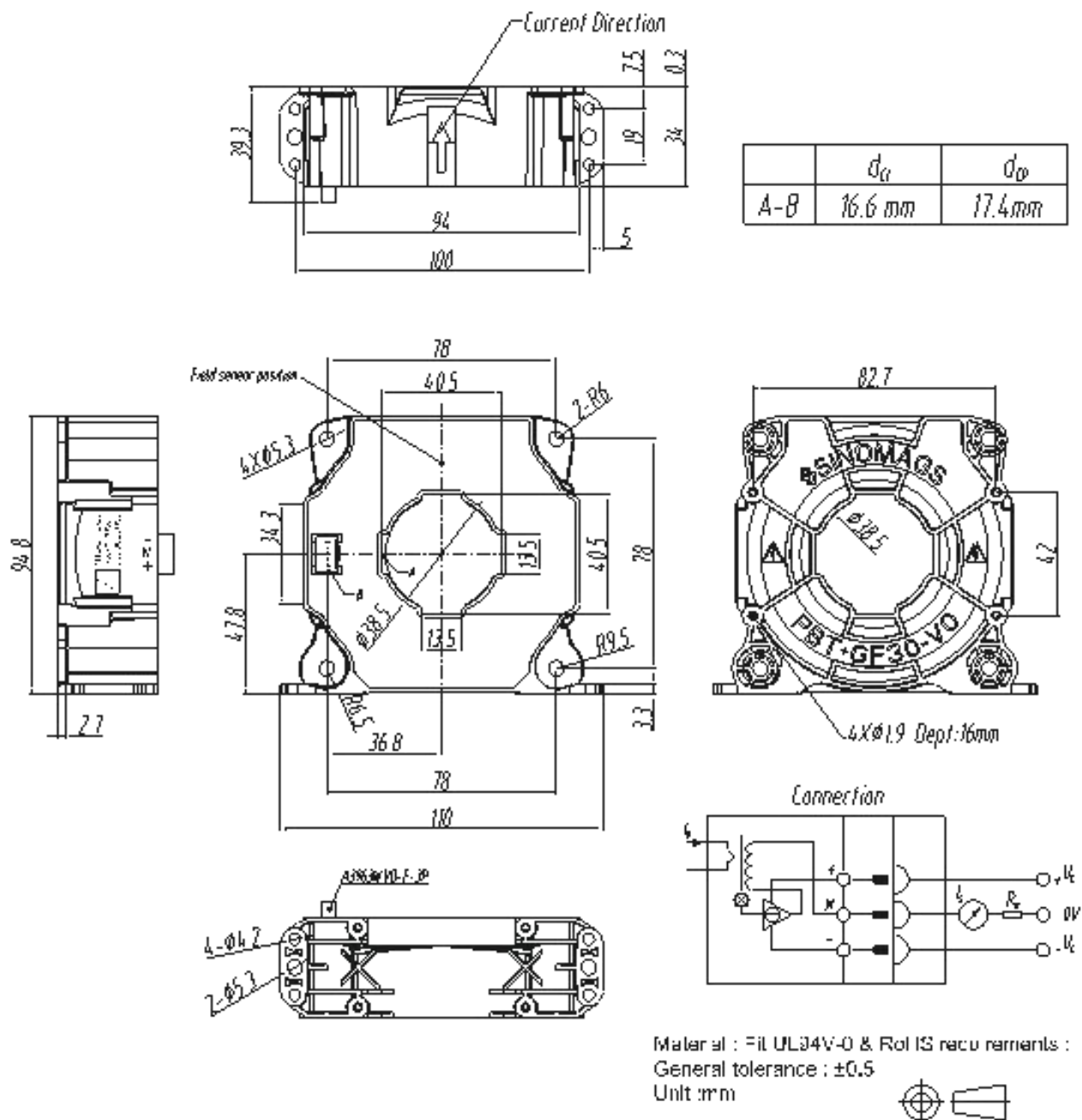
13. STB-1000LF6D-B/SPA1 Dimensions:



14. STB-1188LF6D/SPA6 Dimensions:



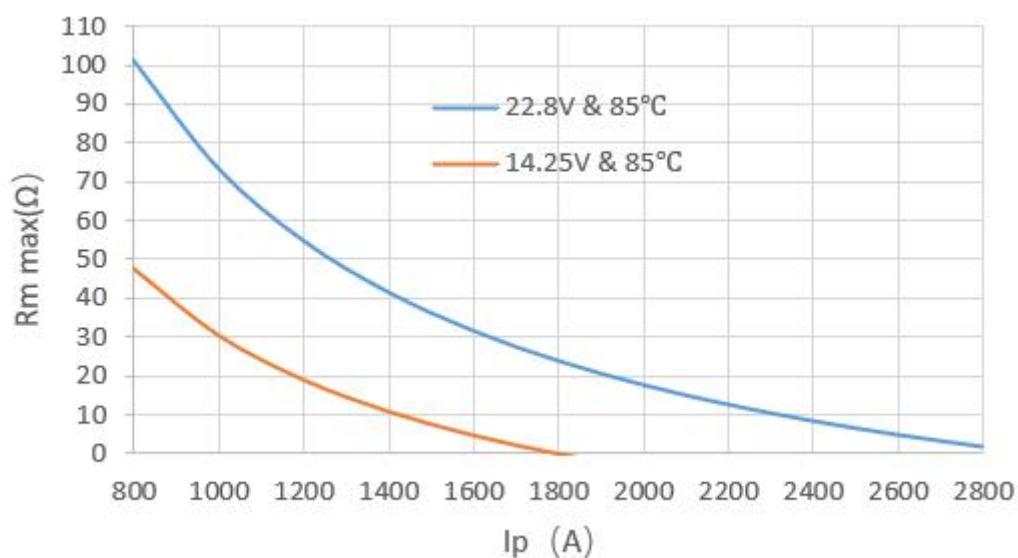
15. STB-1000LF6D/ZJ Dimensions:



16. Mechanical characteristics

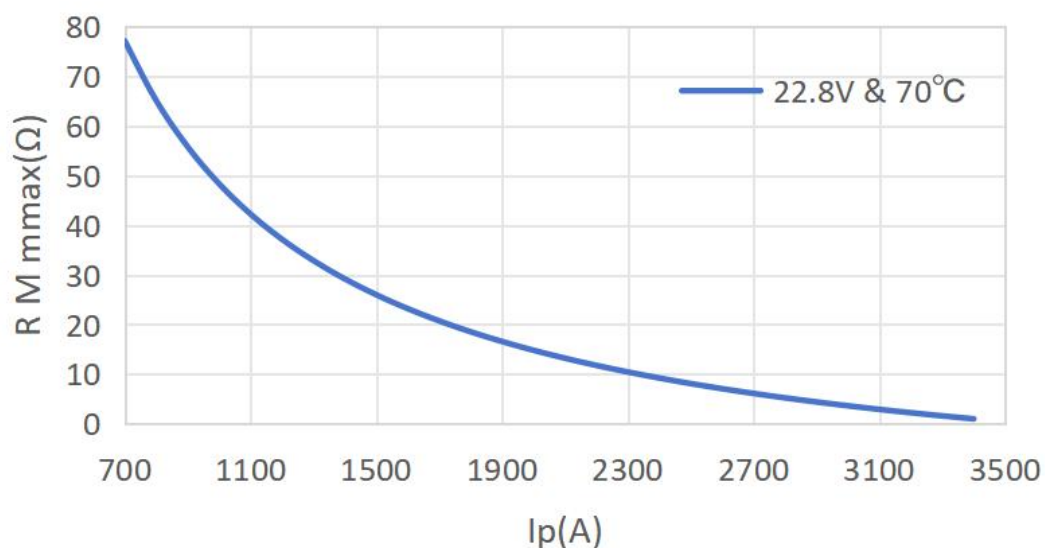
- General tolerance ± 0.5 mm
- Transducer fastening
 - Vertical position
 - 2 holes $\varnothing 5.3$ mm
 - 2 M5 steel screws
 - Recommended fastening torque $3.2 \text{ N}\cdot\text{m} (\pm 10\%)$
 - Or
 - 4 holes $\varnothing 4.2$ mm,
 - 4 M4 steel screws
 - Recommended fastening torque $2.1 \text{ N}\cdot\text{m} (\pm 10\%)$
- Primary through-hole
 - Or
 - $\varnothing 38$ mm
 - 40mm x 13 mm
- Transducer fastening
 - Horizontal position
 - 4 holes $\varnothing 5.3$ mm
 - 4 M5 steel screws
 - Recommended fastening torque $3.2 \text{ N}\cdot\text{m} (\pm 10\%)$
- Connection of secondary
 - STB-1000LF6D Molex 6410 or CJT A2543WV-3P
 - STB-1000LF6D-A JST B3P VH or CJT A3963WV-3P
 - STB-1200LF6D-A/SP10 JST B3P VH or CJT A3963WV-3P
 - STB-1188LF6D-A/SP25 JST B3P VH or CJT A3963WV-3P
 - STB-1000LF6D-B/SPA1 CJT C4201WD-2x2P-V0
 - STB-1188LF6D-B/SPA6 Phoenix 1707641 or 15EDGVM-THR-3.81-XXP-1Y-00A&Z(H)

17. STB-1000LF6D Typical performance characteristics



$$R_{M \max} = (N_S \times (U_{C \min} - 0.5V) / I_P) - R_{S \max} - 1.1 \Omega$$

18. STB-1188LF6D/SPA6 Typical performance characteristics



$$R_{M \max} = N_S \times \frac{U_{C \min} - 0.5 V}{I_P} - R_{S \max} - 0.93 \Omega$$