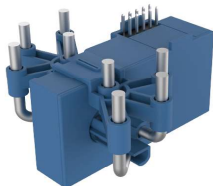




HFCE-F15

FLUXGATE CURRENT SENSOR



Features

- Open loop current transducer
- Voltage and SPI digital output
- Single supply voltage 3.3 V
- Mounted on PCB board
- Very low error at small currents
- High overload capability
- High insulation capability
- Leakage current measurement in an IC-CPD in-cable (mode 2) and for wall boxes (mode 3) contact and protection device
- Single phase nominal current up to ± 32 A RMS

SCOPE OF APPLICATION

HFCE-F15 For the electronic measurement of current: DC, AC, pulsed..., with galvanic separation between the primary and the secondary circuit.

ELECTRICAL DATA (Ta=25°C)

Parameter	Sym	Value
Max Primary involved potential	-	300 V rms
Max Primary current	I_P	32 A
Primary nominal residual RMS current	I_{PN}	± 70 mA
Primary current, measuring range	I_{PM}	± 150 mA
Supply voltage	V_C	3.3 Vd.c.
Current consumption@ 3.3 V	I_C	< 50 mA
Output voltage	V_{OUT}	0 to 3.3 Vd.c.
Start-up time	t_{start}	< 100 ms
reset time	$t_{res min}$	Min: 10 us
Frequency of fault output	$f_{out fault}$	5kHz ~ 12kHz
Fault signal threshold	I_{Th}	152mA ~ 175 mA
Fault signal reaction time	t_{Fault}	< 200 us
Relative humidity	RH	85 %
Ambient operating temperature	T_A	-40°C ~ 85°C
Ambient storage temperature	T_S	-50°C ~ 85°C
Mass	m	35 g
Max primary conductor temperature	T_{Bmax}	100°C
Max withstand primary peak current	I_{Pmax}	3300 A

INSULATION COORDINATION

Parameter	Sym	Value
RMS voltage for AC insulation test, 50 Hz, 1 min	V_d	3.3 kV (IEC 60664)
Impulse withstand voltage 1.2/50 μ s	V_{Ni}	6 kV (IEC 60664)
Clearance (pri. - sec.)	d_{Ci}	12.6 mm
Creepage distance	d_{Cp}	12.6 mm
Clearance	d_{Ci}	6 mm
Creepage distance	d_{Cp}	6 mm
Case material	-	UL 94 V0
Comparative tracking index	CTI	600
Application example RMS voltage line- to- neutral		300 V (IEC 60664-1 or IEC 61010-1 CAT III, PD2)
ESD rating, Human Body Model (BMD)	V_{ESD}	4 kV



HONGFA CURRENT TRANSFORMER
ISO9001 CERTIFIED

2024 Rev. 1.00

CHARACTERISTICS

Analog output performances

common mode current =0A, -40°C ~ +85°C, VC = 3.3 V

Parameter	Sym	Min	Typ	Max
Nominal sensitivity	S _N		8.79V/A	
Delay time to 90 % of IPN	t _{D90}			1ms
Frequency bandwidth (-3 dB)	BW		2kHz	
Sum of sensitivity and linearity error (0<IP≤10 mA)	ε _{S L}	-1mA		1mA
Sum of sensitivity and linearity error (10mA<I _P)	ε _{S L}	-10%I _P		10%I _P

Digital high accuracy output performances

common mode current =0A, -40°C ~ +85°C, VC = 3.3 V

Parameter	Sym	Min	Typ	Max
Nominal sensitivity	S _N		87.99LSB/mA	
Delay time to 90 % of IPN	t _{D90}			40ms
Frequency bandwidth (-3 dB)	BW		10Hz	
Sum of sensitivity and linearity error (0<IP≤6 mA)	ε _{S L}	-0.5mA		0.5mA
Sum of sensitivity and linearity error (6<IP≤10 mA)	ε _{S L}	-1mA		1mA
Sum of sensitivity and linearity error (10mA<I _P)	ε _{S L}	-10%I _P		10%I _P

Digital high bandwidth output performance

common mode current =0A, -40°C ~ +85°C, VC = 3.3 V

Parameter	Sym	Min	Typ	Max
Nominal sensitivity	S _N		87.99LSB/mA	
Delay time to 90 % of IPN	t _{D90}			40ms
Frequency bandwidth (-3 dB)	BW		10Hz	
Sum of sensitivity and linearity error (0<IP≤6 mA)	ε _{S L}	-0.5mA		0.5mA
Sum of sensitivity and linearity error (6<IP≤10 mA)	ε _{S L}	-1mA		1mA
Sum of sensitivity and linearity error (10mA<I _P)	ε _{S L}	-10%I _P		10%I _P

Digital signals electrical parameters

Parameter	Sym	Min	Typ	Max
Input logic low	U _{in L}	-0.3V		0.8V
Input logic high	U _{in H}	2V		VC+0.2V
Output logic low	U _{out L}	-0.3V		0.8V
Output logic high	U _{out H}	2.4V		VC
Sink / drive output maximum current	I _{out max}	-4mA		4mA

ORDERING INFORMATION

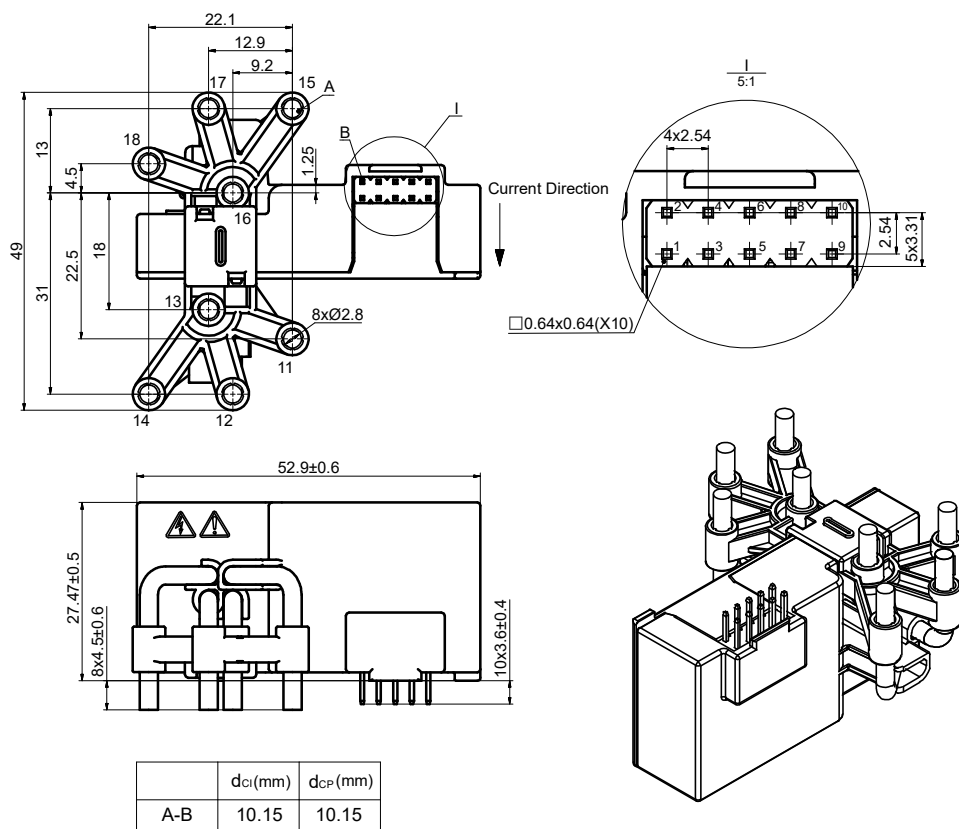
Product Part NO.	HF	CF:Fluxgate current sensor	FCF	-F	15/	0.07	-F	S	3.3	(XXX)
Working Principle	F: For leakage									
Sequence number	15: 15									
Nominal current	0.07: 0.07									
Output method	F: Composite signal									
Operating Voltage Mode	S: Single power supply									
Typical operating voltage	3.3: 3.3V									
Special code ¹⁾	XXX: Customer special requirement									

Notes: 1) The customer special requirement express as special code after evaluating by Hongfa.

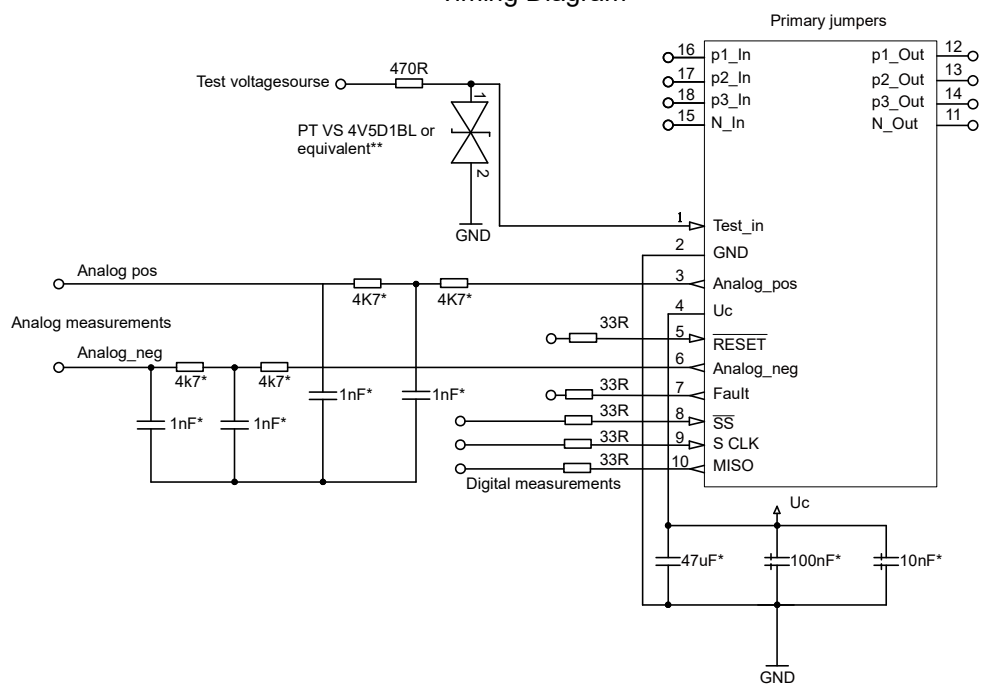
OUTLINE DIMENSIONS, TIMING DIAGRAM

Unit: mm

Outline Dimensions



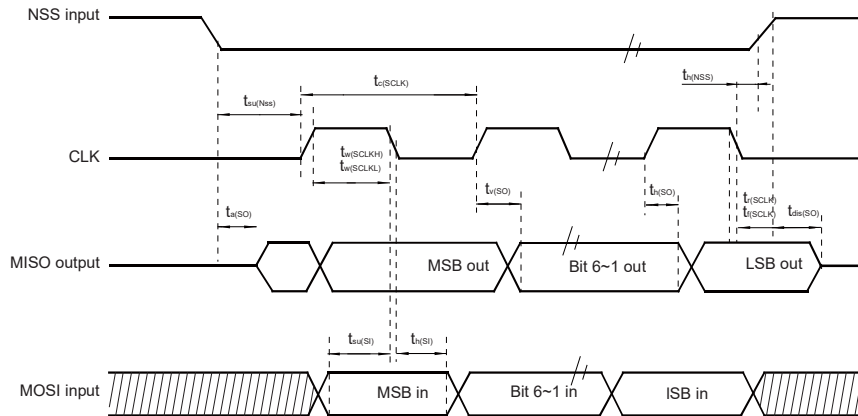
Timing Diagram



OUTLINE DIMENSIONS, TIMING DIAGRAM

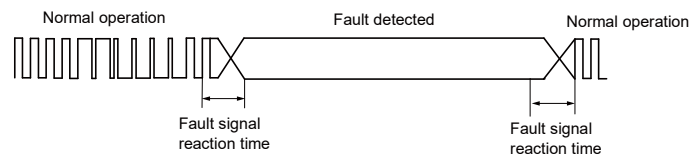
Unit: mm

SPI Communication



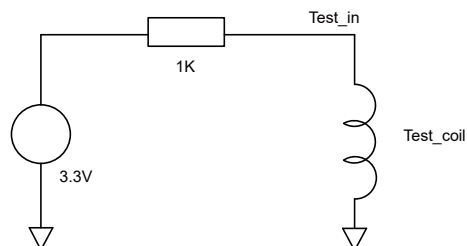
Fault-pin Signal

1. Dynamic diagnostic signal: when a fault is detected the signal remains in any steady state (can be a logic low (0) or high (1)).
2. Detected faults:
 - Over-current
 - Critical over-current
 - Internal hardware self-test



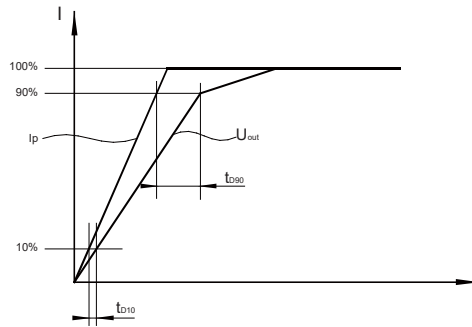
'Test in' PIN

1. The "Test in" pin is connected to a 10 turns coil inside the transducer : 1 mA injected to this pin will result in 10 mA measurement . This enables users to test the transducer.
2. Due to transformer effect a high impedance source is required to generate the test current.
3. Below an example of a 3.3 mA current generation in the test coil.
4. It is also required to connect a bidirectional protection device in order to protect the user PCBA against hazardous transient high pulse current through the primary jumper.
5. Standard Transient Voltage suppressor could accomplish this function (voltage rating to be defined based on specific user application but has to be > 4 V not to perturbate the transducer proper functioning).



Delay times

1. The delay time t_{D10} to 10 % and the delay time t_{D90} @ 90 % with respect to the primary are shown in the next figure.
2. Both slightly depend on the primary current di/dt .
3. They are measured at nominal current.
4. Note: t_{D10} (delay time to 10 %) and t_{D10} (delay time @ 90 %).



NOTES:

- 1) To avoid using current transformer under strong magnetic field, the external magnetic field will cause the accuracy of current transformer to change.
- 2) We could not evaluate all the performance and all the parameters for every possible application field and environment. Thus the user should be in a right position to choose the suitable produce for their own application. If there is any query, please contact HKG for the technical service. However, it is the use's responsibility to determine which product should be used only.
- 3) Operating temperature range in this specification refers to the maximum tolerable temperature range under specific load conditions.
- 4) To maintain the performances of current transformers, please do not make the current transformer drop or be shocked strongly.
- 5) All the performance data listed in the datasheet are the initial values tested under standard testing condition.
- 6) HKG reserves the right to change the product, the customer should confirm this specification before placing the order for the first time, may request us to provide the new specification if necessary.