

# *FCT* *Fast Current Transformer*

*Most sensitive & fastest current transformer*

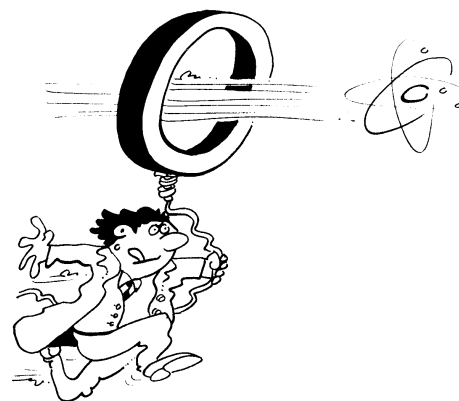
**Best non-destructive instrument to observe pulsed or CW beams  
Yet, not a precise measuring instrument**

Higher sensitivity than a Wall Current Monitor: 5 V/A  
Rise time down to 200ps

**In-flange.FCT** is mounted in the beam line. Short axial length, includes a ceramic gap vacuum-brazed on kovar. Does not require bellows, wall current bypass nor electromagnetic shield. UHV compatible.



Now bakeable to 185°C (365°F)



**In-air FCT installation**, over the vacuum chamber Requires installation of a “gap” to prevent the wall current from flowing through the FCT aperture. The gap can be a brazed ceramic ring or an organic material O-ring depending on the vacuum requirements. Typical installations include bellows, a wall current bypass and an electromagnetic shield covering the FCT completely.

### **Technology**

Composite\* magnetic cores of Cobalt-based amorphous and nanocrystalline alloys provide high permeability and very fast risetime.

Alloys are thermally and magnetically processed in-house, to obtain unequalled performance. Annealing techniques are the result of 20 years experience with cobalt-based alloy processing.

Proprietary multithread winding techniques and numerically analysed modelling to assure uniform field density in magnetic core.

\* Amorphous / nanocrystalline composite cores are made from two or more alloy composition batches. Alloy batches are individually annealed to give each of them specific characteristics. High-temperature annealing is performed under fixed or rotating magnetic field.

## In-flange.FCT dimensions

In-flange.FCT sensor order code	Pipe OD	Mating flange	ID (mm)
FCT-CF3"3/8-22.2-40-UHV	1"	DN/NW50CF	22.2
FCT-CF4"1/2-34.9-40-UHV	1.5"	DN/NW63CF	34.9
FCT-CF4"1/2-38.0-40-UHV	40	DN/NW63CF	38.0
FCT-CF6"-47.7-40-UHV	2"	DN/NW100CF	47.7
FCT-CF6"-60.4-40-UHV	2.5"	DN/NW100CF	60.4
FCT-CF6"3/4-96.0-40-UHV or, FCT-CF8"-96.0-40-UHV	4"	DN/NW130CF DN160/NW150CF	96.0
FCT-CF10"-147.6-40-UHV	6"	DN/NW200CF	147.6
FCT-CF12"-198.4-40-UHV	8"	DN/NW250CF	198.4
		Axial length H	40.0

## Specifications

### Wideband models (standard)

Technology: Predominantly amorphous

Sensitivity (nominal)	0.5	1.25	2.5	5.0	10	20	V/A
Turns ratio (old reference)	50:1	20:1	10:1	05:1	N/A	N/A	Units
Rise time (typ.)	300	200	300	390	440	440	ps
Droop	<3	<6	<10	<20	<20	<20	%/μs
Upper cutoff frequency -3dB typ.	1.17	1.75	1.17	0.9	0.8	0.8	GHz
Lower cutoff frequency -3dB	<4.8	<9.5	<16	<32	<32	<32	kHz
L/R time constant (min.)	35	17	10	5	5	5	μs
Max. charge/pulse (pulses <1ns)	1	0.4	0.2	0.1	0.1	0.1	μC
Max. peak current (pulses >1ns)	2	0.4	0.2	0.1	0.1	0.1	kA
Max. rms current ( $f > 10$ kHz)	14	5.6	2.8	1.4	1.4	1.4	A

### Low droop (-LD) models on option

Technology: Predominantly nanocrystalline

Sensitivity (nominal)	0.5	1.25	2.5	5.0	10	20	V/A
Turns ratio (old reference)	50:1	20:1	10:1	05:1	N/A	N/A	Units
Rise time (typ.)	540	400	500	780	780	780	ps
Droop	<0.2	<1	<3	<8	<8	<8	%/μs
Upper cutoff frequency -3dB typ.	650	850	700	450	450	450	MHz
Lower cutoff frequency -3dB	<0.32	<1.6	<5	<13	<13	<13	kHz
L/R time constant (min.)	500	100	30	12	12	12	μs
Max. charge/pulse (pulses <1ns)	1	0.4	0.2	0.1	0.1	0.1	μC
Max. peak current (pulses >1ns)	2	0.4	0.2	0.1	0.1	0.1	kA
Max. rms current ( $f > 10$ kHz)	25	10	5	2.5	2.5	2.5	A

## Options

-LD	Low droop
-316LN	AISI 316LN instead of 304
-ARB#xx	Arbitrary shape aperture
-BK150C	150°C (300°F) bakeable, In-flange only
-BK185C	185°C (365°F) bakeable, In-flange only
-VAC	Deagassed in-air sensor
-MSH	Magnetic shield for in-air sensor
-H	Radiation tolerant sensor

## FCT in-air dimensions

FCT Order codes * (XX = V/A)	ID (min)	OD (max)	H (max)
FCT-016-xx	16	42	
FCT-028-xx	28	64	
FCT-055-xx	55	91	
FCT-082-xx	82	118	
FCT-122-xx	122	156	
FCT-178-xx	178	226	
FCT-XXX-5.0 V/A and above			35
FCT-XXX-2.5 V/A and lower			22

## Connector

SMA jack 50Ω

## Environment

Temperature

In-air models: 100°C (212°F) any time

In-flange models: 100°C (212°F) any time

On option: 150°C (300°F)

185°C (365°F)

Core saturation 2 mT radial field

2A permanent dc current

Radiation damage

Standard SMA PTFE: 1E3 Gray max

Rad-tolerant Kapton on option

6E7 Gray max

1E17 n/cm2 max

## Distributors

**U.S.A.** GMW Associates [www.gmw.com](http://www.gmw.com)

955 Industrial Rd.

San Carlos, CA 94070, U.S.A.

Tel.: (650) 802-8292 [sales@gmw.com](mailto:sales@gmw.com)

**Japan** REPIC Corporation [www.repic.co.jp](http://www.repic.co.jp)

28-3 Kita Otsuka 1-Chome

Toshima-ku, Tokyo 170-0004, Japan

Tel.: 03-3918-5326 [sales@repic.co.jp](mailto:sales@repic.co.jp)

## Manufacturer

BERGOZ Instrumentation [www.bergoz.com](http://www.bergoz.com)

Espace Allondon Ouest

01630 Saint Genis Pouilly, France

Tel. +33-450.426.642 [sales@bergoz.com](mailto:sales@bergoz.com)



Instrumentation