



Optimized for low bunch charge >50fC  
Optimized for low beam current >0.5μA

≈ 10 fC noise for single bunch measurements  
≈ 0.1 μArms total wideband noise for average current measurements

80dB dynamic range without range switching  
Resolution 1% / accuracy 4% of measured value  
DC Output voltage for single pulse charge measurements

5 MHz bandwidth for average current measurements  
Logarithmically proportional to input current or charge  
USB controls and digital readout up to 1 kS/s  
UHV compatible down to 10<sup>-10</sup> mbar

## Operating principle

The Turbo-ICT is equipped with a narrow band-pass filter at its output. Single pulse induce a short resonance whose amplitude is proportional to the pulse charge. CW beam induce a continuous resonance whose amplitude is proportional to average beam current.

The narrow-band transmission improves immunity against noise.

The BCM-RF-E uses a logarithmic amplifier for detection of resonance envelope. It allows two modes of operation:

- Sample&Hold mode for single bunch.
- Track-Continuous mode for CW beam and long macropulses.

Turbo-ICT can be made with 2 cores adjacent or superposed in a single In-flange package to achieve higher sensitivity.

Turbo-ICT amplifier and RF modulator are powered by the BCM-RF-E via the coaxial transmission cable to avoid ground loops.

## Two modes of operation

### Single bunch charge measurement

- For sub-nanosecond bunches
- Typical measurement range 50 fC – 300 pC\*
- Noise in single bunch measurement 10 fCrms or 1% of the single bunch charge
- Output DC voltage held until next bunch or 100 ms maximum
- Maximum bunch repetition rate 1 MHz

\*Measurement range can be adapted for higher charges

### CW and macropulse average current measurement

- Typical measurement range 2.5 μA – 3 mA\*\*
- RF from 75 MHz to 500 MHz
- Output bandwidth >5 MHz
- Total noise ~0.5 μArms over 5 MHz

\*\*Measurement range can be adapted for higher currents

## MANUFACTURER

**BERGOZ Instrumentation**  
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## DISTRIBUTORS

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**China:** Beijing Conveyi Limited  
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## Specifications

Beam type	Single bunch	CW beam and macropulses
BCM-RF-E set to	Sample&Hold Mode	Track-Continuous mode
Typical measurement range	50 fC – 300 pC	2.5 $\mu$ A – 3 mA
Bunch repetition frequency	Single bunch < 1 MHz	75 MHz – 500 MHz
<b>Output specifications</b>		
Voltage	0 - +5 V Log of bunch charge	0 - +5 V Log of bunch current
Reaction time	500 ns	$\leq$ 70 ns
Noise	10 fC or 1% of bunch charge	0.5 $\mu$ Arms or 0.3% of beam current
Non-linearity	$\sim$ 2%	$\sim$ 2%

All values are typical performance  
For special application, please contact us

## Order codes

### In-flange Turbo-ICT dimensions

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

### In-vacuum Turbo-ICT dimensions

In-vacuum Turbo-ICT sensor order code	Outer dimensions (mm x mm)	ID (mm)
Turbo-ICT-VAC-055	175 x 126	55
Turbo-ICT-VAC-082	203 x 154	82
	Axial length (mm)	22

### BCM-RF-E electronics

BCM-RF-E: Eurocard format 100 x 160 mm, 20 mm wide to be plugged into BCM-RFC chassis station  
May be mixed with BCM-IHR-E in same chassis

### BCM-RFC chassis

BCM-RFC/xx: 19"x3U RF-shielded chassis with xx wired stations (max. 10)  
AC mains 90-125 Vac or 220-245 Vac, switch selectable 50/60 Hz

## Options

- Turbo 2      2 cores option for noise reduction down to 10 fCrms on single bunch charge measurement
- CAL-FO      Calibrated fixed charge generator  
Triggered by Fiber Optic signal  
Mates with 1 mm core plastic fiber  
Optical generator and fiber not provided
- H              Improved radiation tolerance
- 316LN        AISI 316LN instead of AISI 304 stainless steel
- ARBxxx      Arbitrary aperture shape



**Turbo-ICT** is mounted directly on the beam line  
UHV compatible to  $10^{-10}$  mbar  
Ceramic gap vacuum-brazed over Kovar transitions  
Material AISI-304



**Turbo-ICT-VAC** is installed in a laser-plasma vacuum enclosure  
Vacuum compatible to  $10^{-7}$  mbar  
Calibrated charge generator option not available

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